KEPUTUSAN DEKAN FAKULTAS TEKNOLOGI INFORMASI
UNIVERSITAS BUDI LUHUR

NOMOR : K/UBL/FTI/000/004/09/22

TENTANG:
PENUGASAN KEGIATAN TRI DHARMA & PENUNJANG BAGI DOSEN
FAKULTAS TEKNOLOGI INFORMASI UNIVERSITAS BUDI LUHUR
SEMESTER GASAL TAHUN AKADEMIK 2022/2023

DEKAN FAKULTAS TEKNOLOGI INFORMASI UNIVERSITAS BUDI LUHUR

Menimbang : 1) Bahwa Dosen adalah pendidik profesional dan ilmu dengan tugas utama mentrans-formasikan, mengembangkan, dan menyebarluaskan ilmu pengetahuan, teknologi, dan seni melalui pendidikan/pengajaran penelitian & karya ilmiah, dan Pengabdian pada masyarakat yang dikenal dengan istilah Tri Dharma Perguruan Tinggi;

2) Bahwa untuk meningkatkan profesionalitas dan kompetensi sebagai pendidik profesional maka dipandang perlu untuk memberikan tugas-tugas tambahan/penunjang dalam lingkup kegiatan penunjang Tri Dharma;

Mengingat : 1) Undang – undang Republik Indonesia Nomor 12 Tahun 2012 tentang Pendidikan Tinggi;

2) Peraturan Pemerintah Republik Indonesia Nomor 17 Tahun 2010 tentang Pengelolaan dan Penyelenggaraan Pendidikan;

3) Peraturan Menteri Riset, Teknologi, dan Pendidikan Tinggi Republik Indonesia Nomor 44 Tahun 2015 tentang Standar Nasional Pendidikan Tinggi;

4) Peraturan Menteri Riset, Teknologi dan Pendidikan Tinggi Republik Indonesia Nomor 15 Tahun 2017 tentang Penamaan Program Studi Pada Perguruan Tinggi;

5) Akta Yayasan Pendidikan Budi Luhur Tanggal 23 Desember 1991;

6) Peraturan Pengurus Yayasan Pendidikan Budi Luhur Cakti Nomor: K/YBLC/KEP/000/389/08/17 tanggal 24 Agustus 2017 tentang Statuta Universitas Budi Luhur;

M E M U T U S K A N

Menetapkan :

PERTAMA : Menugaskan dosen-dosen Fakultas Teknologi Informasi Universitas Budi Luhur untuk melaksanakan kegiatan **Tri Dharma Perguruan Tinggi dan penunjangnya** pada Semester Gasal Tahun Akademik 2022/2023 yang meliputi:

    a. **Kegiatan partisipasi aktif** dalam Pertemuan Ilmiah sebagai Ketua/Anggota/Peserta/Pembicara/Penulis/Narasumber pada kegiatan Seminar, Workshop, Konferensi, Pelatihan, Simposium, Lokakarya, Forum Diskusi, Sarasehan dan sejenisnya;

    b. **Publikasi Ilmiah** pada Prosiding, Jurnal/majalah/surat kabar dan sejenisnya;

    c. **Partisipasi dalam organisasi** profesi, organisasi keilmuan dan/atau organisasi lain yang menunjang kegiatan Tri Dharma Pendidikan Tinggi;

d. **Pengabdian Kepada Masyarakat (PPM)**, dalam kegiatan terprogram, terjadwal atau insidental;

KEDUA : Dosen-dosen yang melaksanakan penugasan wajib membuat Laporan Kegiatan, dengan mengikuti pedoman dari Fakultas/Program Studi, sebagai pertanggungjawaban atas kegiatan yang diikuti;

KETIGA : Kegiatan Tri Dharma yang tidak termasuk dalam surat keputusan ini akan memiliki penugasan tersendiri;

KEEMPAT : Keputusan ini berlaku sejak tanggal ditetapkan dan akan diubah sebagaimana mestinya apabila di kemudian hari terdapat kekeliruan.

Ditetapkan di : Jakarta
Pada Tanggal : 1 September 2022
==========================
Dekan Fakultas Teknologi Informasi

Dr. Ir. Deni Mahdiana, S.Kom., M.M., M.Kom

**LAMPIRAN KEPUTUSAN DEKAN FAKULTAS TEKNOLOGI INFORMASI
UNIVERSITAS BUDI LUHUR**

NOMOR : K/UBL/FTI/000/004/09/22

**TENTANG:
PENUGASAN KEGIATAN TRI DHARMA & PENUNJANG BAGI DOSEN
FAKULTAS TEKNOLOGI INFORMASI UNIVERSITAS BUDI LUHUR
SEMESTER GASAL TAHUN AKADEMIK 2022/2023**

NO	NIDN	NAMA DOSEN	PROGRAM STUDI
1	0305068201	ACHMAD SOLICHIN	Ilmu Komputer
2	0312127303	ANTON SATRIA PRABUWONO	Ilmu Komputer
3	0311127802	ARIF BRAMANTORO	Ilmu Komputer
4	0319097803	DARMAWAN BAGINDA NAPITUPULU	Ilmu Komputer
5	0324127901	DENNI KURNIAWAN	Ilmu Komputer
6	0324028005	DWI PEBRIANTI	Ilmu Komputer
7	0318068702	INDRA NUGRAHA ABDULLAH	Ilmu Komputer
8	0325117805	LUHUR BAYUAJI	Ilmu Komputer
9	8833923420	MOEDJIONO	Ilmu Komputer
10	0316097401	MOHAMMAD SYAFRULLAH	Ilmu Komputer
11	0314126304	MUHAMAD SADLY	Ilmu Komputer
12	0303097901	RUSDAH	Ilmu Komputer
13	0412017103	SAMIDI	Ilmu Komputer
14	0326086304	SETYAWAN WIDYARTO	Ilmu Komputer
15	0306067506	SOFIAN LUSA	Ilmu Komputer
16	0318016801	YAN RIYANTO	Ilmu Komputer
17	0324107203	ABDUL MUIS SOBRI	Teknik Informatika
18	0302068001	ACHMAD ADITYA AU	Teknik Informatika
19	0305118901	ACHMAD ARDIANSYAH	Teknik Informatika
20	0320038303	AGUNG SAPUTRA	Teknik Informatika
21	0304039102	AHMAD PUDOLI	Teknik Informatika
22	0315018603	ALEXANDER J.P. SIBARANI	Teknik Informatika
23	0301098202	ANDRI SUNANDAR	Teknik Informatika
24	8848870018	ANDY RIO HANDOKO	Teknik Informatika
25	0314038803	ANGGA KUSUMA NUGRAHA	Teknik Informatika
26	0303129401	ANWAR RIFA'I	Teknik Informatika

27	0328079201	AQMAL MAULANA	Teknik Informatika
28	0330087506	ARMAN YUSUF	Teknik Informatika
29	0301027501	ARSANTO NARENDRO	Teknik Informatika
30	0301048101	BASUKI HARI PRASETYO	Teknik Informatika
31	0318068503	CHANDRA JATNIKA	Teknik Informatika
32	0311098901	DOLLY VIRGIAN SHAKA YUDHA SAKTI	Teknik Informatika
33	0328028503	DWI PUSPITA ANGGRAENI	Teknik Informatika
34	0315058201	FERNANDO SITINDAON	Teknik Informatika
35	0305026801	GUNAWAN PRIA UTAMA	Teknik Informatika
36	0308048501	HADIDTYO WISNU WARDANI	Teknik Informatika
37	0306058502	HARIS MUNANDAR	Teknik Informatika
38	0320038704	HILLMAN AKHYAR DAMANIK	Teknik Informatika
39	0302018604	IKA SUSANTI	Teknik Informatika
40	0317069301	IKHSAN RAHDIANA	Teknik Informatika
41	0309069301	IMAN PERMANA	Teknik Informatika
42	0005017601	IMELDA	Teknik Informatika
43	0322038603	INDRA	Teknik Informatika
44	0322118705	INDRA HERTANTO	Teknik Informatika
45	0325128504	IWAN SAPUTRA	Teknik Informatika
46	0305076701	KRISNA ADIYARTA	Teknik Informatika
47	0327118903	KUS ANDRIADI	Teknik Informatika
48	0328017702	LESTARI MARGATAMA	Teknik Informatika
49	0308128901	MEPA KURNIASIH	Teknik Informatika
50	0330127502	MERRY ANGGRAENI	Teknik Informatika
51	0321117001	MOHAMMAD ANIF	Teknik Informatika
52	0329067903	MUFTI	Teknik Informatika
53	0329068201	MUHAMMAD AINUR RONY	Teknik Informatika
54	0305126805	NANO PRAMONO SOERYONEGORO	Teknik Informatika
55	0312128002	NURUL JAMAL	Teknik Informatika
56	0322028201	PIPIN FARIDA ARIYANI	Teknik Informatika
57	0319087801	PURWANTO	Teknik Informatika

58	0308029102	PUTRI HAYATI	Teknik Informatika
59	0330108801	RAHMAT OKTAVIAN	Teknik Informatika
60	0317068301	REVA RAGAM SANTIKA	Teknik Informatika
61	0328036602	RIRIT ROESWIDIAH	Teknik Informatika
62	0313048901	RISKIANA WULAN	Teknik Informatika
63	0327068604	RIZKA TIAHARYADINI	Teknik Informatika
64	0311068001	RIZKY TAHARA SHITA	Teknik Informatika
65	0322027501	SAFRINA AMINI	Teknik Informatika
66	0305068203	SEJATI WALUYO	Teknik Informatika
67	0330016701	SISWANTO	Teknik Informatika
68	0312067402	SUBANDI	Teknik Informatika
69	0314097004	SUBANDI	Teknik Informatika
70	0302106002	SUDARMADI	Teknik Informatika
71	0305068605	SYAMSUDIN ZUBAIR	Teknik Informatika
72	0315117302	UTOMO BUDIYANTO	Teknik Informatika
73	0323108902	WILLIAM FRADO PATTIPEILOHY	Teknik Informatika
74	0317048601	WINDARTO	Teknik Informatika
75	0322058003	WINDHY WIDHYANTY	Teknik Informatika
76	0213068501	YUDI WIHARTO	Teknik Informatika
77	0320069003	ZAQI KURNIAWAN	Teknik Informatika
78	0318017504	ACEP MARDIYANA	Teknik Informatika
79	0312096401	ADY WIDJAJA	Sistem Informasi
80	0322018502	AGNES ARYASANTI	Sistem Informasi
81	0315065602	AGUNG PRIHARTONO	Sistem Informasi
82	0309088302	AGUS UMAR HAMDANI	Sistem Informasi
83	0316068301	ANITA DIANA	Sistem Informasi
84	0316079202	ANUGRAH BAGUS SUSILO	Sistem Informasi
85	0007097901	ARIEF WIBOWO	Sistem Informasi
86	0319097906	ASEP ABDUL ROHMAN	Sistem Informasi
87	0312017102	BAGUS TRI PRABAWA	Sistem Informasi
88	0319027202	BRURI TRYA SARTANA	Sistem Informasi

89	0323126401	BULLION DRAGON ANDAH L	Sistem Informasi
90	0325067402	CHANDRA SUNJAYA	Sistem Informasi
91	0311118201	COUDRY BERNADETH	Sistem Informasi
92	0328127303	DENI MAHDIANA	Sistem Informasi
93	0303129201	DEVIT SETIONO	Sistem Informasi
94	0310128401	DEWI KUSUMANINGSIH	Sistem Informasi
95	0322018301	DIAN ANUBHAKTI	Sistem Informasi
96	0305036302	DJATI KUSDIARTO	Sistem Informasi
97	0321117301	FX BIMA CAHYA PUTRA	Sistem Informasi
98	0306027701	GANDUNG TRIYONO	Sistem Informasi
99	0324096902	GOENAWAN BROTOSAPUTRO	Sistem Informasi
100	0325058101	Hendri Irawan	Sistem Informasi
101	9903260690	HESTYA PATRIE	Sistem Informasi
102	0308087105	HIMAWAN SETIADI	Sistem Informasi
103	0312078106	HIRTY PANCA SARI	Sistem Informasi
104	0303048001	HUMISAR HASUGIAN	Sistem Informasi
105	0314049302	INDAH PUSPASARI HANDAYANI	Sistem Informasi
106	0303118201	ITA NOVITA	Sistem Informasi
107	0312069205	JEREMY JONATHAN	Sistem Informasi
108	0303067601	JOKO SUTRISNO	Sistem Informasi
109	0307079301	JULAIHA PROBO ANGGRAINI	Sistem Informasi
110	0319059103	KUKUH HARSANTO	Sistem Informasi
111	0317057603	LIHIN	Sistem Informasi
112	0422036901	MARDI HARDJIANTO	Sistem Informasi
113	0307038703	MARINI	Sistem Informasi
114	0328116903	MAYANTI	Sistem Informasi
115	0311038203	MOTIKA DIAN ANGGRAENI	Sistem Informasi
116	0324078202	MUHAMAD FITRA SYAWALL	Sistem Informasi
117	0317077905	NAWINDAH	Sistem Informasi
118	0318077601	NIDYA KUSUMAWARDHANY	Sistem Informasi
119	0315028502	NOFIYANI	Sistem Informasi

120	0305078002	NONI JULIASARI	Sistem Informasi
121	0302077805	NURMANSYAH	Sistem Informasi
122	0315057803	NURWATI	Sistem Informasi
123	0302057901	PAINEM	Sistem Informasi
124	0315069301	RATNA KUSUMAWARDANI	Sistem Informasi
125	0305128107	RATNA UJIAN DARI	Sistem Informasi
126	0324038006	RETNO WULANDARI	Sistem Informasi
127	0326039202	RIZA ALAMSYAH	Sistem Informasi
128	0324118802	RIZKY PRADANA	Sistem Informasi
129	0317098201	SAFITRI JUANITA	Sistem Informasi
130	0329098202	SAMSINAR	Sistem Informasi
131	0309097401	SRI MULYATI	Sistem Informasi
132	0407127201	TEJA ENDRA ENG TJU	Sistem Informasi
133	0320127901	TITIN FATIMAH	Sistem Informasi
134	0317018702	TRI IKA JAYA KUSUMAWATI	Sistem Informasi
135	0320096102	WENDI USINO	Sistem Informasi
136	0326047001	WIWIN WINDIHASTUTY	Sistem Informasi
137	0325098802	WULANDARI	Sistem Informasi
138	0316068702	YESI PUSPITA DEWI	Sistem Informasi
139	0316017201	YUDI SANTOSO	Sistem Informasi
140	0325078803	YULIANAWATI	Sistem Informasi
141	0329077501	YULIAZMI	Sistem Informasi
142	0004105902	DWI ACHADIANI	Sistem Informasi
143	0411076603	GATOT PURWANTO	Sistem Komputer
144	0314056902	HARI SOETANTO	Sistem Komputer
145	0305027401	IRAWAN	Sistem Komputer
146	0302046501	JAN EVERHARD RIWUROHI	Sistem Komputer
147	0311118107	RIRI IRAWATI	Sistem Komputer
148	0317025801	TATANG WIRAWAN WISNUADJI	Sistem Komputer
149	0331057703	YANI PRABOWO	Sistem Komputer
150	0315038601	ARI SAPUTRO	Sistem Komputer

151	0320048401	ATIK ARIESTA	Manajemen Informatika
152	0330118001	DYAH RETNO UTARI	Manajemen Informatika
153	0324118302	JOKO CHRISTIAN CHANDRA	Manajemen Informatika
154	0301108606	MUHAMAD SALMAN ALFARISI	Manajemen Informatika
155	0307038501	WAHYU PRAMUSINTO	Manajemen Informatika
156	0323088401	FERDIANSYAH	Manajemen Informatika
157	0319047501	GRACE GATA	Komputerisasi Akuntansi
158	0317058106	LIS SURYADI	Komputerisasi Akuntansi
159	0303027601	SOVAN DIANARTO	Komputerisasi Akuntansi

Ditetapkan di   : Jakarta
Pada Tanggal   : 1 September 2022
==========================
Dekan Fakultas Teknologi Informasi

Dr. Ir. Deni Mahdiana, S.Kom., M.M., M.Kom

11th
IEEE COMNETSAT
2022

PROCEEDING
IEEE COMNETSAT
2022

IEEE International Conference on
Communications, Network,
and Satellite.

Solo, Indonesia
November 3-5, 2022

ISBN : 978-1-6654-6030-9

Institut Teknologi Telkom Purwokerto

IEEE ComSoc
IEEE Communications Society

IEEE INDONESIA SECTION

AESS
Indonesia Section
IEEE AESS / GRSS Chapter

GRSS

Co-Host : USM

Patron : Anritsu
envision : ensure

Copyright and Reprint Permission

Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For reprint or republication permission, email to IEEE Copyrights Manager at pubspermissions@ieee.org.

Additional copies of this proceeding may be ordered to:
Institut Teknologi Telkom Purwokerto
Central Java, Indonesia 53147

Welcome Message from General Chair

The 11th Comnetsat 2022

(Thursday – Saturday), 03th – 05th November 2022

On behalf of the Organizing Committee, I am very delighted to welcome you all keynote speakers, presenters, and participants to the 11th 2022 IEEE International Conference on Communications, Network, and Satellite (IEEE Comnetsat 2022). IEEE Comnetsat is an annual conference of the IEEE Communications Society (ComSoc) Indonesia Chapter, the IEEE Indonesia Section, and the IEEE AESS/GRSS Indonesia Joint Chapter. This year, IEEE Comnetsat 2022 is organized by Institut Teknologi Telkom Purwokerto (ITTP) and Universitas Semarang (USM).

IEEE Indonesia Section has conducted many activities over 30 years in Indonesia. Regarding collaboration, the IEEE Indonesia section has a good and mutual relationship with ICT organizations, Industries, Governments, Universities, and the Community in Indonesia. We hope other high-quality conferences will be continued and strengthened so that the result will benefit and positively impact human beings, especially Indonesian people.

The core purpose of IEEE is to foster technological innovation and excellence for the benefit of humanity. Here, researchers, scientists, students, and practitioners come together to participate and present their latest research findings, developments, and applications related to the various aspects of the current state of technology and the outcome of ongoing research in the area of Communications, Networks, and Satellite Systems.

Despite the challenges, the IEEE Comnetsat 2022 Organizing Committee and volunteers worked very hard to complete the conference program, uphold the quality of conferences, and meet authors' expectations. IEEE Comnetsat 2022 aims to address the current state of technology and the outcome of ongoing research in the application of computer and communication, networks, satellite systems, broadband photonic systems, data science, and artificial intelligence.

Last but not least, I would also like to express sincere and special thanks to the IEEE Communications Society (ComSoc) Indonesia Chapter, the IEEE Indonesia Section, and the IEEE AESS/GRSS Indonesia Joint Chapter, which have shown great support to this event.

I hope you will benefit from this conference and enjoy networking with colleagues from across the globe for future collaboration globally. Your support will also make this a memorable and successful event.

Wishing you all to join us to make IEEE Comnetsat 2022 a successful and safe event. Thank you.

Sincerely,

Dr. Arfianto Fahmi, S.T., M.T.

General Chair

COMMITTEES

Advisory Board:

Dr-Ing Wahyudi Hasbi, M.Kom

Prof. Dr. Ir. Gamantyo Hendrantoro, Ph.D.

Dr. Ign. Wiseto P. Agung

Dr. Arifin Nugroho

Dr. Muhammad Ary Murti, M.T

Arief Hamdani Gunawan, SMIEEE

Dr. Bambang Setia Nugraha

General Chair :
Dr. Arfianto Fahmi, M.T

General Co-chair:

Dr. Anggun Fitrian Isnawati, M.Eng

Technical Program Committee (TPC)

Chair:

Dr. Wahyu Pamungkas, M. T

Co-Chair:

Dr. Tenia Wahyuningrum, M.T

Eko Fajar Cahyadi, S.T., M.T., Ph.D.

Technical Program Committee (TPC) Member:

Prof. Abdallah Makhoul (University of Franche-Comté, France)

Prof.   Abdelmadjid Bouabdallah (Universite de Technologie – Compiegne, France)

Prof.   Adão Silva (Instituto de Telecomunicações (IT)/University of Aveiro, Portugal)

Prof. Ahmed Mehaoua (University of Paris Descartes, France)

Prof.   Alvaro Suárez-Sarmiento (University of Las Palmas de Gran Canaria, Spain)

Prof. António Rodrigues (IT / Instituto Superior Técnico, Portugal)

Prof. Arnaldo Oliveira (Universidade de Aveiro – DETI / Instituto de Telecomunicações – Aveiro, Portugal)

Prof. Aws Yonis (Ninevah University, Iraq)

Prof. Bang Chul Jung (Chungnam National University, Korea (South))

Prof. Bernd Wolfinger (University of Hamburg, Germany)

Prof. Bong Jun Choi (Soongsil University, Korea (South))

Prof. Carl Debono (University of Malta, Malta)

Prof. Carla Raffaelli (University of Bologna, Italy)

Prof. Carlos Becker Westphall (Federal University of Santa Catarina, Brazil)

Prof. Chao Fang (Beijing University of Technology, China)

Prof. Chao Shen (Xi'an Jiaotong University, China)

Prof. Chao-Tsun Chang (Hsiuping University of Science & Technology, Taiwan)

Prof. Chia-Ho Ou (National Pingtung University, Taiwan)

Prof. Demosthenes Vouyioukas (University of the Aegean, Greece)

Prof. Dennis Pfisterer (University of Luebeck, Germany)

Prof. Ding Wang (Nankai University, China)

Prof. Domenico Ciuonzo (University of Naples Federico II, IT, Italy)

Prof. Dushantha Nalin K. Jayakody (Tomsk Polytechnic University, Russia)

Prof. Eduard Babulak (Liberty University, USA)

Prof. Eirini Eleni Tsiropoulou (University of New Mexico, USA)

Prof. Eisuke Kudoh (Tohoku Institute of Technology, Japan)

Prof. Eric Renault (LIGM, Université Gustave Eiffel, CNRS, ESIEE Paris, France)

Prof. Fang Yang (Tsinghua University, China)

Prof. Fernando Velez (University of Beira Interior, Portugal)

Prof. Francesco Palmieri (Università di Salerno, Italy)

Prof. Fuhui Zhou (Nanjing University of Aeronautics and Astronautics, China)

Prof. Gamantyo Hendrantoro (Institut Teknologi Sepuluh Nopember, Indonesia)

Prof. Guy Pujolle (Sorbonne University, France)

Prof. Gyu Myoung Lee (Liverpool John Moores University, United Kingdom (Great Britain))

Prof. Hacene Fouchal (Université de Reims Champagne-Ardenne, France)

Prof. Hans-Juergen Zepernick (Blekinge Institute of Technology, Sweden)

Prof. Harald Øverby (Norwegian University of Science and Technology, Norway)

Prof. Harry Skianis (University of the Aegean, Greece)

Prof. Homayoun Nikookar (Netherlands Defence Academy, The Netherlands)

Prof. Iickho Song (Korea Advanced Institute of Science and Technology, Korea (South))

Prof. Ikmo Park (Ajou University, Korea (South))

Prof. Ioannis Moscholios (University of Peloponnese, Greece)

Prof. Jae-Hyun Park (Chung-Ang University, Korea (South))

Prof. Jenhui Chen (Chang Gung University, Taiwan)

Prof. Jiann-Liang Chen (National Taiwan University of Science and Technology, Taiwan)

Prof. Ji-Hoon Yun (Seoul National University of Science and Technology, Korea (South))

Prof. João Rebola (Instituto de Telecomunicações Lisbon, Portugal)

Prof. Joel Rodrigues (Federal University of Piauí (UFPI), Brazil)

Prof. Johann Marquez-Barja (University of Antwerpen & imec, Belgium)

Prof. Joongheon Kim (Korea University, Korea (South))

Prof. Jorge Sá Silva (University of Coimbra, Portugal)

Prof. Junping Geng (Shanghai Jiaotong University, China)

Prof. Kasturi Vasudevan (Indian Institute of Technology Kanpur, India)

Prof. Kazuo Mori (Mie University, Japan)

Prof. Klaus David (University of Kassel, Germany)

Prof. Knud Skouby (Aalborg University, Denmark)

Prof. Koichi Maru (Kagawa University, Japan)

Prof. Konstantin Mikhaylov (University of Oulu, Finland)

Prof. Kuo-Chang Ting (Minghsin University of Science and Technology, Hsinchu, Taiwan)

Prof. Lahcène Mitiche (University of Djelfa, Algeria)

Prof. Li Xu (Chinese Academy of Sciences, China)

Prof. Li Xu (Fujian Normal University, China)

Prof. Liudong Xing (University of Massachusetts, Dartmouth, USA)

Prof. Ljiljana Trajković (Simon Fraser University, Canada)

Prof. Lorenzo Vangelista (University of Padova, Italy)

Prof. Lu Lu (University of Chinese Academy of Sciences, Hong Kong)

Prof. Lyes Khoukhi (ENSICAEN, Normandie University, GREYC CNRS Lab., France)

Prof. Mamoun Alazab (Charles Darwin University, Australia)

Prof. Manoj Bs (Indian Institute of Space Science and Technology, India)

Prof. Marcelo Alencar (Federal University of Campina Grande, Brazil)

Prof. Marco Listanti (University of Rome "La Sapienza", Italy)

Prof. Mario Tanda (Università di Napoli Federico II, Italy)

Prof. Mariusz Glabowski (Poznan University of Technology, Poland)

Prof. Michele Ruta (Politecnico di Bari, Italy)

Prof. Miguel Franklin de Castro (Federal University of Ceará, Brazil)

Prof. Miodrag Potkonjak (UCLA, USA)

Prof. Mitchai Chongcheawchamnan (Prince of Songkla University, Thailand)

Prof. Mohamad Yusoff Alias (Multimedia University, Malaysia)

Prof. Mohamed Mosbah (CNRS-LaBRI UMR 5800, University Bordeaux, Bordeaux-INP, France)

Prof. Mohammad Matin (North South University, Bangladesh)

Prof. Nabanita Das (Indian Statistical Institute, India)

Prof. Nhu-Ngoc Dao (Sejong University, Korea (South))

Prof. Nuno Pombo (University of Beira Interior, Portugal)

Prof. Pascal Lorenz (University of Haute Alsace, France)

Prof. Paulo de Lira Gondim (Universidade de Brasilia, Brazil)

Prof. Paulo Monteiro (Universidade de Aveiro, Portugal)

Prof. Paulo Pinto (Universidade Nova de Lisboa, Portugal)

Prof. Petra Perner (IBaI Leipzig, Germany)

Prof. Pravati Swain (National Institute of Technology, Goa, India)

Prof. Rafael Caldeirinha (Polytechnic Institute of Leiria, Portugal)

Prof. Richard Lin (National Sun Yat-sen University, Taiwan)

Prof. Ridha Hamila (Qatar University, Qatar)

Prof. Robert Schober (University of British Columbia, Canada)

Prof. Roberto Garello (Politecnico di Torino, Italy)

Prof. Rogerio Dionisio (Instituto Politecnico de Castelo Branco, Portugal)

Prof. Rosaura Palma-Orozco (Instituto Politécnico Nacional, Mexico)

Prof. Sabrina Sicari (University of Insubria, Italy)

Prof. Salahuddin Mohammad Masum (Southwest Tennessee Community College, USA)

Prof. Satoshi Takahashi (Hiroshima City University, Japan)

Prof. Seiji Fukushima (Kagoshima University, Japan)

Prof. Shashikant Patil (SVKMs NMiMS Mumbai India, India)

Prof. Simon Pietro Romano (University of Napoli Federico II, Italy)

Prof. Takuya Asaka (Tokyo Metropolitan University, Japan)

Prof. Telmo Fernandes (IPLeiria / Institute of Telecommunications, Portugal)

Prof. Theo Swart (University of Johannesburg, South Africa)

Prof. Vicente Casares-Giner (Universitat Politècnica de València, Spain)

Prof. William Lehr (Massachusetts Institute of Technology, USA)

Prof. Xiaochuan Sun (NCST, China)

Prof. Yi Shang (University of Missouri, USA)

Prof. Yi-Han Chiang (Osaka Prefecture University, Japan)

Prof. Yiu-Wing Leung (Hong Kong Baptist University, Hong Kong)

Prof. Yoon-Ho Choi (Pusan National University, Korea (South))

Prof. You-Chiun Wang (National Sun Yat-Sen University, Taiwan)

Prof. Yousaf Bin Zikria (Yeungnam University, Korea (South))

Prof. Zalan Heszberger (Budapest University of Technology and Ec., Hungary)

Dr. Aashish Mathur (Indian Institute of Technology Jodhpur, India)

Dr. Abderrahmen Mtibaa (University of Missouri St. Louis, USA)

Dr. Adriaan van Wijngaarden (Bell Laboratories, Nokia, USA)

Dr. Adrian Kliks (Poznan University of Technology, Poland)

Dr. Ajay Singh (Indian Institute of Technology Jammu, India)

Dr. Ala Khalifeh (German University of Jordan, Jordan)

Dr. Alban Duverdier (Centre National D'Etudes Spatiales (CNES), France)

Dr. Alberto Gotta (ISTI-CNR, Italy)

Dr. Alessandro Carrega (CNIT, Italy)

Dr. Alexandru Vulpe (University Politehnica of Bucharest, Romania)

Dr. Amitava Mukherjee (Globsyn Business School, Kolkata, India)

Dr. Angelos Liveris (Wavelab Inc, USA)

Dr. Anna Antonyová (University of Prešov in Prešov, Slovakia)

Dr. Anwer Al-Dulaimi (EXFO Inc., Canada)

Dr. Argyrios Kyrgiazos (University of Surrey, United Kingdom (Great Britain))

Dr. Arianna D'Ulizia (CNR, Italy)

Dr. Atef Abdrabou (UAE University, United Arab Emirates)

Dr. Aveek Das (Palo Alto Networks, USA)

Dr. Barry Evans (University of Surrey, United Kingdom (Great Britain))

Dr. Bongkyo Moon (Quantum Informatics Research (QIR), Korea (South))

Dr. Bramah Hazela (Amity University Uttar Pradesh India, India)

Dr. Cahya Damarjati (Universitas Muhammadiyah Yogyakarta, Indonesia)

Dr. Carlo Augusto Grazia (University of Modena and Reggio Emilia, Italy)

Dr. Cedric Adjih (INRIA, France)

Dr. Chaker Abdelaziz Kerrache (University of Laghouat, Algeria)

Dr. Chau Yuen (Singapore University of Technology and Design, Singapore)

Dr. Chayan Bhar (National Institute of Technology Warangal, India)

Dr. Chi-Fu Huang (National Chung Cheng University, Taiwan)

Dr. Chih-Lin Hu (National Central University, Taiwan)

Dr. Chinmoy Kundu (University College Dublin, Ireland)

Dr. Chongwen Huang (Zhejiang University, China)

Dr. Chunqiang Hu (Chongqing University, China)

Dr. Cicek Cavdar (KTH Royal Institute of Technology, Sweden)

Dr. Dariusz Wiecek (National Institute of Telecommunications, Poland)

Dr. De Mi (University of Surrey, United Kingdom (Great Britain))

Dr. Debashis De (West Bengal University of Technology, India)

Dr. Deepak Mishra (IIST, India)

Dr. Deyun Gao (Beijing Jiaotong University, China)

Dr. Dimitri Papadimitriou (University of Antwerp – imec, Belgium)

Dr. Dimitris Chatzopoulos (Hong Kong University of Science and Technology, Hong Kong)

Dr. Donghyun Kim (Georgia State University, USA)

Dr. Ekasit Nugoolcharoenlap (Rajamangala University of Technology Rattanakosin, Thailand)

Dr. Elyas Rakhshani (Delft University of Technology, TU Delft, The Netherlands)

Dr. Felice Manlio Bacco (National Research Council (CNR), Italy)

Dr. Felipe Cruz-Pérez (Cinvestav-IPN, Mexico)

Dr. Fernando Guiomar (Instituto de Telecomunicações, Portugal)

Dr. Floriano De Rango (University of Calabria, Italy)

Dr. Francesco Gringoli (CNIT/University of Brescia, Italy)

Dr. Gang Wang (PCTEL, Inc., USA)

Dr. Ghadah Aldabbagh (King Abdulaziz University, USA)

Dr. Giuseppe Ruggeri (University of Reggio Calabria, Italy)

Dr. Go Hasegawa (Tohoku University, Japan)

Dr. Guixin Ye (Northwest University, China)

Dr. Gustavo Marfia (Università di Bologna, Italy)

Dr. Haibo Dai (Nanjing University of Posts and Telecommunications, China)

Dr. Hang Li (University of Technology Sydney, Australia)

Dr. Hemant Purohit (Jodhpur Institute of Engineering & Technology, India)

Dr. Heri Wijayanto (University of Mataram, Indonesia)

Dr. Hing Keung Lau (Hong Kong Institute of Vocational Education (Tuen Mun), Hong Kong)

Dr. Hiromasa Habuchi (Ibaraki University, Japan)

Dr. Honghai Zhang (Google, USA)

Dr. Hyung Jae Chang (Troy University – Montgomery, USA)

Dr. Ibrahim Develi (Erciyes University, Turkey)

Dr. Ilija Basicevic (University of Novi Sad, Serbia)

Dr. Ioakeim Samaras (Intracom Telecom, Greece)

Dr. Jad Nasreddine (Rafik Hariri University, Lebanon)

Dr. Javier Gozalvez (Universidad Miguel Hernandez de Elche, Spain)

Dr. Jean-Marc Kelif (Orange Labs, France)

Dr. Jia Hu (University of Exeter, United Kingdom (Great Britain))

Dr. Jin Cao (Xidian University, China)

Dr.   Jing Chen (Wuhan University, China)

Dr.   Jingjing Cui (University of Southampton, United Kingdom (Great Britain))

Dr.   John Vardakas (IQUADRAT Informatica S. L. Barcelona, Spain)

Dr.   Joong-Lyul Lee (University of North Carolina at Pembroke, USA)

Dr.   Jose Santa (Technical University of Cartagena, Spain)

Dr.   José Luis Hernandez Ramos (European Commission – Joint Research Centre (JRC), Belgium)

Dr.   Jukka Lempiainen (Tampere University of Technology, Finland)

Dr.   Kandasamy Selvaradjou (Pondicherry Engineering College, India)

Dr.   Karisma Trinanda Putra (Universitas Muhammadiyah Yogyakarta, Indonesia)

Dr.   Keping Yu (Waseda University, Japan)

Dr.   Kevin (Qixiang) Pang (Lakehead University, Canada)

Dr.   Khoirul Anwar (Telkom University, Indonesia)

Dr.   Kiho Lim (William Paterson University of New Jersey, USA)

Dr.   Kostas Peppas (University of Peloponnese, Greece)

Dr.   Kuntal Deka (IIT Goa, India)

Dr.   Lei Cao (The University of Mississippi, USA)

Dr.   Lei Mo (INRIA, France)

Dr.   Lexi Xu (China Unicom Network Technology Research Institute, China)

Dr.   Lifeng Lai (University of California, Davis, USA)

Dr.   Linawati Linawati (Universitas Udayana, Indonesia)

Dr.   Luca Caviglione (National Research Council (CNR), Italy)

Dr.   Luca Reggiani (Politecnico di Milano, Italy)

Dr. M Sabarimalai Manikandan (Indian Institute of Technology Bhubaneswar, India)

Dr.   M Arif Khan (Charles Sturt University, Australia)

Dr.   Maggie Mashaly (German University in Cairo, Egypt)

Dr.   Majed Haddad (University of Avignon, France)

Dr.   Marcin Piotr Pawlowski (Expeditus, Poland)

Dr.   Marco Baldi (Università Politecnica delle Marche, Italy)

Dr.   Mardeni Roslee (MMU, Malaysia)

Dr.   Marie-Jose Montpetit (Concordia University, Canada)

Dr.   Mariusz Zal (Poznan University of Technology, Poland)

Dr.   Mauro Fonseca (UTFPR, Brazil)

Dr.   Máximo Morales-Céspedes (Universidad Carlos III de Madrid, Spain)

Dr.   Michele Albano (Aalborg University, Denmark)

Dr.   Mingzhe Chen (Princeton University, USA)

Dr. Minoru Okada (Nara Institute of Science and Technology, Japan)

Dr. Mohamed Moustafa (Egyptian Russian University, Egypt)

Dr. Montree Kumngern (King Mongkut's Institute of Technology Ladkrabang, Thailand)

Dr. Muhammad Reza Kahar Aziz (Institut Teknologi Sumatera, Indonesia)

Dr. Mukesh Singhal (University of California at Merced, USA)

Dr. Mustafa Akbaş (Embry-Riddle Aeronautical University, USA)

Dr. N Nasimuddin (Institute for Infocomm Research, Singapore)

Dr. Nanda Kishore Chavali (Mathworks India Pvt Ltd., India)

Dr. Natarajan Meghanathan (Jackson State University, USA)

Dr. Nicola Calabretta (COBRA Research Institute, The Netherlands)

Dr. Nur Abdul Razak (Universiti Teknologi MARA, Malaysia)

Dr. Oluwakayode Onireti (University of Glasgow, United Kingdom (Great Britain))

Dr. Omar Al saif (Northern Technical University, Iraq)

Dr. Paolo Crippa (Università Politecnica delle Marche, Italy)

Dr. Pasquale Dottorato (Lab ID, Italy)

Dr. Paul Mitchell (University of York, United Kingdom (Great Britain))

Dr. Paula Fraga-Lamas (University of A Coruña, Spain)

Dr. Pavel Loskot (ZJU-UIUC Institute, China)

Dr. Peiying Zhang (China University of Petroleum (East China), China)

Dr. Peng-Yong Kong (Khalifa University, United Arab Emirates)

Dr. Petros Bithas (National and Kapodistrian University of Athens, Greece)

Dr. Philippe Owezarski (LAAS-CNRS, France)

Dr. Pietro Cassarà (National Research Council (CNR) at Pisa, Italy)

Dr. Ping Zhou (Apple, USA)

Dr. Prima Kristalina (Politeknik Elektronika Negeri Surabaya (PENS), Indonesia)

Dr. Punnarumol Temdee (Mae Fah Luang University, Thailand)

Dr. Pushpendu Kar (University of Nottingham Ningbo China, China)

Dr. Qasim Ahmed (University of Huddersfield, United Kingdom (Great Britain))

Dr. Qin Hu (IUPUI, USA)

Dr. R Prasad (Delft University of Technology, The Netherlands)

Dr. Rafael Asorey-Cacheda (Technical University of Cartagena, Spain)

Dr. Rakesh T (Monash University, Australia)

Dr. Rallis Papademetriou (University of Portsmouth, United Kingdom (Great Britain))

Dr. Ram Bilas Pachori (Indian Institute of Technology Indore, India)

Dr. Ramiz Sabbagh (University of Kent, United Kingdom (Great Britain))

Dr. Ramzi Adriman (Universitas Syiah Kuala, Indonesia)

Dr. Rashmi Chaudhry (International Institute of Information Technology, Italy)

Dr. Ratul Baruah (Tezpur University, India)

Dr. Ravi Hegde (IIT Gandhinagar, India)

Dr. Ravikant Saini (Indian Institute of Technology Jammu, India)

Dr. Riadh Dhaou (IRIT/ENSEEIHT, University of Toulouse, France)

Dr. Riccardo Colella (University of Salento, Italy)

Dr. Roberto Di Pietro (Hamad Bin Khalifa University, Qatar)

Dr. Rodrigo Campos Bortoletto (Instituto Federal de São Paulo, Brazil)

Dr. Rosdiadee Nordin (Universiti Kebangsaan Malaysia, Malaysia)

Dr. Samir Medjiah (LAAS-CNRS, France)

Dr. Sanjay Dhar Roy (National Institute of Technology Durgapur, India)

Dr. Sanjay Singh (Manipal Institute of Technology, India)

Dr. Sanjeev Gurugopinath (PES University, India)

Dr. Sanya Anees (Indian Institute of Information Technology – Guwahati, India)

Dr. Scahin Kumar (Amity University Lucknow Campus (UP) India, India)

Dr. Seemanti Saha (National Institute of Technology Patna, India)

Dr. Sherali Zeadally (University of Kentucky, USA)

Dr. Shuai Zhao (Tencent America LLC, USA)

Dr. Sirikan Chucherd (Mae Fah Luang University, Thailand)

Dr. Sonali Chouhan (Indian Institute of Technology Guwahati, India)

Dr. Song Xing (California State University, Los Angeles, USA)

Dr. Stylianos Basagiannis (United Technologies Research Centre, Ireland)

Dr. Sudhir Kumar (Indian Institute of Technology Patna, India)

Dr. Sumiko Miyata (Shibaura Institute of Technology, Japan)

Dr. Sunantha Sodsee (King Mongkut's University of Technology North Bangkok, Thailand)

Dr. Surapong Uttama (Mae Fah Luang University, Thailand)

Dr. Taeshik Shon (Ajou University, Korea (South))

Dr. Tariq Umer (COMSATS University Islamabad Lahore Campus, Pakistan)

Dr. Theofilos Chrysikos (University of Patras, Greece)

Dr. Thomas Lagkas (International Hellenic University, Kavala Campus, Greece)

Dr. Thumrongrat Amornraksa (King Mongkut's University of Technology Thonburi, Thailand)

Dr. Tianhua Xu (Tianjin University, China)

Dr. Tomoki Yoshihisa (Osaka University, Japan)

Dr. Trong-Minh Hoang (Posts and Telecommunications Institute of Technology, Vietnam)

Dr. Vandana Rohokale (SPPU Pune, Maharashtra, India)

Dr. Vanlin Sathya (University of Chicago, USA)

Dr. Vasilis Friderikos (King's College London, United Kingdom (Great Britain))

Dr. Vladimir Dyo (University of Bedfordshire, United Kingdom (Great Britain))

Dr. Wael Jaafar (Carleton University, Canada)

Dr. Watcharapan Suwansantisuk (King Mongkut's University of Technology Thonburi, Thailand)

Dr. Wei Feng (Tsinghua University, China)

Dr. Weili (lily) Wu (University of Texas at Dallas, USA)

Dr. Weiwen Zhang (Guangdong University of Technology, China)

Dr. Wenjun Xu (Beijing University of Posts and Telecommunications, China)

Dr. Worasak Rueangsirarak (School of Information Technology, Mae Fah Luang University, Thailand)

Dr. Xianbin Yu (Zhejiang University, China)

Dr. Xiang Gui (Massey University, New Zealand)

Dr. Xianliang Jiang (Ningbo University, China)

Dr. Xiao Zhang (South-Central University for Nationalities, China)

Dr. Xiaohua (Edward) Li (State University of New York at Binghamton, USA)

Dr. Xiaoyu Tang (Zhejiang University, China)

Dr. Yafei Hou (Okayama University, Japan)

Dr. Yang Wang (La Salle University, USA)

Dr. Yangyang Li (China Academy of Electronics and Information Technology, China)

Dr. Yasin Kabalci (Nigde Omer Halisdemir University, Turkey)

Dr. Yatish Joshi (Cisco Systems, USA)

Dr. Yee-Jin Cheon (Korea Aerospace Research Institute, Korea (South))

Dr. Ying Mao (Fordham University, USA)

Dr. Yong Guan (Iowa State University, USA)

Dr. Yongxu Zhu (South Bank University, United Kingdom (Great Britain))

Dr. Yu Zhang (Zhejiang University of Technology, China)

Dr. Yuansong Qiao (Athlone Institute of Technology, Ireland)

Dr. Yun-Wei Lin (National Chiao Tung University, Taiwan)

Dr. Yusuf Nur Wijayanto (Indonesian Institute of Sciences (LIPI), Indonesia)

Dr. Yvon Gourhant (Orange Labs, France)

Dr. Zeeshan Kaleem (COMSATS University Islamabad, Wah Campus, Pakistan)

Dr. Zengpeng Li (Lancaster University, United Kingdom (Great Britain))

Dr. Zheng Chu (University of Surrey, United Kingdom (Great Britain))

Dr. Zhi Lin (Army Engineering University of PLA, China)

Dr. Zhiyuan Zheng (Pinterest, USA)

Dr. Zongyang Zhang (Beihang University, China)

Program Schedule

Day 1: November 3th 2022	
Time (GMT+7)	**Activity**
08:00 – 09:00	Registration
09:00 – 10:10	Opening/Welcome Remark
10:10 – 10:45	**Keynote 1 Session**
	Carla Raffaelli, M.Sc., Ph.D. (University of Bologna)
10:45 – 11:20	**Keynote 2 Session**
	Dr. Vasilis Frederikos (King's College London)
11:30 – 13:00	**Parallel Session 1**
13:00 – 13:30	Break
13:30 – 15:45	**Parallel Session 2**
Day 2: November 4th 2022	
07:00 – 08:00	Registration
08:00 – 08:05	Opening
08:05 – 08:40	**Keynote 3 Session**
	Dr. Nolang Fanani, B.Eng., M.Sc. (Hyundai Mobis R&D Center Europe, Frankfurt, Germany)
08:55 – 10:25	**Parallel Session 3**

Day 3: November 5th 2022	
09:00 – 09:15	Opening
09:15 – 10:15	**Keynote Speech - Anritsu** Sahashiv Phadnis (Anritsu Company, Morgan Hill, CA)
10:15 – 11:15	'Networking Dots" Session (Participants)
11:15 – 11:25	Awarding (best paper & best presenter)
11:25 – 11:30	Closing

Keynote Speakers

Carla Raffaelli, M.Sc., Ph.D.

(University of Bologna)

"*Network slicing: from definition to evolution towards 6G*"

Abstract :

Network slicing is recognized as the key technology for programmable virtual infrastructures, including fifth generation (5G) networks and beyond. Network slicing has recently come on stage in relation to the maturity reached by network virtualization techniques in the framework of Network Function Virtualization (NFV) and Software Defined Networking (SDN), and create remarkable business opportunities for operators, service providers and verticals. The primary goal of network slicing is to appropriately allow end-to-end resource configuration to support service requirements during the entire slice lifecycle. Resource optimization is a key problem to ensure efficient slice deployment in increasing complexity scenario. However, communication networks are inherently dynamic and network slices typically need to be dynamically reconfigured during their life cycle to maintain optimal allocation and expected performance. In addition, the increasing number of devices and variety of applications and the need to adapt the network to user behavior open new challenges for network slicing with impact on both data and control and management plane. This talk will review the concept of network slicing and indicate the emerging challenges towards human centric networking with some examples of ongoing research on techniques and methodologies to ensure proper deployment and performance of end-to-end slicing in future scenarios.

Short Bio:

Carla Raffaelli is Associate Professor at the University of Bologna. She received her M.Sc. and Ph.D degrees in electronic and computer engineering (University of Bologna, Italy), in 1985 and 1990, respectively. Her research interests include performance analysis of telecommunication networks, switch architectures, optical networks and 5G networks. She actively participated in many National and International research projects, such as the EU funded ACTS-KEOPS, the IST-DAVID, the e-photon/One and BONE networks of excellence. She is author or co-author of more than 170 conference and journal papers in the field of network modelling and performance, optical networking and virtual infrastructure optimization. She regularly acts as a reviewer for top international conferences and journals and serves as Technical Program Committee member in several IEEE International Conferences, namely ICC, Globecom, HPSR, Comnetsat. She was the demo co-chair at Netsoft 2022. Since October 2013 she is a member of the editorial board of the journal Photonic Network Communications by Springer. She is associate editor of IEEE OJ- COMS since its foundation. She is IEEE Senior Member since 2016 and OSA member. She has been the Director of the International Telecommunications Engineering Master's Degree at the University of Bologna, Italy (2015-2021).

Keynote Speakers

Dr. Vasilis Frederikos

(King's College London)

"Robotic Aerial Small Cells for Efficient 6G Network Densification"

Abstract:

Aerial base stations realized by using Unmanned Aerial Vehicles (UAVs) (or drones) have recently received significant attention from both industry and academia since they have proven to offer increased capacity to the wireless network in an on-demand manner thanks to their dominant line-of-sight links and controlled mobility. However, the key hurdle is the limited flying/hovering endurance due to battery constraints. To overcome this fundamental problem, we are exploring the use of robotic aerial small cells that are equipped with energy neutral grasping end-effectors that can autonomously grasp at tall urban landforms such as for example lampposts. Since with an energy neutral grasping functionality the energy consumption can be dramatically decreased compared to hovering, robotic small cells can provide high-capacity network connectivity for multiple hours compared to minutes for hovering based aerial base stations. This opens the path for significant novel network optimization opportunities, especially for network densification since robotic small cells can 'follow' the spatio-temporal network traffic dynamic. Hence, network densification can be achieved without densifying the installed network equipment, i.e., fixed small cells at lampposts. In this talk we will be exploring the benefits that such robotic small cells can bring in the 6G networks as well as the challenges and research opportunities to provide a fully autonomous deployment of robotic small cells with a tight integration into the management and orchestration functions of an open-RAN 5G and beyond network ecosystem.

Short Bio:

Vasilis Friderikos is currently a Reader at Department of Engineering at King's College London. He has published 200 research papers in flagship IEEE, Elsevier, Springer journals, international conferences and book chapters. He has received two times best paper awards in IEEE ICC 2010 and WWRF conferences respectively. He has been visiting researcher at WinLab in Rutgers University (USA) and recipient of the British Telecom Fellowship Award. His research interests lie broadly within the closely overlapped areas of wireless networking, mobile computing, and architectural aspects of the Future Internet. Vasilis is a member of IEEE, member of IET and member of the INFORMS section on Telecommunications.

Keynote Speakers

Dr. Nolang Fanani, B.Eng., M.Sc.

(Hyundai Mobis R&D Center Europe, Frankfurt, Germany)

"*Artificial Intelligence for Autonomous Vehicle*"

Abstract:

Autonomous Vehicle is one of the most exciting applications of Artificial Intelligence (AI) technology. Based on the data recorded by a set of vehicle sensors, AI concepts are applied to provide meaningful and useful information for the vehicle to navigate safely and accurately. The continuous advancement of technology has gradually increased the autonomy level of autonomous vehicles. However, there are still theoretical and practical challenges to developing a fully autonomous vehicle. This talk aims to discuss the effort to contribute to solving transportation problems using autonomous vehicle technology. The AI components of autonomous vehicle technology are briefly explained, with a focus on the camera-based advanced driver assistance system. While the bright prospects of autonomous vehicle technology are so promising, the threatening risks coming with it are also discussed. This talk also emphasizes the need for a larger synchronized transportation system beyond vehicle levels. It is very interesting to explore the potential of wireless communication supported by interconnected networks and satellites to further improve the accuracy and safety of autonomous vehicles.

Short Bio:

Nolang Fanani is currently a Deputy Manager at Camera Technology for Autonomous Driving, Hyundai Mobis R&D Center Europe, Germany. He received Ph.D. in Computer Science from Goethe University of Frankfurt, Germany, in 2018, and an M.Sc. in Computer Vision and Robotics from the Erasmus Programme at Université de Bourgogne, France; Universitat de Girona, Spain; Heriot-Watt University, United Kingdom; Technische Universität München, Germany. He also received some scholarships for DAAD Research Ph.D. Scholarship from 2014-2018 and Erasmus Mundus Master Scholarship from 2011-2013. In 2018, he has awarded a Best Paper Award - 2nd Prize at IEEE Intelligent Vehicles 2018.

Keynote Speakers

Sahashiv Phadnis

(Anritsu Company, Morgan Hill, CA)

"New Generation Microwave Synthesizer Key Design Technologies and Advanced Testing Trend"

Short Bio:

Sadashiv Phadnis is the Product Marketing Manager for signal generators at Anritsu Company, Morgan Hill, CA. Sadashiv has previously worked with Conexant, NXP Semiconductors and Sigma Designs Inc. Sadashiv has more than 30 years of experience in RF design and product marketing functions including design of satellite receivers, synthesizers and LNAs

Technical Session
Thursday, November 3th 2022
(11:45 – 13:00)
Parallel Session 1
Room 1
Code Session: BPS0106
Title Session: Technical Session Broadband, Photonics, and Satellite

(11:45) Design and Analysis of Optical Fiber Network Jakarta - Singapore - Nusantara via Karimata Strait

Author: Muhammad Rendra Perdana Kusuma Djaka, Fajar Aulia Rachman, Herry Tony Andhyka and Catur Apriono (Universitas Indonesia, Indonesia).

Abstract: The government and The House of Representatives of Indonesia have decided to move the capital city from Jakarta to Nusantara. Nusantara is the world's superhub and the driver of Indonesia's new economy, following its vision to create 4.3 - 4.8 million new jobs. The relocation of the capital will mean moving around 1.9 million people to Nusantara. Thus, Nusantara requires high internet network connectivity with large bandwidth. This study proposes a fiber optic telecommunications network backbone design that connects the new capital Nusantara with Singapore and Jakarta via Pontianak. The proposed design for the connection from Nusantara to Pontianak is a land route, while from Pontianak to Singapore and Jakarta is a sea route. The design results show that the power loss and rise time values follow the standards, respectively 45 dB for power loss and 684 ps for the rise time. Therefore, the proposed network design is feasible to be implemented.

(12:00) Terahertz Antenna-coupled Microbolometer: Impact of High Heater Resistance

Author: Arie Pangesti Aji (Universitas Indonesia, Indonesia); Hiroaki Satoh (Shizuoka University, Japan); Catur Apriono and Eko Tjipto Rahardjo (Universitas Indonesia, Indonesia); Hiroshi Inokawa (Shizuoka University, Japan).

Abstract: We report the terahertz bolometric detection by antenna-coupled microbolometer that consists of a titanium (Ti) meander thermistor, and a Ti heater coupled to the antenna. In this study, we investigate the impact of high resistance heater to the microbolometer performances. Two antenna models of folded and halfwave dipoles are investigated to capture 1 THz radiation and transfer the energy to the 586Ω and 91Ω resistance heaters, respectively. A minimum NEP of 39 pW/Hz1/2 and 66 pW/Hz1/2 are obtained for folded and halfwave dipole antenna-coupled microbolometers, respectively. The results confirm the usefulness of the higher heater resistance and proper impedance matching to the antenna for microbolometer performance improvement.

(12:15) Modeling of Multiplexing Indoor Light Fidelity (Li-Fi) Technology Using Movable LED Panel

Author: I Wayan Mustika (Universitas Gadjah Mada, Indonesia); Fauza Khair and Anggun Fitrian Isnawati (Institut Teknologi Telkom Purwokerto, Indonesia); Arrizky Ayu Faradila Purnama (Institute of Technology Telkom Surabaya & Faculty of Electrical Technology and Intelligent Industry, Indonesia); Dwi Edi Setyawan (Institut Teknologi Telkom Surabaya, Indonesia).

Abstract: Light fidelity (Li-Fi) technology emerged to overcome wireless technology problems in terms of increasing network capacity, efficiency, availability and security. However, the limitations of Li-Fi technology that can only be applied to line of sight (LOS) conditions, it is necessary to develop a multiplexing system on the Li-Fi technology to increase bandwidth efficiency, especially for indoor applications. Therefore, this study aims to design and analyze the proposed model of multiplexing indoor LiFi system using movable light emitting diode (LED) panel scheme. The modeling is carried out for 2 multiple input multiple output (MIMO) scenarios including 2x2 channels and 4x4 channels of multiplexing systems by varying the channel spacing value from 5 nm up to 25 nm. Observation of system model performance based on the parameter values of bit error rate (BER), Q-factor, signal to noise ratio (SNR), and optical received power. The results of the received power value on the receiving side shows that there is no significant difference values for either the 2x2 multiplexing system or the 4x4 multiplexing system. The increase in the channel spacing value affects the system performance improvement, where the 25 nm channel spacing scenario has the smallest BER value and the highest Q factor value, especially on the fourth channel.

(12:45) Energy Efficient Cooperative Strategy over LEO Satellite Internet of Things

Author: Kaiwei Wang (No 38 Research Institute, China Electronics Technology Group Corporation, China)

Abstract: We design an energy efficient cooperative strategy over LEO satellite IoT network. We construct a queueing model to describe UEs' data flow and formulate a long-term optimization problem. With Lyapunov optimization approach, we convert the problem into an instantaneous one that can be easily solved with real-time satellite channel states and queue backlog information. We then divide the instantaneous optimization problem into two parts: admission control and beamforming optimization, and solve them with liner programming and WMMSE method separately. The simulation results suggest that we may achieve varied trade-offs between energy efficiency and data traffic latency using a control parameter, which is compatible with the theoretical analysis.

(13:00) Link Budget Analysis for a 3U Nanosatellite Operating at S-band

Author: Habib Idmouida (Mohammed V University in Rabat, Morocco & University Center for Research in Space Technologies, Mohammedia School of Ingeniers, Morocco))

Abstract: In recent years, nanosatellites have gained more attention in the space field, making them extremely useful platforms for technology demonstration, scientific research and academic projects. One of the most crucial components is the communication subsystem. In this paper, the S-band data link budget between a LEO nanosatellite and a ground station in Rabat is estimated. The aim is to design a reliable communication subsystem with the associated attenuation that affects the ground-to-satellite communication link. Therefore, the AGI Software Tool Kit (STK) and the AMSAT-IARU Link spreadsheet are used to design orbit, calculate link budget and analyze the impact of elevation angle and channel coding scheme on link margin.

Technical Session
Thursday, November 3th 2022
(11:45 – 13:00)
Parallel Session 1
Room 2
Code Session: DSA0105
Title Session: Technical Session Data Science and Artificial Intelligence

(11:45) Reversible Data Hiding using Pixel-Value-Ordering and Difference Expansion in Digital Images

Author: Ntivuguruzwa Jean De La Croix and Chaidir Islamy (Institut Teknologi Sepuluh Nopember, Indonesia); Tohari Ahmad (Institut Teknologi Sepuluh Nopember (ITS), Indonesia)

Abstract: Pixel value ordering (PVO) and difference expansion (DE) are promising methods for digital image steganography. PVO is a steganographic method of digital images that deals with pixel values sorting before the data embedding. In digital image steganography, DE is a method for data protection based on hiding secret data in differences computed between pixels. Even though the previous methods based on PVO, and DE tried to improve the embedding capacity and the quality of the stego image, improvement is still needed to increase both at the same time. This work proposes a new method that combines PVO and DE to improve the number of embeddable areas and the embedding capacity in the pixels of a digital image. The experimental results showed that the maximum number of embeddable areas within used images with the existing methods was increased from 17582 pixels to 131009 pixels, yielding the embedding capacity improvement from 6.70% up to 49.97%.

(12:00) Systematic Literature Review: Accuracy of Machine Learning for Depression Detection in Social Media

Author: Alya Melati Putri, Kevin Wijaya and Owen Salomo (Binus University, Indonesia); Anderies Anderies (BINUS University, Indonesia); Alexander Agung Santoso Gunawan (Bina Nusantara University & University of Indonesia, Indonesia)

Abstract: There are so many health problems that affect humans. One of them is depression. Depression is a mental health disorder that would trigger suicidal tendencies if not treated carefully. People who are depressed tend to have less concentration and productivity. However, detecting depression is not easy due to the self-denial of some patients, and they keep depression untreated and undiagnosed. Some factors of untreated or undiagnosed depression are poor knowledge and recognition in many places the patient is shy to talk to a psychologist, and the stereotypes in public that says people who come to a psychologist are "insane." Depression symptoms of a user can be shown in social media posts, and these symptoms can be detected using a machine learning algorithm. These Machine learning algorithms can be an alternative to detecting depression or as a supporting document for psychologists' diagnoses. The algorithm obtains accuracy that varies depending on the dataset. For this reason, we conducted a systematic literature review to find out which machine learning has the best accuracy in detecting depression. We also provide information about stable algorithms to detect a given dataset and the popular dataset used in previous studies based on the most frequent text that is easy to test. In conclusion, the greatest accuracy is obtained from Logistic Regression with an accuracy value of 99.80%. Stable algorithms are obtained by LR and SVM because the machine learning method obtains values above 70%. The most popular dataset used in previous studies is the Twitter dataset.

(12:15) Click Bait Detection for Internet News Title with Deep Learning Feed Forward

Author: Berlian Al Kindhi (Institut Teknologi Sepuluh Nopember, Indonesia)

Abstract: Clickbait has been widely circulated on social media and has become one of the ways used to increase reader traffic and website/website visitors, but this clickbait is often misused by website managers in increasing visitor traffic to get an income or profit by ignoring the satisfaction of news readers with how to display a trapping title and hyperbole and the information in the content does not match what is stated in the news title. Today's society is in an emergency for clickbait news, even on national news pages sometimes they still use the title clickbait. In this study, a clickbait news prediction system is proposed on the news circulating. A deep learning neural network method has been proposed, and the architecture we use is flexible feed forward, namely by providing classes with semantic or multiple-meaning languages. Our proposed deep learning architecture on the neural network is able to classify clickbait news with accuracy values of 80%. The purpose of this research is to provide intelligent education to the public to be able to sort out news easily.

(12:30) A Decision Tree Knowledge-based System for Reviewing of Research Ethics Protocol

Author: Ratih Nur Esti Anggraini (Intelligent Systems Lab, University of Bristol, United Kingdom (Great Britain) & Institut Teknologi Sepuluh Nopember, Indonesia); Nurul Fajrin Ariyani, Abdullah Faqih Septiyanto, Zahra Meilani and Riyanarto Sarno (Institut Teknologi Sepuluh Nopember, Indonesia)

Abstract: Knowledge base systems have undergone many developments in providing similar results to experts. This can help increase time effectiveness in determining decisions and analysis results. Several methods have given good results in determining decisions based on knowledge, one of which is using a decision tree. In this study, the researchers applied decision tree modeling to determine the results of the review on ethical research protocols. Three models are used in this research to make a decision tree model with the best results that can predict the ethical review protocol results according to the expert's dataset. The experiments showed that all models showed the same result, with an accuracy value of 0.91, precision of 0.93, and recall of 0.91. However, manual checking showed that the second model with Gini criteria parameters and class weight balance resulted in 10 data correctly predicted based on the dataset used.

(12:45) Systematic Literature Review: Collaborative Filtering Algorithms for Recommendation Systems

Author: Michael The Hadinata, Hans Andika, William Huang and Anderies Anderies (BINUS University, Indonesia); Irene Anindaputri Iswanto (Bina Nusantara University, Indonesia)

Abstract: The recommendations system is divided into some classification approaches such as collaborative filtering (CF), content-based (CB), and hybrid approach. In this paper, we focus deeper on the CB approach. However, there are many algorithms in CB such as KNN, K-Means, Deep Learning, SVD, and many more. Thus, we selected KNN, Deep Learning, and SVD algorithms for our study to discover well-performed methods from

previous researchers. The result was many methods had been developed in both algorithms, and most of them produced a good result in recommending items for users.

Technical Session
Thursday, November 3th 2022
(11:45 – 13:00)
Parallel Session 1
Room 3
Code Session: DSA0610
Title Session: Technical Session Data Science and Artificial Intelligence

(11:45) Intrusion Detection using Support Vector Machine on Internet of Things Dataset

Author: Rifky Aditya, Hilal H. Nuha and Sidik Prabowo (Telkom University, Indonesia)

Abstract: Recently, the Internet of Things (IoT) has developed into a technology to build a Smart Environment. Security and privacy are important in building an IoT-based Smart Environment. A low level of security on IoT-based systems can lead to attacks or threats that have an impact on Smart Environment applications. Therefore, an Intrusion Detection System (IDS) is urgently needed to improve security on IoT-based systems from attacks. In this journal, the author proposes an Intrusion Detection System using the Support Vector Machine (SVM) as a classifier to classify data that is affected by attacks and normal ones. The author takes the case by using a dataset containing data retrieved from IoT devices. The system to be built consists of several processes, namely Preprocessing, Data Split, Classification with SVM, and system performance analysis. In the last process, the accuracy value of the system created will be obtained. The experimental results show that the SVM is able to achieve over 89% of accuracy.

(12:00) Flood Identification with Fuzzy Logic Based on Rainfall and Weather for Smart City Implementation

Author: Berlian Al Kindhi (Institut Teknologi Sepuluh Nopember, Indonesia)

Abstract: Flood is one of the problems that often occur in big cities, one of which is Surabaya. This arises due to various factors, including changes in land use, relatively high rainfall, and an inadequate drainage system. Floods in several places in Surabaya are basically caused by the unavailability of ditches and places to drain rainwater. This causes rainwater to fall directly onto the road and cause air impacts. One way to anticipate flooding is to know the conditions that trigger flooding, namely rainfall and air temperature. In this study, a classification system for the level of rainfall and air temperature is proposed which affects flooding. The method we propose is fuzzy logic with the Mamdani approach. Our data set is real temperature and rainfall data in the city of Surabaya from 2017 to 2020. The test results from our proposed method, it can be analyzed that fuzzy logic can also study the relationship and degree between temperature and rainfall so as to result in the condition of the city in that month there will be flooding or not.

(12:15) Performance Comparison of Machine Learning Algorithms for Student Personality Classification

Author: Didi Supriyadi (Diponegoro University, Indonesia & Institut Teknologi Telkom Purwokerto, Indonesia); Purwanto Purwanto (Universitas Diponegoro, Indonesia); Budi Warsito (Diponegoro University, Indonesia)

Abstract: Personality is one of the factors that affect student academic performance. The questionnaire instrument used to measure a person's personality was developed by Costa and McCrae in 1992, known as the Big-Five Personality model. This instrument consists of 50 statement items using a 5-point Likert scale rating. The purpose of this study is to analyze the performance of each Machine Learning algorithm such as Support Vector Machine (SVM), Random Forest (RF), and Neural Network (NN) for student personality classification based on the OCEAN big five personality models consisting of Openness (O), Conscientiousness (C), Extraversion (E), Agreeableness (A), and Emotional Stability or Neuroticism (N). The results showed that the Neural Network method was able to produce the best accuracy value of 84.62% and was followed by the Random Forest and SVM

methods with an accuracy value of 69.23%. Based on the personality criteria of each student, it is expected that students' academic performance can be predicted.

(12:30) Improvement Object Detection Algorithm Based on YoloV5 with BottleneckCSP

Author: Aria Hendrawan (Information System School of Postgraduate Universitas Diponegoro, Indonesia & Universitas Semarang, Indonesia); Rahmat Gernowo, Oky Nurhayati, Budi Warsito and Adi Wibowo (Information System School of Postgraduate Diponegoro University, Indonesia)

Abstract: Detecting objects using deep learning technology has the advantage of getting good accuracy. The accuracy obtained depends on the processing time of using deep learning technology. One object detection algorithm is called You Only Look Once (YOLO) in which currently has its fifth version, or Yolov5. This paper proposes the real-time object detection algorithm with a video dataset recorded on the highway using Yolov5. The increase of YOLOv5 started by adding augmentation data mosaic by the size of 480x480. We practiced the YOLOV5 -BottleNeckCSP model to detect objects and then got the object information divided into six classes. The results of using mosaic data augmentation are mAP@0.5 of 0.984, mAP@0.5-0.95 of 0.696 by the precision value of 95.1% and a recall value of 98.4%. Our research framework can be applied effectively to improve the performance of object detection algorithms.

(12:45) Intrusion Detection using Deep Neural Network Algorithm on the Internet of Things

Author: Syariful Ikhwan (Institut Teknologi Telkom Purwokerto, Indonesia) ; Adi Wibowo and Budi Warsito (Diponegoro University, Indonesia)

Abstract: The increasing use of IoT devices on future networks is very helpful for humans in their lives. However, the increase in devices connected to IoT networks also increases the potential for attacks against those networks. Vulnerabilities in IoT networks can be exposed at any time. Artificial intelligence can be used to protect the IoT network by being able to detect attacks on the network so that they can be prevented. In this study, network detection was carried out using the Deep Neural Network (DNN) algorithm. The test was carried out using the UNSW Bot-IoT dataset with a comparison of training data of 75% of the overall data. The results obtained show the ability of the algorithm to detect attacks on average with 99.999% accuracy. The validation loss and training loss look very small. In this study, there is a validation loss that still occurs in overfitting, but the difference is very small.

Technical Session
Thursday, November 3th 2022
(11:45 – 13:00)
Parallel Session 1
Room 4
Code Session: COM0105
Title Session: Technical Session Communications

(11:45) Integration of Decision Tree-Fuzzy Algorithm for Decision Support System in Military Operation

Author: Hendri Himawan Triharminto (Indonesian Air Force Academy, Indonesia); Lenny Iryani (Politeknik Negeri Bandung, Indonesia)

Abstract: This paper focuses on developing DSS (decision support system) that is implemented in command control for military operations. The DSS decides on the military operation field primarily to obtain air sovereignty. The system employs two algorithms i.e., the decision tree algorithm and the fuzzy algorithm. The decision tree algorithm solves the whole branch of the decision-making process and fuzzy algorithm is to cope with the partial decision-making in a particular attribute for continue input. The input of the decision tree is aircraft, divided into four attributes, i.e., altitude, velocity, type, and position of the enemy's aircraft. The altitude, velocity, and type attributes determine a decision using fuzzy logic with a specific membership function that reflects the possible condition. The membership function consists of two or three states. The proposed mathematical modeling calculates the total friendly aircraft fighter to chase the enemy's aircraft. The outputs of

the decision-making process are air force base, squadron, type, and total aircraft. The experimental setup is conducted in different scenarios to examine the proposed method. The results show that the application of decision tree and fuzzy algorithm can be used in military operations as DSS.

(12:00) Design and Implementation of On-Body Textile Antenna for Bird Tracking at 2.4 GHz

Author: Hasri Ainun Harris, Levy Olivia Nur and Radial Anwar (Telkom University, Indonesia)

Abstract: This paper has proposed a design for a textile wearable antenna integrated with the vest along with a Wi-Fi module and a lithium battery for a tracking system. It is intended to operate in 2.4 GHz of the Industrial, Scientific, and Medical (ISM) frequency band. The substrate and radiating element of the antenna were chosen nylon cloth and copper thread, respectively. Moreover, this study evaluated the system's ability represented by its coverage in the distance (meters) in non-line-of-sight (NLOS) and line-of-sight (LOS) conditions. The proposed antenna design is discussed in detail. The prototype's experimental results are shown as SAR, VSWR, and radiation patterns parameters.

(12:15) Outage Analysis of UAV-assisted Co-operative communication system with imperfect SIC

Author: Anju Rs (National Institute of Technology, Trichy, India); Anandpushparaj J (National Institute of Technology, Trichirappalli, India); Muthu Palanivel Chidambara Nathan (National Institute of Technology, India)

Abstract: An Unmanned aerial vehicle and its application in the field of communication are of great interest these days. This paper analyzes a UAV-based system model that replaces the conventional relay and derives the closed-loop expression for performance metrics like outage and throughput over Nakagami-m Channel. The results are validated using the simulation results. All the analyses are done considering selection combining (SC) as the diversity technique, Non-orthogonal multiple access technique (NOMA) as the multiple access technique, and imperfect successive interference cancellation (SIC) at the receiver. To add more novelty to the work, we have incorporated an energy harvesting technique i.e. power splitting approach (PS).

(12:30) HPA Rapp Model Nonlinear Distortion Effect Mitigation Technique on GFDM System

Author: Ari Endang Jayati (Institut Teknologi Sepuluh Nopember & Universitas Semarang, Indonesia)

Abstract: Nowadays, smartphones have become a necessity for everyone. The internet is not only used by humans but is also used by various machines and equipment. This has resulted in new requirements for mobility, data rate, latency, Quality of Service, and high energy efficiency. Generalized Frequency Division Multiplexing (GFDM) is a non-orthogonal multicarrier transmission system that can overcome the shortcomings of Orthogonal Frequency Division Multiplexing (OFDM). Out-ofband radiation in GFDM is controlled by a pulse shaping filter on each subcarrier. GFDM uses Cyclic Prefix (CP) to overcome Interference Inter Symbol (ISI) on multipath channels. GFDM uses a better spectrum than OFDM because of its simpler structure. The contribution of this research is to apply mitigation techniques to overcome the effects of nonlinear distortion due to the use of the High Power Amplifier (HPA) Rapp Model on the GFDM system. The simulation results show that the application of a predistorter in GFDM can reduce the effect of HPA's nonlinear distortion. The system with the predictor was proven to have better spectrum parameters. The signal spectrum with HPA has an increase in OOB of 55 dB. Meanwhile, the predistorter system experienced a decrease in the OOB value by 55 dB, thus successfully compensating for the HPA effect. A system with a predistorter to obtain a Bit Error Rate (BER) of 10-2 requires an E_b/N_0 of 9 dB.

(12:45) System Usability Scale Analysis of Infusion Fluid Level Monitoring And Notification System Using IoT

Author: Handika Jaladara, Rizka Reza Pahlevi and Hilal H. Nuha (Telkom University, Indonesia)

Abstract: In the era of technology like now, the internet is very important and required in various aspects, including the health sector, because the need for accurate and fast information will improve the quality of service to the community. Especially during a pandemic like now, hospitals, polyclinics, health centers are the places that

transmit a disease the fastest, especially if there are too many patients while medical staff, paramedics are very limited. Based on the results of observations, that the place of health services in Purworejo district, namely inpatient health centers in monitoring patient infusions still uses the conventional way, namely going around one by one to the patient's room. This method will endanger the patient if the infusion condition has run out but there are no medical personnel to replace the infusion. The purpose of this study was to develop and analyze a system for monitoring and notification of infusion fluid levels using the SUS method. The use of the ESP 8266 module which is connected to the load cell sensor will send data to the website via an internet connection, then the computer screen will display the data on the amount of infusion fluid. If the amount of infusion fluid is at a minimum, a notification in the form of an alarm will appear and the website will display which room the infusion should be changed to. The test results show that all features have been running well. The results of the SUS measurement showed mixed results.

Technical Session
Thursday, November 3th 2022
(11:45 – 13:00)
Parallel Session 1
Room 5
Code Session: NET0105
Title Session: Technical Session Network

11:45)   The Performance Analysis of Hybrid SDN-IP Reactive Routing on ONOS Controller in Tree Topologies

Author: Bongga Arifwidodo (Telkom Institute of Technology Purwokerto, Indonesia); Donny Arief Oktavian and Jafaruddin Gusti Amri Ginting (IT Telkom Purwokerto, Indonesia)

Abstract: Software Defined Networking (SDN) is a new paradigm in the world of networking that separates control and forwarding functions. In implementation, SDN network has difficulties to connect with traditional IP network. The Open Network Operating System (ONOS) controller has an application to connect SDN networks and traditional IP networks through the BGP protocol, namely SDN-IP. SDN-IP will convert the BGP route packets obtained from BGP Speakers into an intents. These intents will be processed by the ONOS controller into an Openflow route which will be forwarded to the data plane. SDN-IP Reactive Routing will calculate and create traffic paths from the SDN network to the traditional IP network, so that the two networks can communicate with each other. When an SDN network and a traditional IP network run side by side, it is known as Hybrid SDN. In this study, Quality of Service testing will be carried out which includes in a Hybrid SDN network with 2 scenarios. First, scenario is testing from a traditional IP network to a traditional IP network via an SDN network. Second, testing is carried out from a traditional IP network to an SDN network. Each scenario is given variations in the addition of background. The results of two scenario show the average value of throughput is 47.776 Mbps and 52.9836 Mbps, delay is 0.1589 ms and 0.1510 ms, jitter is 0.4859 ms and 0.0132 ms. In both scenarios, the QoS value is classified as good according to the ITU.T G.1010 standardization.

12:00)   Auto Discover Virtual Private Network Using Border Gateway Protocol Route Reflector

Author: Setiyo Budiyanto, Ch Aprihansah, Lukman Silalahi and Imelda Simanjuntak (Universitas Mercu Buana, Indonesia); Freddy Artadima Silaban (Universitas Mercu Buana & Indones, Indonesia); Agus Rochendi (Badan Riset dan Inovasi Nasional, Indonesia)

Abstract: VPN (Virtual Private Network) is one of the communication technologies that allows users to connect to public networks and allows to use, send, and get information as if the network were a private network. However, a VPN becomes complicated if a company has branch offices spread across many places and implements a full mesh method. In a full mesh network, each branch office is required to be able to communicate with the head office or fellow branch offices, so each branch office must make bGP (Border Gateway Protocol) peer to the head office and also to other branch offices. BGP route reflector is one solution in implementing a full mesh network. The experimental hypothesis in this study uses BGP Non-Route Reflector requires 15 BGP Peers while the results of this research using BGP Route Reflector only require 5 BGP Peers. By using BGP Route Reflector is no longer needed to create BGP Peer at each branch office to the head office, then the head office will be Reflectors for all existing routers. The conclusion in this research can be stated that the entire network can automatically find other

networks that are integrated. Network quality testing found that the highest jitter occurred at 9.76 ms while for the highest packet loss at 2.15%.

12:15) QoS Analysis on VoIP with VPN Using SSL and L2TP IPSec Method

Author: Erryc Darmawan, Setiyo Budiyanto and Lukman Silalahi (Universitas Mercu Buana, Indonesia)

Abstract: This research background began with the VoIP (Voice over Internet Protocol) service which allows to share information, communicate and become a supporting priority part of the WFH (Work from Home) scheme. VoIP requires QoS (Quality of Service) because it is very sensitive to loss and delay of information packets. The novelty of this research is to compare the performance generated on several VPN security system mechanisms that use the L2TP IPSEC (Layer 2 Tunnelling Protocol Security) and SSL (Secure Socket Layer) methods. The purpose of this research is to obtain a VoIP security system mechanism and analyze delay, jitter, throughput and packet loss as well as MOS (Mean Opinion Score) measurements. This research is expected to produce a model of best practice of applying QoS VoIP to network security systems The proposed research method is qualitative and objective studies. This research resulted in VoIP performance with an average delay on Forticlient SSL VPN of 7,804 ms while the average delay on L2TP IPSEC VPN was 9,787 ms and the average for forticlient SSL VPN jitter was 7,804 ms while the average jitter for L2TP IPSEC VPN was 9,786 ms. These results show that the SSL method's VoIP performance is better than the L2TP IPSec method, and jitter shows the L2TP IPSec method is better than the SSL method.

12:30) Secret Image Sharing and Steganography based on Fuzzy Logic and Prediction Error

Author: Chaidir Islamy (Institut Teknologi Sepuluh Nopember, Indonesia); Tohari Ahmad (Institut Teknologi Sepuluh Nopember (ITS), Indonesia); Royyana Ijtihadie (Institut Teknologi Sepuluh Nopember, Indonesia)

Abstract: Transmitting data through the internet may have severe security risks due to illegal access done by attackers. Some methods have been introduced to overcome this issue, such as cryptography and steganography. Nevertheless, some problems still arise, such as the quality of the stego data. Specifically, it happens if the stego is shared with some users. In this research, a shared-secret mechanism is combined with steganography. For this purpose, we use fuzzy logic edge detection and Prediction Error (PE) methods to hide private data. The secret sharing process is carried out after the data are embedded in the cover image. This sharing mechanism is performed on image pixels that have been converted to PE values. We obtain various Peak Signal to Noise Ratio (PSNR) values from the experiment. It is found that the number of participants and the threshold do not significantly affect the image quality of the share.

12:45) Adapting ISO 17025 to Improve Quality Measurement on Internet of Medical of Things Moreover QoS

Author: Muhammad Yusro, Nor Safira Azlyn and Sevia Purnama (Institut Teknologi Telkom Purwokerto, Indonesia)

Abstract: Biomedical tool quality assurance needs to be concerned regarding its measurement validation worrying its function to treat the human body. It has been found that in reported medical tools on the internet of medical things (IoMT), the quality of the tool is defined mostly only using Quality of Service (QoS). It has not been standard that medical tools also must be concerned about their quality measurement yet. This article imposed to elaborate on developing quality assessment in the medical tool by adapting ISO 17025 as quality measurement, particularly the validation method. ISO 17025 is the method using notable parameters used in the quality of laboratory of measurement. The parameters include calibration, selectivity, sensitivity, precision (repeatability), accuracy, linearity and working range, robustness, and ruggedness (reproducibility). To clarify how this standard is implemented, the medical tool, detector of kidney disorder based on pH meter, is used as a case study. The result said that even though QoS is a very good outcome, this biomedical tool has crucial parameters, particularly in calibration regarding validation result measurement. Hopefully, this article could be a reference to enhance the quality standard of medical tools, especially on the internet of medical things besides QoS that has been already well known implemented.

Technical Session
Thursday, November 3ᵗʰ 2022
(13:45 – 15:45)
Parallel Session 2
Room 1
Code Session: DSA1117
Title Session: Technical Session Data Science and Artificial Intelligence

(13:45) Marine V essels Detection on V er y High-Resolution Remote Sensing Optical Satellites

Author: Bill Van Ricardo Zalukhu and Arie Wahyu Wijayanto (Politeknik Statistika STIS, Indonesia); Muhammad Iqbal Habibie (National and Research Innovation Agency (BRIN), Indonesia)

Abstract: Marine vessels or ships have been considered as one of the primary vehicles used for sea transportation, which can also be used as an intermediary tool to serve numerous other marinerelated activities. In tracking and monitoring the activities of these ships, automatic vessel object detection is undoubtedly challenging to extract the number and position of the vessels from complex seawater backgrounds. In this study, we build a one-stage network of YOLOv5x6 based deep learning model on ShipRSImageNet large-scale dataset. With more than 3,435 real-world images and 17,573 ship samples, our model obtained a promising performance with a mean average precision of 75.18%. Our findings are potentially beneficial to support maritime security enforcement policy including counter-measuring illegal fisheries and managing seawater traffic surveillance.

(14:00) An Implementation of Large Scale Hate Speech Detection System for Streaming Social Media Data

Author: Doan Long An (University of Information Technology, Vietnam); Thao Phuong Nguyen (University Information Technology, Vietnam); Trong-Hop Do (University of Information Technology, Ho Chi Minh City & Vietnam National University, Ho Chi Minh City, Vietnam)

Abstract: The omnipresence of online social media brings various positive and negative consequences for society. Besides benefits, social media can cause big problem caused by hate and offensive contents. Detecting and removing those toxic contents using machine learning is a major research topic in social network. Two of the challenges of this topic are that the volume of social media data is so big and that these data need to be processed in real-time. In this paper, we set out to develop system to detect hate speech in Vietnamese YouTube comments using machine learning and big data technology. The streaming data from Youtube is processed in real-time using Kafka, Spark, and machine learning technology. Finally, a dashboard powered by Streamlit will be used to display the results.

(14:15) A Practical Real-Time Flight Delay Prediction System using Big Data Technology

Author: Tri Minh Vo and Vu Tran Trieu (University of Information Technology, Vietnam); The Duc Pham (University Imformation of Technology, Vietnam); Trong-Hop Do (University of Information Technology, Ho Chi Minh City & Vietnam National University, Ho Chi Minh City, Vietnam)

Abstract: Flight delay is an unexpected incident in the field of aviation in particular and transportation in general. Predicting the possibility or delay of flights plays a vital role in proactively arranging a time for the airline as well as increasing the reputation of the airline among users. This study presents an implementation of a real-time flight delay prediction system. To ensure the practicality, the entire system is built using big data technology. Apache Kafka is used to stream the flight data to trained machine learning models integrated inside Apache Spark to output real-time prediction results, which will be displayed through a dashboard and stored in Cassandra database simultaneously. Consequently, the system can process a huge amount of input data and produce prediction results in real-time.

(14:30) Design and Testing on Migration of Remiss-Supply in Banking System to Microservice Architecture

Author: Alwi Maulana (Institut Teknologi Telkom Purwokerto, Indonesia); Pradana Ananda Raharja (Institut Teknologi Telkom Purwokerto, Indonesia & Fakultas Informatika, Indonesia)

Abstract: The architectural migration of the banking service system from a monolithic architecture to a microservices architecture is now comprehensive. However, service applications that adapt to a monolithic architecture have many shortcomings at the time of development. This paper analyses, migration, and testing microservices architecture to meet the needs of banking services at PT. Bank Negara Indonesia with the scrum method. The Scrum method focuses on analysis, data inquiry migration, details inquiry, remis-supply, deployment, and testing. The test results on migrating banking services to microservices can be applied and have non-constant performance.

(14:45) School Zoning System for Student Admission using Constrained K-Means Algorithms

Author: Andi Alviadi Nur Risal (Hasanuddin University, Indonesia); Zahir Zainuddin (University of Hasanuddin, Indonesia); Muhammad Niswar (Universitas Hasanuddin, Indonesia)

Abstract: The issuance of the Regulation Minister of Education and Culture number 51 of 2018 regulates new student admission by implementing a zoning system to achieve equal distribution of education quality in every school, especially at the high school level in Makassar city. This study aims to cluster the school zoning area based on the closest distance between the student's domicile and the school location. The dataset used is 22 school locations and 2248 student location data. In this paper, the method used is constrained k-means to cluster the prospective new students to each school. The constrained k-means method works based on the value of K as the closest cluster center to the value of N (cluster members) with a linear programming algorithm (LPA) approach so that each cluster has a balanced N member. The results of this study can overcome the unbalanced data distribution problem with an average cluster member value of 103 and the absence of empty clusters in each school/centroid. Thus, the system can be implemented in the new student admissions process as a reference in determining the optimal and accurate school zoning area based on the cluster center.

(15:00) Classifying Leaf Types using the Artificial Neural Network Method by Optimizing Parameter Iteration

Author: M Alfian Dzikri, S Ayu Septianingrum, Nova Rijati and Pujiono Pujiono (Universitas Dian Nuswantoro, Indonesia)

Abstract: The variegated leaves represent a mosaic of one or more non-green leaf regions. Different leaf folding patterns aroused early interest in the taxonomy of different leaf species. With many studies related to leaf types, this research is proposed using the Artificial Neural Network (ANN) classification method. In the process, this study with a dataset of 275 leaf types, uses a 5-step iteration optimization in which to determine the number of folds using a loop from a minimum of 2 to a maximum of 10, and 21 features are used. This study resulted in an accuracy of 92.8% on the 4751st iteration, the 8th number of folds, 100 neural training cycles, 0.5 neural learning rate, and 0.6 momentum, and also generated an RMSE of 0.264 with a standard deviation of (+/-) 5.73%.

(15:15) Ensemble of the Distance Correlation-Based and Entropy-Based Sensor Selection for Damage Detection

Author: Jimmy Tjen, Genrawan Hoendarto and Tony Darmanto (Universitas Widya Dharma Pontianak, Indonesia)

Abstract: In this paper, a novel ensemble Principal Component Analysis (PCA) algorithm is proposed to detect the presence of damage by exploiting the structure's historical data. In particular, there are 2 main contributions highlighted in this paper: First, a sensor selection algorithm is derived from the distance correlation coefficient from the correlation analysis, to reduce the number of sensors without affecting the model accuracy and fault detection sensitivity. Next, a novel technique based on the combination of the distance correlation-based and the previously introduced entropy-based PCA, is derived, to generate the ensemble PCA algorithm, which can be

used to detect structural damages and improves the robustness of the previous methods. The presented algorithms are validated on three different damage cases, providing evidence that the proposed ensemble PCA algorithm outperforms the previous approaches, in the sense that it improves the fault detection sensitivity and model prediction accuracy, while also offering information on the most sensitive subset of sensors in detecting faults.

Technical Session
Thursday, November 3th 2022
(13:45 – 15:45)
Parallel Session 2
Room 2
Code Session: DSA1825
Title Session: Technical Session Data Science and Artificial Intelligence

(13:45) Mandibular segmentation on panoramic radiographs with CNN Transfer Learning

Author: Nur Nafi'iyah, Chastine Fatichah and Darlis Herumurti (Institut Teknologi Sepuluh Nopember, Indonesia); Eha Renwi Astuti (Universitas Airlangga, Indonesia); Esa Prakasa (BRIN, Indonesia)

Abstract: Gender identification and age estimation can use the mandible bone on panoramic radiographs. The identification process using the system requires a segmentation stage. Mandibular segmentation is research that has been done a lot to get an accurate object result. The purpose of this study was to segment the mandible on a panoramic radiograph using transfer learning CNN (MobileNetV2, ResNet18, ResNet50). The CNN method has been done before, so we tried to use the CNN method to produce clear and complete mandibular segmentation results on panoramic radiographs. The dataset used to train the model was taken from the Dental Hospital, Airlangga University, Surabaya. There are thousands of datasets, and based on the criteria of a radiologist, the data used are 38 images. The best result of mandibular segmentation on panoramic radiographs is the MobileNetV2 method because the highest Jaccard mean value is 0.9522.

(14:00) Clustering Stress Reactivity based on Heart Rate Variability during Acute Mental Stress Task

Author: Auditya Purwandini Sutarto, Nailul Izzah and Mohamad H Hariyadi (Universitas Qomaruddin, Indonesia)

Abstract: Stress reactivity refers to an individual's ability to cope with job stress, influenced by her/ his subjective emotional and physiological reactions in various stressful situations. Despite extensive research on the association of heart rate variability (HRV) and productivity indicators, very few studies to date have utilized HRV change for grouping individual stress reactivity. This paper aims at identifying subjects based on their cardiovascular stress reactivity, indicated by HRV parameters, on an acute mental stress task. We performed a k-means clustering analysis using the Nbclust package in R environment to classify 162 healthy subjects according to their heart rate and HRV indexes reactivity between baseline and mental stress tasks into $k = 2$ and $k = 3$ number of clusters. We found that $k = 3$ could differentiate subjects with similar patterns into two groups but with different magnitudes of reactivity (high and low) and one group for those who experienced the opposite pattern. Our study offers potential use of such a classification in the implementation of workplace health promotion programs and to assign the right jobs or tasks to employees.

(14:15) GRU-MF: A Novel Appliance Classification Method for Non-Intrusive Load Monitoring Data

Author: Aji Gautama Putrada, Nur Alamsyah, Syafrial Fachri Pane and Mohamad Nurkamal Nurkamal Fauzan (Telkom University, Indonesia)

Abstract: Appliance classification using non-intrusive load monitoring (NILM) data is a growing research interest. Various studies in the field have used methods such as long short-term memory (LSTM), recurrent neural network (RNN), convolutional neural network (CNN), and deep neural network (DNN). However, there is a research opportunity to apply a gated recurrent unit (GRU), which is good for low-frequency data, with filtering mode (MF) for smoothing prediction results. This study proposes a novel GRU-MF method for classifying electricity appliances using power data from NILM. The first step in this research is to get NILM data. We use

power data from the dishwasher, heater, refrigerator, and lighting. Then the first stage of data pre-processing consists of auto-correlation and time series-data transformation processes. The second stage of pre-processing data consists of normalization, standardization, label encoding, and one hot encoding process. The next stage is GRU training, where we compare the GRU with four benchmark methods: LSTM, CNN, DNN, and RNN. We tested the performance of our proposed model with Accuracy, P recision, and Recall. Finally, we implement MF to improve the performance of our appliance classification model. The test results show that our novel method is better than the LSTM, RNN, CNN, and DNN models. The GRU model itself has Accuracy = 0.96 on test data. Once combined into GRU-MF, we achieve the Accuracy of 0.98 in real data.

(14:30) GAN Based Medical Image Augmentation for Increased ELM Performance Pap Smear Classification

Author: Rando Rando, Noor Akhmad Setiawan and Adhistya Erna Permanasari (Universitas Gadjah Mada, Indonesia); Riries Rulaningtyas (Airlangga University, Indonesia); Andriyan B. Suksmono (Bandung Institute of T echnology, Indonesia); Imas Sukaesih Sitanggang (Bogor Agricultural University, Indonesia)

Abstract: Cervical cancer is one of the deadliest diseases in women. One of the cervical cancer screening methods is pap smear method. However, using a pap smear method to detect cervical cancer takes a long time for a pathologist to diagnose. Hence, a rapid development of medical computerization for early detection to get the results quickly is needed. This paper proposes synthetic data augmentation by using Deep Convolutional Generative Adversarial Network (DCGAN) to increase number of pap smear samples in dataset. Gray Level Co-occurrence Matrix (GLCM) is employed to extract features from dataset. Classification of 3 classes which are Adenocarcinoma, High-Grade Squamous Intraepithelial Lesion (HSIL), and Squamous Cell Carcinoma (SCC) is conducted using Extreme Learning Machine (ELM). The result shows that the addition of synthetic data improves the performance of ELM with the accuracy of 90%. This accuracy is better than the accuracy of ELM using only the original dataset which is 85%.

(14:45) n-Mating Effect on Genetic Algorithm-Based Clustering Performance for Hotspots Data

Author: Rani Rotul Muhima (Institut Teknologi Adhi Tama Surabaya, Indonesia)

Abstract: This study aims to explain the effect of variations in the number of individuals mated with father (n-mating) on the performance of Genetic Algorithm Polygamy (GAP) clustering. GAP clustering is clustering method based genetic algorithm with polygamy crossover. We evaluate the performance GA based clustering for hotspot data with three clustering evaluation, namely Sum Square Error, Davies-Bouldin Index, and Silhouette Coefficient. Based on experimental result, GA Polygamy clustering outperforms GA clustering based on SSE and SC. n-mating in the crossover process of GAP clustering affects GAP clustering performance also performance of time to convergence of GAP clustering.

(15:00) A study of Convolution Neural Network Based Cataract Detection with Image Segmentation

Author: Nina Sevani, Hendrik Tampubolon, Jeremy Wijaya, Lukas Cuvianto and Albert Salomo (Krida Wacana Christian University, Indonesia)

Abstract: Timely and precise cataract detection is crucial to managing the risk and preventing blindness for cataract's patients. This paper proposed a framework for automatic cataract detection consisting of the K-Means clustering-based segmentation (KMSeg) and Convolutional Neural Network (CNN). At first, data pre-processing was performed. Then, KMSeg is responsible for characterizing the input images into a subgroup of color. Lastly, three CNN were employed based on DCNN, ResNet18, and ResNet50 backbones for feature learning and classification task. An extensive study was examined on Fundus and Front Eye datasets with numerous experimental settings. The result shows that the proposed KMSeg-CNN is able to maintain accuracy yet provides a faster training and testing execution time across dataset.

(15:15) A Novel License Plate Image Reconstruction System using Generative Adversarial Network

Author: Vy-Hao Phan and Minh-Quan Ha (University of Information Technology, Vietnam); Trong-Hop Do (University of Information Technology, Ho Chi Minh City & Vietnam National University, Ho Chi Minh City, Vietnam)

Abstract: This paper deals with the problem of license plate reconstruction, which is a method used for enhancing the quality of images of vehicle license plates in parking lot management systems. More specifically, poorly capture images of vehicle license plates which are unrecognizable by both human eyes and computer will be reconstructed so that they can be perceptible. This paper proposes a two-stage deep learning based algorithm for this problem. In the first stage, the position of the license plate in the image is detected using a YOLOv4 based transfer learning model. In the second stage, the image area of the license plate detected in the previous stage is fed to Pix2Pix, which is a type of Generative Adversarial Networks for the reconstruction. The experiment results show that by applying the proposed algorithm, license plate images with blur and flare can be transformed in to clear images which can be read by human eyes or can be used as inputs for computer vision applications such as license plate recognition.

(15:30) A Small-Scale Temperature Forecasting System using Time Series Models Applied in Ho Chi Minh City

Author: Nam Quoc Nguyen, Thang Chau Phan, Khanh Phuoc Bao Truong, Hong Thi Thuy Dang and Trong-Hop Do (University of Information Technology, Ho Chi Minh City & Vietnam National University, Ho Chi Minh City, Vietnam)

Abstract: Weather forecasting is an important application for urban life as it can reduce weather-related losses, protect public health and safety, and support for economic development and quality of life. This paper focuses on building a small-scale temperature forecasting system using state-of-the-art time series model. To this end, the temperature in Ho Chi Minh City is collected. Then, multiple machine learning and deep learning based time series models are implemented and their performances corresponding to different length of input data are examined. The best model is selected to build a small-scale temperature forecasting system. The proposed system is especially suitable for an indoor temperature forecasting system used in smart agriculture, which cannot be achieved with any large-scale temperature forecasting systems.

Technical Session
Thursday, November 3th 2022
(13:45 – 15:45)
Parallel Session 2
Room 3
Code Session: COM0612
Title Session: Technical Session Communication

(13:45) Linear Filter Design for FBMC-OQAM Transceiver

Author: Davide Mattera (Università degli Studi di Napoli Federico II, Italy); Mario Tanda (Università di Napoli Federico II, Italy)

Abstract: The FBMC-OQAM transceiver is increasingly investigated for its use in multiple-access uplink scenario where timing and power control of the different terminals is not carried out. This is becoming a critical issue in modern multi-operator radio access networks. The use of FBMC-OQAM, however, is attractive when a simple equalizer with a few taps is able to perform correct equalization. This is possible when the number of subcarriers is correctly set in consequence of the existing multipath delay spread of the digital channel. In this paper we provide an extension of a general matrix description of the considered transceiver that is much useful for correctly setting the overall number of subcarriers that allows simple channel equalization.

(14:00) Triangular Patch Antenna Using Coplanar Waveguide and DGS Techniques for 5G Communications

Author: Nurhayati Nurhayati, Mohammad Iyo Agus Setyono and Alga Mardhiarta Yundha Tama (Universitas Negeri Surabaya, Indonesia)

Abstract:.This article proposes a new design of a triangular microstrip patch antenna using a coplanar waveguide and defected ground surface technique for use in 28 GHz 5G network communication. The antenna is designed using a Rogers RT 5880 substrate with a relative permittivity (εr) of 2.2, a substrate height (h) of 0.5 mm, and a loss tangent (tan) of 0.009. The simulation results that have been carried out show a return loss of -19.770 dB and a VSWR of 1.229. The working frequency of this antenna is 27.85 GHz and the frequency setting is obtained by adjusting the length and width of the feed and the dimensions of the patch on the antenna. The antenna bandwidth obtained is 2.036 GHz.

(14:15) Coplanar Vivaldi Antenna with wave slot structure for RADAR application

Author: Nurhayati (Universitas Negeri Surabaya, Indonesia); Eko Setijadi (Institut Teknologi Sepuluh Nopember, Indonesia)

Abstract: This study purposes a new design of coplanar Vivaldi antenna using a Wave Slot structure that could be applied for radar applications. The Coplanar Vivaldi Antenna works in the frequency of 0.5 to 4.87 GHz. By adding a wave slot structure at the edge of the patch on both sides of the coplanar patch, it can increase the directivity of the antenna. We compare five types of Coplanar Vivaldi Antenna (CVA) with Wave Slot (WS) structures with different positions and tilt angles ie: Regular Coplanar Vivaldi Antenna (RCVA), Vertical Wave Slot Coplanar Vivaldi Antenna (VWS-CVA), Horizontal Wave Slot Coplanar Vivaldi Antenna (HWS-CVA), Left Tilt Wave Slot Coplanar Vivaldi Antenna (LTWS-CVA) and Right Tilt Wave Slot Coplanar Vivaldi Antenna (RTWS CVA). From the simulation results, an antenna with a wave structure can increase directivity. At frequency 2.5 GHz LTWS-CVA gots a directivity of 6,38 dBi while RTWS-CVA reaches a directivity of 8,44 dBi. At frequency 2 GHz, HWS-CVA yields an improvement of directivity as 4.92 dBi if it compares with RCVA, hence it could be applied for radar application.

(14:30) Performance Evaluation of LoRa 915 MHz for Health Monitoring with Adaptive Data Rate

Author: Puput Dani Prasetyo Adi (National Research and Innovation Agency (BRIN-RI), Indonesia & UNMER-Malang, Indonesia)

Abstract:.One of the problem factors in transmitting LoRa data using a small bit rate (bytes) of a maximum of 125 kbps is the amount of packet loss. This is because many end nodes send data to the server simultaneously; transmitting data effectively needs to be done because this is a major thing. So one mechanism that can be done is to use the Adaptive Data Rate method on the LoRa module. This research discusses the Adaptive Data Rate shown explicitly by the way it works and the effect it gives if ADR is applied to transmitting LoRa data. And how much influence on packet Loss (bytes). Adaptive Data Rate on LoRa Transmission is essential for regulating power on LoRa in terms of battery power saving; LoRa runs in UHF, which is in the 300 MHz-3 GHz range; LoRa in this research works at 915 MHz-920 MHz depending on the type of devices used. LoRa works with power or supply voltage of 2.1-3.6 Volt DC, high sleep currents between 7.66 A up to 34 mA; in this research, LoRa is M2M between LoRa Transmitter and Receiver, which communicate alternately in sending sensor data with the delay method used for monitoring human health such as Pulse sensors, ECG sensors, and other sensors and these sensors' data is displayed in realtime using Thingspeak Application Server.

(14:45) Network Planning and Performance Analysis for 5G mmWave in Urban Areas

Author: Nasaruddin Nasaruddin (Syiah Kuala University, Indonesia); Nuzuar Rafli and Yunida Yunida (Universitas Syiah Kuala, Indonesia); Rusdha Muharar (Syiah Kuala University, Indonesia)

Abstract: The millimeter wave (mmWave) 5G technology has a frequency with a wavelength between 1-10 millimeters and large bandwidth of 1 GHz, which can cope with the demand for capacity due to increasing cellular users. Therefore, to assist in implementing the 5G mmWave network, this paper conducts network planning for

the 5G mmWave in urban areas using two Base Transceiver Stations (BTS) for macrocells. In the planning, we consider five scenarios based on 8, 16, 32, 64, 128, and 256 antennas and a hybrid beamforming technique consisting of analog and digital beamforming. Furthermore, the link budget is analyzed to determine the received power and bit rate at the micro base station (BTS) from macro-to-micro BTS transmission and the user equipment (UE) from micro BTS-to-UEs transmission to evaluate the performance of the planned network. The simulation of the planned network has been conducted, and the results show that the large number of antennas used on both the transmitter and receiver sides, the greater the receiving power and bit rate. Besides that, the signal-to-interference-plus-noise ratio (SINR) strength for two cases (64 and 256 element antennas) also achieves the highest SINR, which reaches 22 dB.

(15:00) Performance analysis of FBMC-PAM systems in frequency-selective Rayleigh fading channels in the pres

Author: Davide Mattera (Università degli Studi di Napoli Federico II, Italy); Mario Tanda (Università di Napoli Federico II, Italy)

Abstract: Although orthogonal frequency division multiplexing (OFDM) schemes are widely used for their advantages related, for example, to the low complexity equalization, they present some issues related to the spectral efficiency reduction due to the insertion of the cyclic prefix and the contained out-of-band attenuation, and, moreover, to the strict synchronization requirements. Filter bank multicarrier (FBMC) techniques are emerging alternatives to OFDM for applications such as machine type communications or cognitive radio. In particular, the FBMC-PAM scheme based on a sine prototype filter assures a reduced system latency and is robust to carrier-frequency offset. In this paper the performance of FBMC-PAM systems in Rayleigh-fading frequency selective channels in the presence of a phase estimation error, is analyzed. Specifically, an analytical expression for the SER is derived and compared with simulation results.

(15:15) A 4x4 Microstrip Feeder Antenna Design using Dolph-Chebyshev for Receiving Himawari-8 Satellite Data

Author: Muhammad Riza Darmawan and Catur Apriono (Universitas Indonesia, Indonesia)

Abstract: This study proposes the design of a planar microstrip array antenna with a rectangular patch shape as a feed antenna for a parabolic antenna system at the Himawari-8 satellite data receiving earth station. The antenna works in the frequency range of 3.8 - 4.2 GHz. Simulation using CST Microwave Studio. The planar microstrip array antenna design uses a Rogers RT/Duroid-5880 substrate with a dielectric constant of 2.2 and a thickness of 1.575 mm. The techniques and methods are proximity coupled feed, corporate feed, Dolph-Chebyshev, Wilkinson unequal power divider, double layer substrate, and a parabolic reflector. Simulation of a 4x4 planar microstrip array antenna with Rogers RT/Duroid-5880 material produces a bandwidth of 717.4 MHz at 3.6899 - 4.4073 GHz, a gain of 18.97 dB at 4.148 GHz, a directivity of 19.45 dB at 4.148 GHz, 97.54% efficiency, HPBW for the horizontal direction of 13.9° and HPBW for the vertical direction of 9.8°, and the resulting radiation pattern is directional. A 4x4 planar microstrip array antenna as a feed antenna with a 2.4-meter parabolic reflector produces a bandwidth of 717.4 MHz at 3.6899 - 4.4073 GHz. The gain is 26.57 dB at 4.148. GHz, the directivity of 27.04 dB at 4.148 GHz, the efficiency of 98.27%, HPBW for the horizontal direction of 4.6° and HPBW for the vertical direction of 1.4°, and the resulting radiation pattern is directional.

Technical Session
Thursday, November 3th 2022
(13:45 – 15:45)
Parallel Session 2
Room 4
Code Session: COM1320
Title Session: Technical Session Communication

(13:45) LEO Satellite Authentication using Physical Layer Features with Support Vector Machine

Author: Mohammed Hammouda and T. Aaron Gulliver (University of Victoria, Canada)

Abstract: To overcome terrestrial network coverage limitations, low-earth orbit (LEO) satellites aim to provide worldwide connectivity for sixth generation (6G) networks. However, LEO satellites are vulnerable to spoofing attacks. To overcome this limitation, physical layer authentication (PLA) can be employed to provide effective satellite authentication by utilizing physical features. In this paper, an adaptive PLA scheme is proposed using a single-class classification support vector machine (SCC-SVM) with received power (RP) and Doppler frequency spread (DS) features. The proposed scheme is evaluated for on-the-pause satellite communication (OTPSC) systems. The results obtained show that using both RP and DS as features provides better authentication performance than when they are used individually.

(14:00) Designing QPSK Modulator Using LTspice-Based Discrete Components

Author: Andicho Haryus Wirasapta (Gadjah Mada University, Indonesia); Prapto Nugroho (Universitas Gadjah Mada, Indonesia); Sigit Basuki Wibowo (Gadjah Mada University, Indonesia)

Abstract:.QPSK (Quadrature Phase Shift Keying) is one of the digital modulation techniques that is able to encode two bits per symbol based on data that has been divided into two parts, namely even data bits and odd data bits to minimize the bit error rate (BER). In this work, a QPSK modulator is designed using discrete components based on LTspice in order to support developments in digital communication systems for information exchange especially for low frequency applications. QPSK modulator consist of data sources, odd-even data dividers, carrier signals, balanced modulator, odd-even modulated signals and OpAmp circuits. After the entire cicuits of QPSK modulator have been designed by using LTspice, then simulation testing can be carried out in each circuit and the whole, so that it can be known whether the circuit is worked properly. After the testing has been carried out, it was found that the output in each circuit and overall modulator was in accordance with the expected where the QPSK modulator was able to generate a QPSK modulated wave with a frequency of 2 MHz and a data frequency of 500 kHz. This result can be used as a reference to be implemented into a prototype, because the results are not much different from the implementation.

(14:15) Threshold-Based Physical Layer Authentication for Space Information Networks

Author: Mohammed Hammouda and T. Aaron Gulliver (University of Victoria, Canada)

Abstract: To overcome terrestrial network coverage and reliability limitations, the space information network (SIN) provides worldwide access to internet-based services. SIN is heavily reliant on low-earth orbit (LEO) satellites. However, because of its tremendous architecture, SIN poses greater authentication concerns, such as spoofing attacks, than traditional networks. Hence, an adaptive physical layer authentication (PLA) scheme is proposed in this paper to provide effective authentication for LEO satellites. In the proposed scheme, Doppler frequency spread (DS) and received power (RP) characteristics are used. Moreover, hypothesis testing with a threshold is used to distinguish between legitimate and illegitimate satellites. The proposed scheme is being evaluated for use in on-the-move satellite communication (OTMSC) systems. The results obtained show that using the combination of RP and DS characteristics provides the highest authentication performance, followed by using the DS and then the RP characteristic.

(14:30) FER Polar Codes Performances Using 5G Broadband Channel with CP-OFDM Techniques at 2.3 GHz Frequency

Author: Reni Dyah Wahyuningrum (Institut Teknologi Telkom Purwokerto, Indonesia); Khoirun Ni'amah (Institut Teknologi Telkom Purwokerto & Telkom University, Indonesia); Solichah Larasati and Shinta Romadhona (Institut Teknologi Telkom Purwokerto, Indonesia)

Abstract: The use of high frequencies in the 5G system results in the technology being sensitive to the surrounding environment and attenuation such as human blockage. This study analyzes the performance of frame error rate (FER) based on polar code and without polar code on broadband channels that are affected by human blockage using a frequency of 2.3 GHz, bandwidth of 99 MHz, and the CP-OFDM technique. The purpose of this research is to determine the performance results and analyze the FER parameters using polar codes and without polar codes on 5G network broadband channels that are affected by human blockage which has been validated with outage performances. Broadband channels on the 5G network are presented in a representative Power Delay

Profile (PDP) with the influence of human blockage obtained as many as 41 paths with multiple delays of 10 ns on each path. This research also uses the scaling method on representative PDP because it adjusts the use of FFT of 128 blocks and the results of this scaling show that there are 9 paths with multiple delays of 50 ns. This research evaluates the average FER 10^(-3). FER performance without a polar code is affected by human blockage R=1 requiring a Signal to Noise (SNR) of 41 dB and using a polar code R=1/2 requires an SNR of 20.1 dB. The results show that the utilization of cyclic prefix (CP)-OFDM with channel coding helps the diversity effect of 5G transmissions to achievable.

(14:45) Recent Trends in the Reconfigurable Intelligent Surfaces (RIS): Active RIS to Brain-controlled RIS

Author: Muhammad Miftahul Amri (Sungkyunkwan University, Korea (South))

Abstract: Rises as a promising technology for future wireless communications, Reconfigurable Intelligent Surfaces (RIS) have brought many potentials. RIS consists of a massive number of unit cells, each of which can be tuned individually to induce a manipulation of the wireless signal properties. These properties include the signal's phase, magnitude, frequency, and even polarization. In this manuscript, we briefly present the recent trends in RIS research. This manuscript covers the trends in the development of active RIS, various RIS control elements comparison (i.e., electronics, mechanics, and materials approaches), flexible and transparent RIS, RIS lens and RIS mirror, and the most-recent brain-controlled RIS paradigm. This review was derived from the recent high-quality meta-analyses, reviews, and original research papers related to the recent RIS works. We extensively searched online libraries such as IEEE, Nature, Scopus, and Google Scholar for those articles. There were no limitations on the year of the publications. In this manuscript, we consider any research study types written in English (excluding unpublished data, technical notes, and submitted manuscripts). As a result, we have gathered more than 50 references related to the recent RIS research. While RIS promised attractive capabilities for reconfiguring the wireless environment, several challenges are lying ahead and must be overcome. Among those, there are two major challenges: multiplicative fading effect and channel estimation problems.

(15:00) Indoor Positioning System for Campus Building Based on WLAN Fingerprint

Author: Mohammad Edar Paradise Wibowo, Mohammad Raudya Hananditya and Firdaus Firdaus (Universitas Islam Indonesia, Indonesia); Noor Azurati Ahmad and Azlan Adi (Universiti Teknologi Malaysia, Malaysia)

Abstract: Today, buildings have many floors and rooms. The buildings usually provide a conventional map that shows the name and location of the existing rooms. The use of conventional maps is currently considered less effective because ordinary people who visit to find the desired location have difficulty. GPS is unreliable because the signal is not strong enough to pierce the building. A solution is proposed to create an Android application-based system that can detect the location of humans in the building by utilizing a Wi-Fi signal. The proposed system has a level of accuracy in the room-scale, where the system can find out where the user is in which room. The system was tested in the Faculty of Industrial Technology Building, Universitas Islam Indonesia, with an accuracy of 72% on a room-scale. The level of system accuracy is affected by the device's ability to receive signals, and the signal from the access point is not always stable. Overall, the designed system can detect where the user is when accessing the application.

(15:15) Techno-Regulation Analysis of Micro Operator in Industrial Area

Author: Melati Sabila Putri, Bambang Setia Nugroho and Helni Jumhur (Telkom University, Indonesia)

Abstract:.Indonesia has started the deployment of 5G networks to continue to develop in terms of telecommunications. However, accelerating the deployment of a 5G network will take a long time because the cost of deploying infrastructure is not cheap, and getting permits to build infrastructure in an area isn't easy. In 5G, it has a new business model, namely micro operators. Micro operators are 5G service deployments outside the deployment and Mobile Network Operators (MNO). Implementing micro operators can accelerate the deployment of 5G networks and connectivity distribution. With this approach, an analysis of the implementation of micro operators in Jababeka using the mmwave 28 GHz is carried out. From the results, there is an increase in the population. Scenario 1 shows a negative trend and scenario 3 show a positive trend. That means Indonesia can

adopt scenario 3 to implement micro operator for the booster 5G network. that affects the rise in the number of gNB built in the area. In terms of regulation, Law Number 36 of 1999, Government Regulation Number 52 of 2000, Law Number 11 of 2020, and Government Regulation Number 46 of 2021 are the basis for discussing the proposed micro operator regulation based on existing rules in Indonesia

(15:30) Private 5G Network Capacity and Coverage Deployment for Vertical Industries: Case Study in Indonesia

Author: Asri Wulandari Asri (Politeknik Negeri Jakarta, Indonesia); Alfin Hikmaturokhman (Institut Teknologi Telkom Purwokerto & Universitas Indonesia, Indonesia); Marfani Marfani (PT Telkomsel, Indonesia)

Abstract: The business and industrial worlds are implementing the Internet of Things (IoT) more and more, which impacts the use of cellular networks as a connectivity provider platform. The presence of the 5G network provides a solution by offering the flexibility to build a public or personal network to support vertical industry needs. The goal of this study is to create a private 5G network in the Jababeka Industrial Area, with an area of 35 km2. To determine the optimal number of gNodeB, this study applies a planning method depending on capacity and coverage at 2300MHz and 40MHz BW to get the best number of gNodeB needs when implemented by the Private 5G Network. According to the capacity analysis, setting up a private 5G network requires in downlink are 69 gNodeB and in uplink are 65 gNodeB. As for coverage, it takes 44 gNodeB for uplink and 69 gNodeB for downlink. These findings indicate that 69 gNodeB is the ideal number of nodes needed for the Jababeka industrial region. With these results, the coverage analysis using Atoll found the SS-RSRP value was-92, 76 dBm, falling under the "Good" category and the SS-SINR value is 6.94, falling under "Normal." Also, the value for the need of traffic demand was 2688 Mbps/km2, having a maximum data throughput for the uplink of 1.456 Gbps and the downlink of 1.361 Gbps.

Technical Session
Thursday, November 3th 2022
(13:45 – 15:45)
Parallel Session 2
Room 5
Code Session: NET0613
Title Session: Technical Session Network

13:45) Performance Comparison of Web Server Application on Single Board Computer

Author: Mega Pranata (Institut Teknologi Telkom Purwokerto); Aditya Wijayanto and Muhammad Fajar Sidiq (Institut Teknologi Telkom Purwokerto, Indonesia)

Abstract: This research aims to compare two Web Servers on Single board computer (SBC). Sbc is usually used for IoT applications because only needs a small amount of power and compact in size. Raspberry Pi 4 Model B with 8GB of RAM and 128GB SD Card is used in this research. We compare Apache Web Server and Nginx as web servers. WordPress and Apache Benchmark is used to evaluate the performance of web servers. The servers were tested with 10, 25, 50 and 100 concurrent connections with 1000 connections every test.

14:00) Tracking Device for The Mountaineers Using GPS

Author: Ari Endang Jayati (Institut Teknologi Sepuluh Nopember & Universitas Semarang, Indonesia)

Abstract: The use of the telecommunications system is now very sophisticated and growing very rapidly. One of the telecommunication system is often used to connect to the monitor using the mapping system is GPS. GPS tracker system is commonly used for and get the data mapping from satellites as navigation system. The purposed of the research that will be done is to give information on the where abouts of the mountaineers on the minimum communication resources and provides a guide to the evacuation team, if things happen that are outside of the security in order to be immediately carried out the action. The first method will do is by designing a system that will be built to make the devices and program it, then do the testing devices and trackers the mountaineer program

to get accurate results. Research conducted in this hoped can give to the inaccuracies as a tracking device the mountaineers who are doing the climb.

14:15) Sybil Attack Detection on ITS-V2X System using a Realistic Traffic Model-based Approach

Author: Afdhal, Ahmadiar and Ramzi Adriman (Universitas Syiah Kuala, Indonesia)

Abstract: V2X system is a cooperative communication network developed for ITS based-on information technology. ITS-V2X system can enable the provision of reliable and real-time information flow in increasing traffic efficiency, driving comfort, safety, and enabling internet connectivity in vehicles. However, the ITS-V2X system is very vulnerable to attacks, infiltration, and sabotage from various irresponsible individuals. Sybil Attack is one type of malicious attack that disrupts the communication system in a structured, systematic, and massive force. This attack works by replicating and multiplying fake nodes with multiple identities according to the attacker's goals. Sybil's nodes will be acting as a group of vehicles by other vehicles in the transmission area. These nodes are not only visible but also capable of sending fake messages to their neighbors. This work proposes an approach allowing the detection of Sybil attacks using a realistic traffic model-based. This approach considers the benefits of real vehicle movement and the degree of freedom of vehicle mobility based on several attributes and parameters on the road network topology. The results show this approach can detect and classify vehicles that are Sybil's nodes or real cars by comparing the current speed prevalence of each vehicle with the estimated approximate vehicle speed generated from a realistic traffic model. The other finding result shows this approach is also able to discover the attack detection loads based on the level of traffic density.

14:30) Deep Feature Selection for Machine Learning based Attack Detection Systems

Author: Minh-Tri Huynh, Hoang-Trung Le, Xuan-Ha Nguyen and Le Kim-Hung (University of Information Technology, Vietnam)

Abstract: The typical intrusion detection system (IDS) based on machine learning classifies normal and attack network traffic by extracting and analyzing network features. However, several extracted features are irrelevant and may degrade the classification accuracy. In addition, they also increase the training time and model size. Therefore, feature selection is an essential process in building an IDS system. In this paper, we propose a feature selection method for IDS by employing a Deep Neural Network model to search and select the most crucial features. The proposal is evaluated with two datasets: UNSW-NB15 and CIC-IDS2017, and archives superior results compared with other feature selection algorithms with accuracy up to 99.96% for UNSW-NB15 and 99.91% for CIC-IDS2017 while combining with LSTM-based IDS.

14:45) LoRA Gateway Coverage and Capacity Analysis in Urban Area For IoT Smart Gas Meter Demand

Author: Kalam Adhiansyah Lutfie (University of Indonesia, Indonesia); Prima Dewi Purnamasari and Dadang Gunawan (Universitas Indonesia, Indonesia); I Ketut Agung Enriko (Institut T eknologi Telkom Purwokerto & PT Telkom Indonesia, Indonesia)

Abstract: Today, the deployment of LoRa gateway in Indonesia uses only traditional methods by predicting the coverage and capacity without using formulas related to LoRa gateway performance or considering area type (urban, suburban, or rural). This paper conducts the study and research for coverage and capacity analysis of LoRa Gateway to cover all sensor device demands. The formula is calculated to save more resources and optimize the performance of the LoRa gateway covering all demands needed for Smart Gas Meter devices in Urban areas. The location taken as a model is Jakarta City. In order to obtain the number of gateways to cover all smart gas meter demands, this paper uses the Okumura-Hata formula to obtain coverage prediction for each gateway. It uses time on air and interval concepts to determine capacity per interval times. The calculation result is about 4 LoRa gateways need to be deployed, and the interval of transmission data is about once per 35 minutes to cover all Smart Gas Meter devices in Jakarta.

15:00) Feasibility Evaluation of Compact Flow Features for Real-time DDoS Attacks Classifications

Author: Muhammad Fajar Sidiq (Institut Teknologi Telkom Purwokerto, Indonesia); Akbari Indra Basuki (National Research and Innovation Agency (BRIN), Indonesia); Nanda Iryani (Institut Teknologi Telkom Purwokerto, Indonesia); Arief Indriarto Haris and Rd Angga Ferianda (BRIN, Indonesia)

Abstract: According to the research trend, training Distributed Denial of Services (DDoS) attacks classifier using network flow features will yield higher classification performances and efficiency than the per-packet-based approach. Nonetheless, the existing flow-based classifier uses bloated features and offline flow extraction that is not suitable for real-time DDoS protection. This study investigates the feasibility of compact flow features that are directly extractable using a programmable switch for real-time DDoS attack classification. The proposed method considers only four flow features: IP protocols, packet counter, total byte counter, and the delta time of a network flow. The evaluation results on the CICDDoS2019 dataset showed a comparable classification performance to the works that use bloated features (24 - 82 features). The best result was achieved by decision tree and random forest classifier showing > 89.5 % scores in accuracy, precision, recall, and F1-score. The proposed models can classify 10 out of 12 DDoS attacks correctly, failing only to discriminate between SSDP and UDP-based DDoS attacks. In addition, the trained classifier shows better generalization ability by retaining similar performances on unseen 42.8 million flow data while trained on < 200 thousand flow data. At last, the proposed method is suitable for real-time application since it supports quick classification performance of up to 9.6 million flow inferring per seconds on Decision Tree classifier.

15:15) An IoT-Based System for Water Quality Monitoring and Notification System of Aquaculture Prawn Pond

Author: Ramzi Adriman, Maya Fitria and Afdhal (Universitas Syiah Kuala, Indonesia)

Abstract: The quality of pond water greatly affects the main factor of prawn survival and its aquaculture productivity. The checking process of the prawn pond water quality is generally very simple and is done manually by the cultivator. Thus, it is necessary to have a system that can assist the cultivator in monitoring the condition of the ponds at all times with accurate data. This work aims to develop an IoT-based system that not only monitors the quality of water in a prawn pond but also warns the users when the quality of the water pond is not in great condition. This system is constructed using several main components, namely the pH sensor, the salinity sensor, the ultrasonic sensor for reading the water level of the pond, and the microcontroller ESP32 to process all input data. The parameters read by the sensors are stored in cloud firebase to be forwarded and displayed on the Android application which is built in the flutter framework. The evaluation results showed that the system can proficiently monitor the water condition, as well as send the notification to the user when the parameter values are not in a normal range.

15:30) Design of Spectrum analyzer Android-based Instructional Media for Vocational High School Student

Author: Assa K Rohana and Adythia E Nugraha (SMK TELKOM JAKART A, Indonesia); Rohani Cristyn (Penabur Christian Senior High School Kota Wisata, Indonesia); Kukuh Harsanto and Garrison Lee (SMK TELKOM JAKARTA, Indonesia)

Abstract: This research aims to produce spectrum analyzer instructional media that will be implemented in Radio Transmission Operations and Maintenance subjects. Research development adopts the ADDIE model according to William W. Lee & Diana L. Owens, which includes analysis, design, development and implementation, and evaluation. In the development and implementation steps, there are activities in the form of expert validation of instructional media based on Android applications. Theory experts, media experts, and users were necessary for the evaluation. Furthermore, the spectrum analyzer instructional media was tested on learning activity in Telecommunication Transmission Engineering Skill Competency at SMK Telkom Jakarta. The gain from the range of questionnaire values is converted to determine the eligibility category. The results showed that teaching and learning activities in operating and maintaining radio transmission subjects require instructional media for practical activity learning in the form of software on an Android-based smartphone consisting of theory, quiz, and job sheets; and a manual guide of media. The research results show that the value of the spectrum analyzer instructional media quality, in general, is 3.46, which is interpreted in the excellent category. Because

the Android-based spectrum analyzer instructional media obtained an excellent feasibility value, this media reliable to be implemented in classroom learning.

Technical Session
Friday, November 4ᵗʰ 2022
(09:10 – 10:25)
Parallel Session 3
Room 1
Code Session: DSA2730
Title Session: Technical Session Data Science and Artificial Intelligence

(09:10) Portable Air Quality Monitoring System in ANN Using Combination Hidden Layer Hyperparameters

Author: Haniah Mahmudah, Cindy Ulan Purwanti, Rahardhita Sudibyo, Ilham Dwi Pratama and Nur Menik Rohmawati (Politeknik Elektronika Negeri Surabaya, Indonesia)

Abstract: The transportation and industrial sectors are growing rapidly, with positive and negative consequences in the form of air pollution. According to the Global Alliance on Health and Pollution. (GAHP), 3.4 million people died from air pollution-related causes worldwide in 2017, with 123,700 of them dying as a result of air pollution. As a result, a portable system was built in this study to monitor air quality and categorize it using the Artificial Neural Network (ANN), with the classification results displayed on an Android application. Air quality classification is accomplished by varying the hyperparameters of the Artificial Neural Network (ANN), such as the number of hidden layer neurons, dropout, and batch size, while utilizing the gas parameters PM10, PM2.5, NO2, SO2, CO, and O3. The classification results will also be classified into five categories: good, moderate, satisfactory, poor, and very poor air quality. The system is intended to give accurate results.

(09:25) Performance of Deep Learning Benchmark Models on Thermal Imagery of Pain through Facial Expressions

Author: Raihan Islamadina (Universitas Islam Negeri Ar Raniry, Indonesia); Khairun Saddami (Universitas Syiah Kuala, Indonesia); Maulisa Oktiana (Syiah Kuala University, Indonesia); Taufik F. Abidin (Universitas Syiah Kuala, Indonesia); Rusdha Muharar (Syiah Kuala University, Indonesia); Fitri Arnia (Universitas Syiah Kuala, Indonesia)

Abstract: Pain recognition can be done by identifying facial expressions through a taxonomic system of human facial movements coded by FACS (Facial Action Coding System) which categorizes physical expressions of emotions. The FACS objective description of changes in facial expression is generated by muscle movement based on 30 Action Units (AU). However, FACS requires 100 units of coding time with a painstaking coding procedure that is unlikely to be useful in a busy clinical setting. Recently, research on pain recognition through facial expressions has developed in the field of deep learning, namely with pain recognition from self-reported Visual Analogue Scale (VAS) pain levels, as well as pain recognition through facial expressions using the UNBC McMaster Shoulder database dataset. and Multimodal Pain Intensity (MintPain) database for facial pain-level recognition in the form of visual/RGB images. This study focuses on the comparison of several methods (e.g., ResNet, MobileNetV2, and EfficientNet) of deep learning using transfer learning concepts for pain recognition through facial expressions using thermal images from the MintP Ain database. The first step is to arrange the dataset in the form of training data and test data based on good quality and have the same size. Next, fine-tuning the learning parameters focuses on the effect of the epoch. Finally, a performance analysis is carried out from the results of training and testing.

(09:40) Sliding Mode Control of Angular Speed DC Motor System

Author: Alfian Ma'arif (Universitas Ahmad Dahlan, Indonesia); Iswanto Iswanto, Is (Universitas Muhammadiyah Yogyakarta, Indonesia); Aninditya Anggari Nuryono, Aan (Mulia University, Indonesia); Nia

Maharani Raharja (Universitas Gadjah Mada, Indonesia); Hari Maghfiroh (Universitas Gadjah Mada & IEEE SB UGM, Indonesia)

Abstract: A sliding mode control (SMC) was proposed to control the angular speed of the DC motor. Moreover, a detailed performance comparison of the method with Proportional Integral Derivative (PID) Control was presented. The research was done using simulation in Simulink MATLAB, requiring a DC motor model in transfer function to be defined first. The SMC has a better response than the PID control based on the results. System response was considered robust, with no overshoot.

(09:55) Oil Palm Leaf Disease Detection on Natural Background Using Convolutional Neural Networks

Author: Anindita Septiariniand Hamdani (Universitas Mulawarman, Indonesia); Eko Junirianto (P oliteknik Pertanian Negeri Samarinda, Indonesia); Mohammad Sofyan S Thayf (STMIK KHARISMA Makassar, Indonesia); Gandung Triyono (Universitas Gadjah Mada, Indonesia); Henderi (University of Raharja, Indonesia)

Abstract: Oil palm plant diseases typically manifest themselves on the leaves, resulting in reduced crop quality. It is necessary to solve this issue as the need for premium-quality palm oil keeps growing. Despite the fact that various automatic detection models for oil palm leaf disease have been developed, their performance was frequently inadequate due to the similarity of class characteristics. This work proposes a method that automatically detects the oil palm leaf disease on a natural background to distinguish between infected and healthy leaf classes. The method was developed using deep learning based on Convolution Neural Network (CNN) model. The private dataset consists of 600 oil palm leaf images (300 healthy and 300 infected) on a natural background. In order to decrease the computation time, pre-processing was carried out, which consists of resizing and normalizing the image, followed by augmentation. Augmentation was applied by rotation, flip, shear, and zooming techniques. Furthermore, the CNN model was employed to detect oil palm leaf disease using Tensorflow 2.5.0 framework with 224×224 input data. The proposed method successfully achieved the highest performance, revealed by the accuracy value of 1.

(10:10) Decision Making via Game Theory for Autonomous Vehicles in the Presence of a Moving Obstacle

Author: Marina Vicini, Sercan Albut and Elvina Gindullina (University of Padova, Italy); Leonardo Badia (Università degli Studi di Padova, Italy).

Abstract: We consider an emergency maneuver scenario involving two autonomous vehicles interacting with a road obstacle characterized by a random behavior. We employ game theory to solve the resulting problems, first framing a static game of compete information, and further adding incomplete information about the obstacle so as to transform it into a Bayesian game. Depending on the considered scenario, the autonomous vehicles can have multiple available actions, such as to stay at the same lane and swerve and move to another one. These actions can lead to different outcomes, such as keep driving on an empty lane, hit the obstacle, or hit another car. We analyse the Nash equilibria of the game and test the hypothesis that the knowledge of one vehicle about an obstacle can be advantageous to other road participants, which is key in the context of connected vehicles.

Technical Session
Friday, November 4th 2022
(09:10 – 10:25)
Parallel Session 3
Room 3
Code Session: COM2226
Title Session: Technical Session Communication

(09:10) Hiding Document Format Files Using Video Steganography Techniques With Least Significant Bit Method

Author: Tufail Akhmad Satrio, Wahyu Adi Prabowo and Trihastuti Yuniati (Institut Teknologi Telkom Purwokerto, Indonesia)

Abstract: In this study, an application will be made to hide files into videos or commonly called Video Steganography. In order for the inserted data file to be more secure, the video steganography technique is combined with the cryptographic technique, namely Fernet. The secret file will be inserted into the video frame that has the largest size. The video used is a video with .mp4 format and the files used in inserting messages into the video are files with .docx and .pdf formats. The method used in this steganography video is Least Significant Bit (LSB). The resulting embedding output is an embedded video with .mp4 format, while the resulting extraction output is a file with a format that matches the file inserted in the embedded video. The results of PSNR value on file insertion in the 2nd bit have a PSNR value of >40 dB so that it can be categorized as feasible to use, while the file insertion on the 4th and 6th bits has a PSNR value of <40 dB so it can be categorized as not feasible for used because there is noise that can be seen with the naked eye. Embedded video has a very large size compared to the original video, and the resulting extraction file is the same as the original file. The speed of the file insertion and file extraction process is influenced by the number of Frames Per Second (FPS) of a video, the more frames it takes, the longer it takes.

(09:25) Error Rate Performance of Equatorial HF Skywave MIMO Packet Radio

Author: Elsa Lolita Anggraini, Gamantyo Hendrantoro and Titiek Suryani (Institut Teknologi Sepuluh Nopember, Indonesia)

Abstract: The use of High Frequency (HF) channels equipped with data-link protocols for the process of sending data has proven to be useful for communication systems in remote areas. However, the HF channel has propagation conditions that tend to be unstable, therefore a Multiple Input Multiple Output (MIMO) system is needed to be able to increase the capacity of the HF channel. In this paper, we utilize a MIMO 2×2 system to maximize the ability of the HF channel and use the third generation of Automatic Link Establishment (ALE) data-link protocol which is equipped with double layer error coding in the form of Cyclic Redundancy Check (CRC) and Convolutional Code (CC). The MIMO 2×2 system will be compared with the Single Input Single Output system to see the increase in channel capacity. From these results, the addition of a MIMO 2×2 system and the third generation of ALE proved to increase the channel capacity and protect the data from errors due to disturbances during the transmission process through the HF channel.

(09:40) Analysis of Microwave Absorber Using Sugarcane Bagasse for 27 - 29 GHz Frequency

Author: Yougha Budi Prahmana, Ayu Mika Sherila and Umaisaroh Umaisaroh (Universitas Mercu Buana, Indonesia); Erfan Handoko (Universitas Negeri Jakarta, Indonesia); Mudrik Alaydrus (Universitas Mercu Buana, Indonesia)

Abstract: Several electromagnetic absorber researches have been mentioned, most of which aim to absorb this harmful electromagnetic radiation. By using biomaterial instead of polyurethane or polystyrene foam for absorber was a beneficial to the nature. This study suggested a sugarcane bagasse as a material for absorber in a 27-29 GHz frequency work. In order to demonstrate the absorption behavior of the sugarcane bagasse, we simulated using HFSS. The dielectric constant and loss tangent used are 0.161 and 1.44, respectively. The results confirmed that the thickness of the absorber significantly influences the effectiveness of microwave absorption. Both simulation and measurement results obtain a good performance of the sugarcane bagasse absorber over 29 GHz frequency is in a round shape with a diameter of 70 mm and a thickness of 20 mm in a reflection factor of -33.18 dB and -20.42 dB. At the same time, an absorber with a diameter of 90 mm and thickness of 10 mm produced a reflection factor of -29.62 and -25.81 dB.

(09:55) Trajectory and Power Optimization for Buffer-Assisted Amplify-and-Forward UAV Relay

Author: Naga manoj Makkena (International Institute of Information of Technology, Hyderabad, India); P Ubaidulla (International Institute of Information Technology, India)

Abstract: This paper proposes a buffer-assisted amplify-and-forward (AF) unmanned aerial vehicle (UAV) relay for communication between two ground nodes without a direct link. These communications are essential in disaster rescue areas where fairness plays a significant role. To achieve fairness, we aim to maximize the minimum information rate. The traditional way of prefixed scheduling the time slots to transfer and receive at the UAV does

not guarantee that the communication system uses high signal-to-noise ratio (SNR) communication links instead of low SNR links. Therefore, we choose to employ a buffer at the UAV to store the information and transfer it to the destination nodes in the high SNR links. The pairing of time slots is necessary here since we are using a buffer, and we do not know in which time slot data is transmitted to the destination node after it is received at the UAV. Consequently, we formulate a fairness maximization problem by jointly optimizing the trajectory and power control. Unfortunately, this formulation results in a non-convex problem. We propose a solution based on the principles of the minorize-maximize (MM) algorithm and linear programming relaxation techniques to solve the fairness problem and pairing of time slots. Numerical results demonstrate that the trajectory, power control, and paired slots favor the UAV and ground nodes to communicate in the high SNR channel links, thus maintaining fairness.

(10:10) Robustness Analysis of 5-Element Overlapped Linear Subarrays for Wide Angular Scanning Applications

Author: Titis Cahya Pertiwi (Institut Teknologi Sepuluh Nopember, Indonesia); Fannush Shofi Akbar (Institut Teknologi Telkom Surabaya, Indonesia); Gamantyo Hendrantoro (Institut Teknologi Sepuluh Nopember, Indonesia); Leo P. Ligthart (em. prof. Delft University of Technology & Universitas Indonesia, Bejing Institute of Technology, ITS Surabaya, The Netherlands)

Abstract: A phased array design method with a wide scanning angle composed of several integrated subarrays to mitigate scan loss (SL) and side lobe level (SLL) problems has been previously reported in the literature. This paper discusses the robustness of the overlapped subarray, one of the subarrays for suppressing SL and SLL in the phased array if one of the elements or the feeder is damaged. Such a damage potentially causes changes in the directivity pattern of the subarray and the full array. Robustness analysis in the paper needs to be carried out for four cases. In the first case, one of the two edge elements, namely elements 1 and 5, is damaged, while in the second case, one of the elements 2 and 4 is damaged. Because element three is overlapped and is supplied by two suppliers, in the third case, the analysis needs to be carried out in conditions where element three is damaged or in case four if one of the suppliers is disconnected. The decrease in reliability of the subarray overlap design under poor conditions affects the range of angles of the scan direction, which increases in magnitude to close to 6 dBi.

Technical Session
Friday, November 4th 2022
(09:10 – 10:25)
Parallel Session 3
Room 4
Code Session: NET1418
Title Session: Technical Session Network

(09:10) Implementation of the Internet of Things for Flood Mitigation and Environmental Sustainability

Author: Muhamad Azrino Gustalika (Institut Teknologi Telkom Purwokerto, Indonesia); Sudianto Sudianto (Telkom Institute of Technology Purwokerto, Indonesia); Diandra Chika Fransisca, Fahrudin Mukti Wibowo, Mas Aly Afandi and Reni Dyah Wahyuningrum (Institut Teknologi Telkom Purwokerto, Indonesia)

Abstract: One of the components that support the smart city program is the existence of a smart environment. A smart environment is a form of environmental management by paying attention to the environment in future city development. The current problem is that smart cities in Indonesia are not optimal, especially regarding flood mitigation handling sources from rivers and river water quality. Floods in urban areas often cause material losses and cause fatalities, especially with the increasing significance of the impact of climate change, which is difficult to predict. Thus, there is a need for sustainable Internet of Things (IoT)-based river monitoring to monitor river water levels and quality. This research aims to apply the Internet of Things for flood mitigation and environmental sustainability. The architecture used is using Antares as a cloud media. The results obtained by monitoring the river showed that the influence of the provider in sending sensor data is influenced by the availability of network service facilities in locations. In addition, the fastest data transmission lasts five seconds. At the same time, the suitability of data transmission occurs in under two minutes.

09:25)   DRL-Based Secure Beamforming for Hybrid-RIS Aided Satellite Downlink Communications

Author: Quynh Tu Ngo, Khoa Tran Phan, Abdun Mahmood and Wei Xiang (La Trobe University, Australia)

Abstract: In this paper, a secure multiuser MISO satellite downlink communication system is considered with the assistance of a hybrid reconfigurable intelligent surface (RIS). A robust satellite and RIS beamforming joint design is formulated to maximize the overall system secrecy rate. The RIS active and passive elements are optimized considering practical models of the outdated channel state information and power consumption. Deep reinforcement learning is leveraged to solve the highly dynamic and multi-dimensional beamforming design problem. Simulation results confirm the beamforming design effectiveness and the performance gains when exploiting hybrid-RIS over conventional passive RIS.

09:40)   Investigated insider and outsider attacks on the federated learning system

Author: Ibraim Ahmed (University of Mosul, Iraq & College of Science, Iraq); Manar Kashmoola (Mosul University, Iraq)

Abstract: Nowadays, many people are interested in smart systems since the number of uses for them is rapidly expanding. Smart systems, such as those used in 6G applications, rely heavily on distributed machine learning techniques like federated learning. Security and performance are the biggest problems with federated learning (FL), which could be affected by poisoning attack models. This paper suggests a new framework for federated learning that makes it more secure against GANs and Sybil poisoning attacks. The proposed framework, called FED-CCF, uses federated learning with Microsoft CCF to make a hybrid environment (Confidential Consortium Framework). It creates a safe and trustworthy environment that tricks attackers who are trying to break into federated learning. The MNIST dataset is used to check how well the FL model with FED CCF works in terms of accuracy. The FL model is tested by using the MNIST dataset and 30% of malicious devices that use the GAN and Sybil attacks. Experiments with the proposed system and FED CCF show that it works 96% of the time, with no Sybil poisoning attacks and only 0.18% GAN poisoning attacks.

(09:55) Analysis of Transmitter Half Angle and FOV Variations on Multiplexing Indoor Li-Fi Communication

Author: I Wayan Mustika (Universitas Gadjah Mada, Indonesia); Fauza Khair and Anggun Fitrian Isnawati (Institut Teknologi Telkom Purwokerto, Indonesia); Dwi Edi Setyawan (Institut Teknologi Telkom Surabaya, Indonesia); Arrizky Ayu Faradila Purnama (Institute of Technology Telkom Surabaya & Faculty of Electrical Technology and Intelligent Industry, Indonesia)

Abstract: Light fidelity (Li-Fi) is the communication technology that is in great demand for future technology because it provides communication services with the high bandwidth, especially for indoor communication. However, Li-Fi requires the proper device placement to meet line of sight (LOS) conditions as the primary requirement for visible light communication (VLC). Therefore, this study aims to design the multiplexing indoor Li-Fi communication model for 4 channels by varying the parameters of transmitting and receiving parameters including transmitter half angle and field of view (FOV). The investigation is carried out for variations in the angle value of 30o up to 75o and 25 nm channel spacing using bit rate of 20 Mbps per channel. System performance observations include the parameter of received, signal to noise ratio (SNR), Q-factor and bit error rate (BER). Result of this study shown that increasing the value of transmitter half angle and FOV causes the decrease in system performance which is indicated by an increase in the BER value and the decrease in the Q-Factor value. Based on the proposed model scheme shown that the fourth channel has the best performance compared to the other channels.

Technical Session
Friday, November 4th 2022
(09:10 – 10:25)
Parallel Session 3
Room 5
Code Session: NET1923
Title Session: Technical Session Network

09:10)   Performance Analysis of Eigenface Method for detecting organic and non organic waste type

Author: Aditya Wijayanto (Institut Teknologi Telkom Purwokerto, Indonesia); Afifah Dwi Ramadhani (Politeknik Elektronika Negeri Surabaya, Indonesia); Muhamad Azrino Gustalika and Alon Jala Tirta Segara (Institut Teknologi Telkom Purwokerto, Indonesia)

Abstract: Indonesia is one of the largest countries in Asia with a very dense population. According to data from The World Bank, human population indicators in Indonesia in 2019 increased by 270 milion people. This shows that population density in Indonesia is related to world problems related to waste generated from households. The household sector contributes as the top waste producer in Indonesia. Landfilling that occurs without any waste sorting, results in waste being more difficult to decompose and difficult to recycle. Therefore, to overcome this problem, it is necessary to increase public awareness about waste sorting and processing. We propose to create a device that can help sort organic and non-organic waste with Computer Vision-based Artificial Intelligence technology using the Eigenface method and the Internet of Things. Eigenface is a method that has a working principle by using XML files in performing face recognition. The result of testing in this system can run well, where the system detects organic objects the door of the chopping machine can open and if it detects nonorganic, the machine door is closed. The accuracy result for organics is 80% and for inorganic 85%. This is due to the lack of variation in the dataset and changes in the physical condition of the object.

09:25)   Soft FFR Scheme for Distributed D2D Communication in Multicell of Cellular Communication Networks

Author: Soraida Sabella, Misfa Susanto, Fx Arinto Setyawan and Fadil Hamdani (University of Lampung, Indonesia)

Abstract: The increasing demands for multimedia mobile traffics in cellular communication results has resulted in a massive increase in interests of researchers to increase network capacity and to improve the network quality. Device to Device (D2D) communication has emerged as a promising technology to improve spectral efficiency further. In a conventional cellular network, cellular users or Cellular User Equipment (CUE) communicate with each other through a central coordinator such as a base station (BS) or E node B (eNB). D2D communication allows the users (D2D pair) communicate directly each other without going through eNB. However, enabling D2D communication in the cellular networks cause the interference issues, since D2D devices share the frequency bandwidth with the conventional cellular networks, i.e., in-band D2D. The interference situations become more worse in the multicell scenario of cellular system. This paper proposes a resource allocation method for D2D communication in cellular systems using soft Fractional Frequency Reuse (FFR) scheme. Extensive simulation experiment has been carried out and the performance parameters in terms of Signal to Interference plus Noise Ratio (SINR), throughput, and Bit Error Rate has been measured. The simulation results show that the proposed soft FFR can improve the cellular network with a number of D2D pairs deployed. SINR performance achieves 50% improvement with 100 D2D pairs deployed in the cell center of macrocell.

09:40)   New Approach of Ensemble Method to Improve Performance of IDS using S-SDN Classifier

Author: Amarudin Amarudin (Universitas Teknokrat Indonesia, Indonesia); Ridi Ferdiana (Universitas Gadjah Mada, Indonesia); Widy Widyawan (Gadjah Mada University, Indonesia)

Abstract: The application of Machine Learning (ML)-based Intrusion Detection System (IDS) has been widely used. The advantage of ML-based IDS is that it can detect attacks in the network. However, in its application, there are still false positive detections on the IDS. False positive detection occurs due to improper ML techniques.

This research applies an S-SDN model based on Ensemble Learning (EL) to overcome this problem. The S-SDN model is built from three base-learners, namely Support Vector Machine (SVM), Decision Tree (DT), and Naïve Bayes (NB) with the Stacking technique. Furthermore, the S-SDN model is used as a classifier on the IDS to detect intrusions. S-SDN was validated using the UNSW-NB15 dataset. Based on the experiment, S-SDN's performance was superior to the old method based on a single classifier. The performance of S-SDN can achieve an accuracy of 83.19%. In comparison, the old method based on a single classifier (SVM) can only achieve an accuracy of 75.89% and the ensemble classifier (Bagging-DT) only 80,09%. As for further research, the development of EL-based IDS still needs to be improved. For example, it builds an EL-based model with feature selection techniques and different base learners.

09:55)   Security Analysis and Improvement for Satellite and Mobile Network Integration

Author: Meiling Chen (CMRI, China)

Abstract: An important feature of 6G is to realize the integrated three-dimensional coverage of air, space, earth and sea areas, which requires the deep integration of ground network and air network on the basis of interconnection, so as to provide high-quality coverage and network services for all areas. The integration of terrestrial mobile network and nonterrestrial network will bring new security challenges. Based on the integrated architecture analysis of 3GPP, SAT5G and ETSI, this paper summarized architecture models and analyzed security risks and requirements for each model. According to the requirements, this paper proposes a protocol conversion module, an enhanced satellite access authentication algorithm, and a new wireless security negotiation mechanism to solve the security risks faced during the integration process.

(10:10) Quality Control Through Game Theory of a Cascading Multi-robot Machine Vision System

Author: Samuele Benfatti, Ivano Donadi and Elvina Gindullina (University of Padova, Italy); Leonardo Badia (Università degli Studi di Padova, Italy)

Abstract: In this paper we analyze automated probabilistic quality control from a game theoretic point of view. Quality control is a key component of many industrial production lines and in the recent years there has been a push to automate this task, thanks to the advances in industrial manipulators with machine learning and vision capabilities. We formalize a serial multi-robot quality control model and analyze it in comparison with single-robot models, both theoretically and through some instance scenarios.

Table of Contents

Berlian Al Kindhi (Institut Teknologi Sepuluh Nopember, Indonesia)

Alwi Maulana (Institut Teknologi Telkom Purwokerto, Indonesia); Pradana Ananda Raharja (Institut Teknologi Telkom Purwokerto, Indonesia & Fakultas Informatika, Indonesia)

Browse ⌄   My Settings ⌄   Help ⌄   Institutional Sign In

Institutional Sign In

All   ⌄

🔍

ADVANCED SEARCH

Conferences > 2022 IEEE International Confe... ❓

Design of Spectrum Analyzer Android-based Instructional Media for Vocational High School Student

Publisher: IEEE   **Cite This**   📄 **PDF**

Assa Kesthy Rohana ; Rohani Cristyn ; Adythia Esha Nugraha ; Kukuh Harsanto ; Garri...   **All Authors** •••

9
Full
Text Views

Alerts

Manage Content Alerts

Add to Citation Alerts

Abstract

Document Sections

I.   Introduction

II. Methods

III. Results and Discussion

IV. Conclusion

Authors

Figures

References

Keywords

Metrics

More Like This

📄
Downl
PDF

Abstract: This research aims to produce spectrum analyzer instructional media that will be implemented in Radio Transmission Operations and Maintenance subjects. Research developme... **View more**

▶ **Metadata**

Abstract:

This research aims to produce spectrum analyzer instructional media that will be implemented in Radio Transmission Operations and Maintenance subjects. Research development adopts the ADDIE model according to William W. Lee & Diana L. Owens, which includes: analysis, design, development and implementation, and evaluation. In the development and implementation steps, there are activities in the form of expert validation of instructional media based on Android applications. Theory experts, media experts, and users were necessary for the evaluation. Furthermore, the spectrum analyzer instructional media was tested on learning activity in Telecommunication Transmission Engineering Skill Competency at SMK Telkom Jakarta. The gain from the range of questionnaire values is converted to determine the eligibility category. The results showed that teaching and learning activities in operating and maintaining radio transmission subjects require instructional media for practical activity learning in the form of software on an Android-based smartphone consisting of theory, quiz, and job sheets; and a manual guide of media. The research results show that the value of the spectrum analyzer instructional media quality, in general, is 3.46, which is interpreted in the excellent category. Because the Android-based spectrum analyzer instructional media obtained an excellent feasibility value, this media reliable to be implemented in classroom learning.

≣ Contents

I. Introduction

7th President Ir. Joko Widodo conveyed that the development of Human Resources is necessary that bring Indonesia compete in the needs of the 4.0 industry [1]. In order to develop and increase the industry, it requires workers with hard and soft skills. Therefore, vocational secondary education provides besides the mission: Improving the quality of learning at Vocational High Schools to produce graduates who are competitive in work [2]. However, graduates of Vocational High School is highest the education unit that have unemployment rate on 2021 [3]. Information and Communication Technology is the highest unemployment rate out of 9 scope in Vocational High School in 2019 [4]. Meanwhile, the projected workforce needs in the Information and Communications sector will grow by more than 10% annually from 2022–2025 [5]. One of the hard skills in Information and Communication Technology sector is measuring tools operation. Based on the survey of several parties in the field of Information and Communication Technology, namely Vocational High School students, bachelor students, and practitioners, the least measurement instrument to understood is spectrum analyzer with a frequency of 31.34%.

Sign in to Continue Reading

Authors	⌄
Figures	⌄
References	⌄
Keywords	⌄
Metrics	⌄

IEEE Personal Account	Purchase Details	Profile Information	Need Help?	Follow
CHANGE USERNAME/PASSWORD	PAYMENT OPTIONS VIEW PURCHASED DOCUMENTS	COMMUNICATIONS PREFERENCES PROFESSION AND EDUCATION TECHNICAL INTERESTS	US & CANADA: +1 800 678 4333 WORLDWIDE: +1 732 981 0060 CONTACT & SUPPORT	f in ⅋

IEEE Account	Purchase Details	Profile Information	Need Help?

» Change Username/Password   » Payment Options   » Communications Preferences   » **US & Canada:** +1 800 678 4333

» Update Address   » Order History   » Profession and Education   » **Worldwide:** +1 732 981 0060

                                » View Purchased Documents » Technical Interests   » Contact & Support

About IEEE *Xplore* | Contact Us | Help | Accessibility | Terms of Use | Nondiscrimination Policy | Sitemap | Privacy & Opting Out of Cookies