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Gandung Triyono <gandung.triyono@budiluhur.ac.id>

Invitation to Review Manuscript ID: ACRT-2026-0103 [AI, Computer Science and Robotics Technology Journal]

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ReView

Journal: AI, Computer Science and Robotics Technology

Manuscript ID: ACRT-2026-0103

Paper Title: MineDense: Mining-Domain Dense Retrieval Using Large Language Model-Generated Query–passage Training Data

Author(s): Ebenezer Cobbinah, Rajive Ganguli

Dear Dr Triyono,

I am pleased to invite you to review the paper "MineDense: Mining-Domain Dense Retrieval Using Large Language Model-Generated Query–passage Training Data" (Manuscript ID: ACRT-2026-0103) for the AI, Computer Science and Robotics Technology journal. Given your expertise in this scientific field, we believe your contribution to this paper would be valuable.

The abstract for this paper is available in the extension of this email. It would be greatly appreciated if you could respond to this invitation within 3 days. Please let me know if you are interested in reviewing the article or need more time to consider the invitation.

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Don't hesitate to contact our Editorial Office for any assistance by replying to this email.

Thank you for your time and consideration.

Sincerely,

Professor Paulo Quaresma
Editorial Board Member

IntechOpen Journals - Editorial Office
AI, Computer Science and Robotics Technology

MANUSCRIPT ID ACRT-2026-0103 INFORMATION:

TITLE: MineDense: Mining-Domain Dense Retrieval Using Large Language Model-Generated Query–passage Training Data
AUTHOR(S): Mr Ebenezer Cobbinah, Professor Rajive Ganguli

ABSTRACT:

Retrieving relevant passages from technical mining documents is challenging because operational, geotechnical, geological, and metallurgical concepts are often expressed with specialized,

inconsistent, and site-specific terminology that general-purpose retrievers may not capture. This study develops MineDense retrieval models, mining-domain dense retrieval encoders trained on large language model (LLM)-generated query–passage training data from technical mining corpora. The method combines LLM-based query generation, domain filtering, deduplication, hard-negative mining, and guided contrastive training to align retrievers with mining-document search behavior. The study focuses on semantic retrieval across exploration, mine planning, geotechnical, and mineral-processing documents. Two dense retrievers were trained. The primary retriever, MineDense-MPNet, was initialized from multi-qa-mpnet-base-cos-v1 and trained on 597,652 query-positive pairs, with up to four explicitly mined negative passages per training pair. A held-out set of 40,000 samples was used for evaluation. On the held-out set, MineDense-MPNet improved Accuracy@1 from 0.36 to 0.58, Accuracy@10 from 0.61 to 0.80, and Mean Reciprocal Rank at 5 (MRR@5) from 0.43 to 0.65 relative to the base model. A compact variant, MineDense-MiniLM, retained most of MineDense-MPNet’s retrieval performance, supporting lower-memory, lower-cost, and local or mine-site deployment scenarios. Secondary embedding-geometry analysis did not indicate severe semantic-space compression or collapse. The resulting models provide mining-adapted dense retrievers for technical mining corpora, trained on LLM-generated query–passage data and hard-negative examples.

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ACRT-2025-0259 | Research paper



A Blended Likelihood Approach for Achieving Fairness Using Naïve Bayes

Journal: acrt | **Submitted by:** Dr Charles Roland Haruna^{Corresp.} | **Submitted date:** 14-12-2025 20:35

[View Article](#) | **Review:** completed | **Assigned to:** Dr Gandung Triyono (Reviewer) | **Accepted date:** 19-05-2026 05:27 | **Completed date:** 20-05-2026 09:21

ACRT-2026-0103 | Research paper



MineDense: Mining-Domain Dense Retrieval Using Large Language Model-Generated Query–passage Training Data

Journal: acrt | **Submitted by:** Professor Rajive Ganguli^{Corresp.} | **Submitted date:** 31-05-2026 01:59

[View Article](#) | **Review:** completed | **Assigned to:** Dr Gandung Triyono (Reviewer) | **Accepted date:** 08-07-2026 21:09 | **Completed date:** 20-07-2026 14:39

MineDense: Mining-Domain Dense Retrieval Using Large Language Model-Generated Query-passage Training Data

Status Review | Article type Research paper | Article ID ACRT-2026-0103 | Submitted by Professor Rajive Ganguli | Date submitted 31-05-2026 | Days since submission 78

Current Version

Article Details

Article details	Questionnaire answers
Basic details	
Article ID	ACRT-2026-0103
Article title	MineDense: Mining-Domain Dense Retrieval Using Large Language Model-Generated Query-
Submitted article type	Research paper
Current status	Revised Review
Sections	Expand AI
Abstract	Retrieving relevant passages from technical mining documents is challenging because oper concepts are often expressed with specialized, inconsistent, and site-specific terminology th develops MineDense retrieval models, mining-domain dense retrieval encoders trained on l training data from technical mining corpora. The method combines LLM-based query gener mining, and guided contrastive training to align retrievers with mining-document search be exploration, mine planning, geotechnical, and mineral-processing documents. Two dense re MPNet, was initialized from multi-qa-mpnet-base-cos-v1 and trained on 597,652 query-posi passages per training pair. A held-out set of 40,000 samples was used for evaluation. On the from 0.36 to 0.58, Accuracy@10 from 0.61 to 0.80, and Mean Reciprocal Rank at 5 (MRR@5) fi variant, MineDense-MiniLM, retained most of MineDense-MPNet’s retrieval performance, su deployment scenarios. Secondary embedding-geometry analysis did not indicate severe sei models provide mining-adapted dense retrievers for technical mining corpora, trained on LI examples.
Keywords	EMBEDDING MODEL SEMANTIC SEARCH DOMAIN ADAPTATION MINING INDUSTRY
Submitted by	Professor Rajive Ganguli
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Generated pdf	Preview PDF

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Attachments

File name	File intended for	File description	File
IntechOpen_Journal_Article_Sentence_Embedder_Paper_MineDense_v5.pdf	✓ Production ✓ Review	Manuscript	0.5!

Review

Review by Gandung Triyono on 20-07-2026

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Is the work in scope for the journal it is submitted to and does it contain sound science which will be of interest to researchers in the same field (negative and null results are permitted)?	Yes
Does the paper follow the journal's manuscript structure, with good language and use of figures/tables and references? (Please note authors for whom English is a second language should not be penalised but instead please highlight papers which might need additional copy editing if suitable for publication - language alone is not a reason to reject a manuscript).	Yes
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These comments will be sent directly to the author without editing and any suggestions for improvement, if required.

Remember:

- Focus on the scientific content of the article.
- Don't reject articles based on their layout or English language.
- Comment on importance, validity and generality of methods.
- Comment on general logic and on justification of interpretation.
- Suggest additional experiments or analyses which will be necessary.

General Comments

This manuscript presents MineDense, a dense retrieval framework paragraph pairs. The topic is timely and relevant to current research for technical domains characterized by specialized terminology and is clearly described, and the experimental results demonstrate novelty. Nevertheless, although the study presents promising results, several particular, the manuscript requires a clearer statement of novelty, better position the proposed method within the current state of the art.

Major Comments

1. The novelty of the proposed approach should be better articulated. The proposed framework combines several well-established techniques: guided contrastive learning. Although the application to the mining contribution differentiates MineDense from previous approaches, the authors are encouraged to explicitly identify the novel aspects and methodological differences between MineDense and existing domain.

2. The experimental baselines are insufficient. The experimental comparison is limited to the original MPNet and domain adaptation, it does not adequately position the proposed method. It is recommended to include comparisons with widely used retrieval baselines. Such comparisons would significantly strengthen the experimental results.

3. The evaluation protocol should follow standard Information Retrieval. The retrieval performance is evaluated using Accuracy@k and Mean Hits@k, commonly adopted. Since each query appears to have only one relevant document, Hits@k).

The authors may consider adopting the standard IR terminology (e.g., retrieval studies).

Furthermore, the evaluation would be more comprehensive if additional metrics like Mean Average Precision (MAP) are included.

4. An ablation study is missing. The proposed framework consists of multiple components, including guided contrastive learning. However, the manuscript does not quantify the contribution of each component. An ablation study is strongly recommended to demonstrate the effectiveness of each component.

5. Statistical significance analysis should be included. Although the reported improvements are substantial, it is unclear if they are statistically significant. The authors are encouraged to perform statistical significance tests (e.g., p-values).

6. The discussion should provide deeper technical insights. The discussion section mainly summarizes the numerical improvements. The manuscript would benefit from a deeper analysis addressing the following questions:

- Why does hard negative mining improve retrieval performance?
- Why does MineDense-MiniLM achieve performance close to MineDense?
- Why does cosine similarity decrease after fine-tuning?
- How does the increase in participation ratio relate to embedding quality?

A more analytical discussion would considerably strengthen the manuscript.

7. Error analysis should be provided. The manuscript would be considerably strengthened by including an error analysis. For example, the authors could present: Representative queries, Topicality analysis, Tuning, Analysis of why incorrect passages were retrieved. Such analysis would provide valuable insights into the strengths and weaknesses of the framework.

8. Computational efficiency should also be evaluated. Since the manuscript compares MPNet and MiniLM, it would be beneficial to evaluate computational efficiency metrics like embedding dimensionality, Inference latency, Memory consumption, Embedding size, etc. These results would improve the practical relevance of the study for real-world applications.

Minor Comments

1. The Research Gap section should conclude with a more explicit statement of the research objectives.

2. The methodology lacks several important implementation details: configuration, and hardware specifications. Providing these details would improve reproducibility.

3. A more detailed workflow diagram illustrating the complete pipeline would improve readability.

4. The experimental tables could be enhanced by reporting relative improvements over baselines.

5. The conclusion primarily summarizes the experimental findings and implications, limitations, and future research directions.

Review decision	Major revision
Decision explanation	Major Revision, the manuscript addresses a relevant and timely re data. The proposed methodology is well structured and the report revisions before it is suitable for publication. In particular, the nov strengthened through comparisons with state-of-the-art retrieval practice, and the discussion should provide deeper technical insig impact of the work.
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