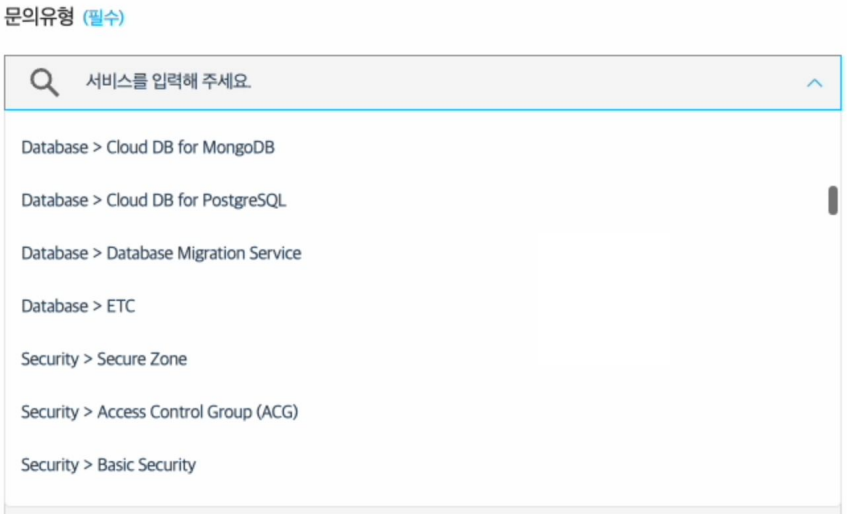
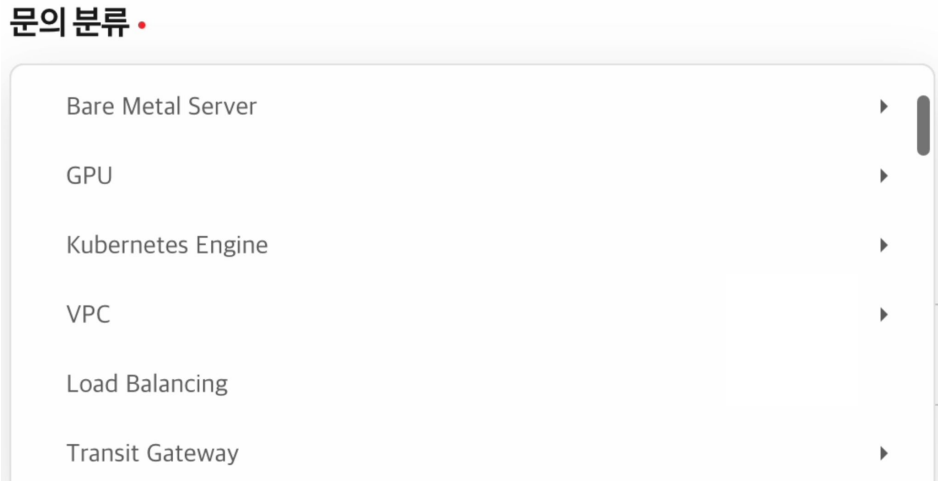
Improving Cloud FAQ Experience through Contrastive Learning-based Question Classification

Yongshin Kim
Okestro

Contents

Problem Setup

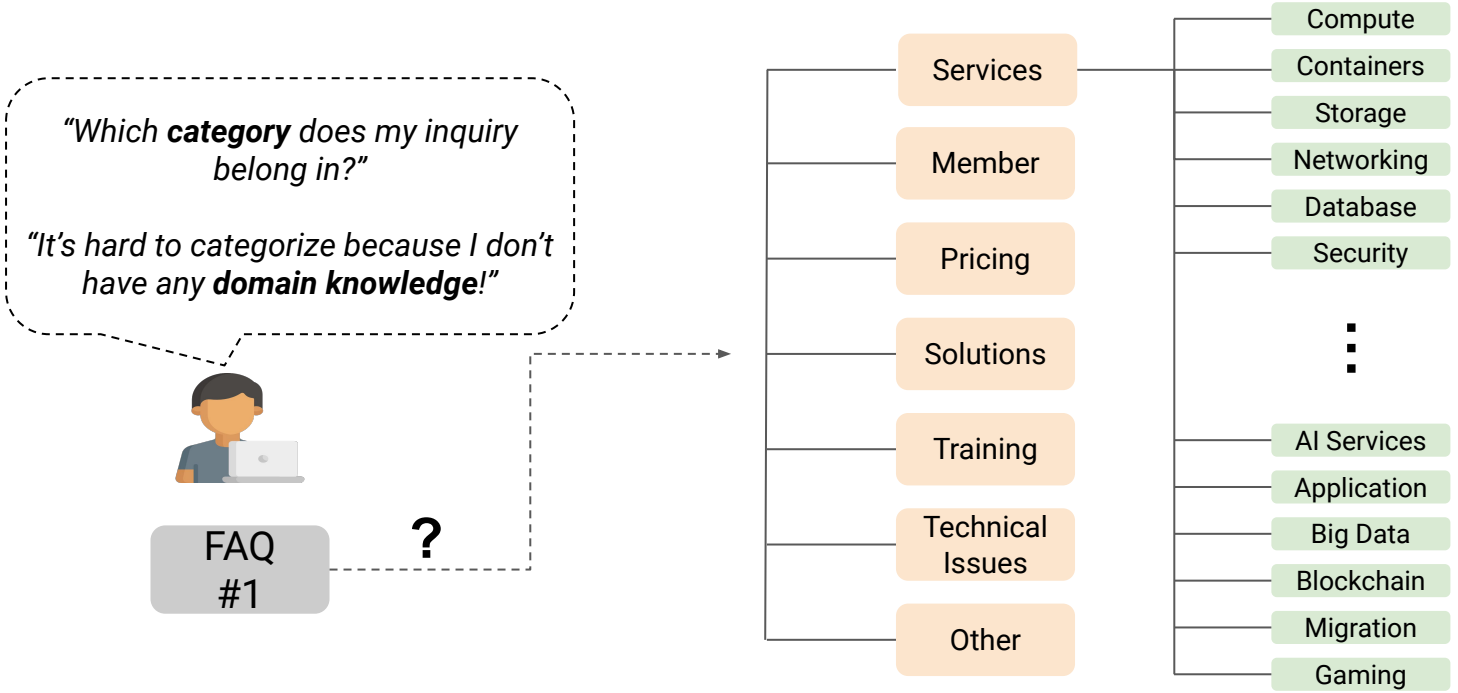




Problem Setup

When a user leaves a question, the user must select the category of the question by themselves.

- What if the user doesn't have enough **domain knowledge**?
- It will **take a lot of time** to classify the categories of questions, and the classification **accuracy will be reduced**.



Research Question

- If a SaaS user leaves a question, is it possible to **automatically categorize** it using NLP?

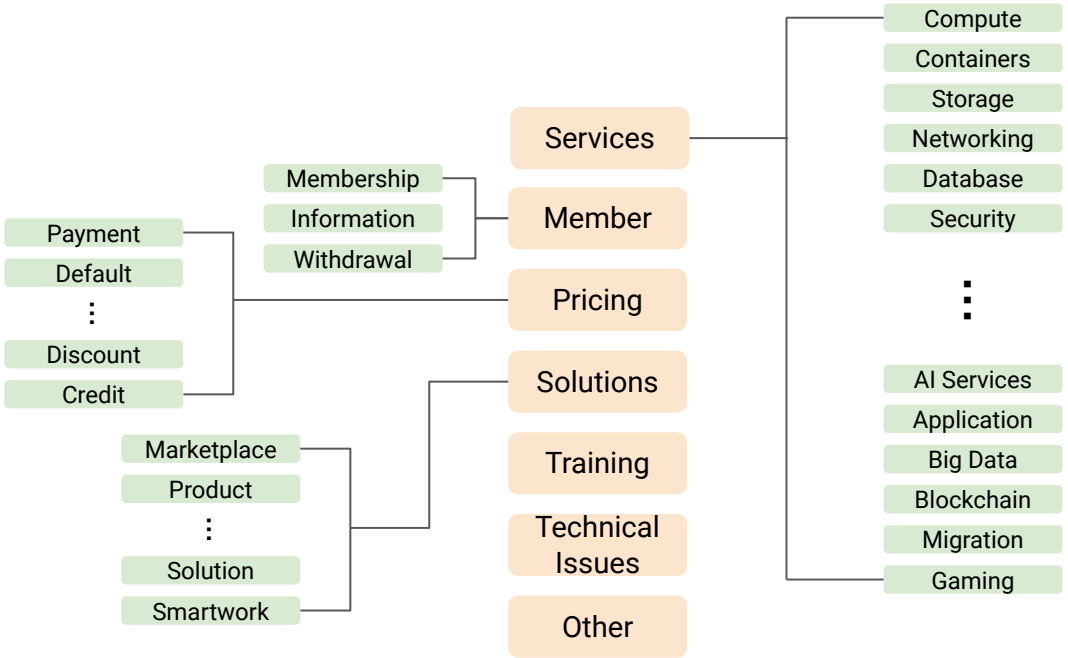
Contribution

- Existing FAQ problem
  - Users need to select one of the many categories **themselves** and leave a question.
- This study presents a method for efficiently classifying user questions.
  - User do not need to classify questions into one of the categories themselves.
    - Users can leave questions **without domain knowledge**.
    - Questions are automatically **classified** into appropriate categories.

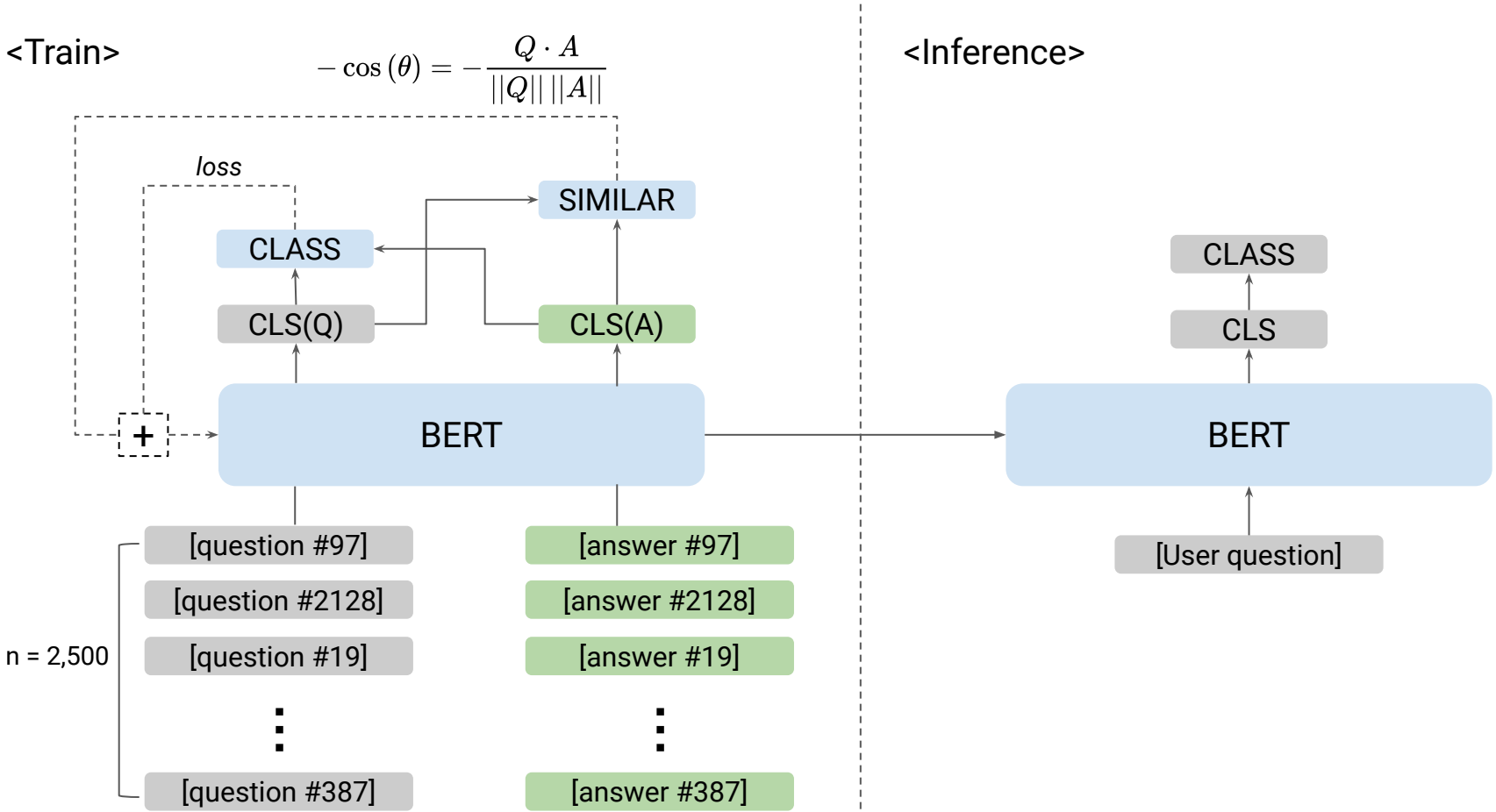
Contents

Dataset

- We collected about **3,000** question-answer pairs.
- We collected data using FAQs from NAVER CLOUD, GCP, AWS, Kakaoicloud and Okestro.
- We built an **integrated category** that encompasses all company's questions and re-classified all data to fit that category.

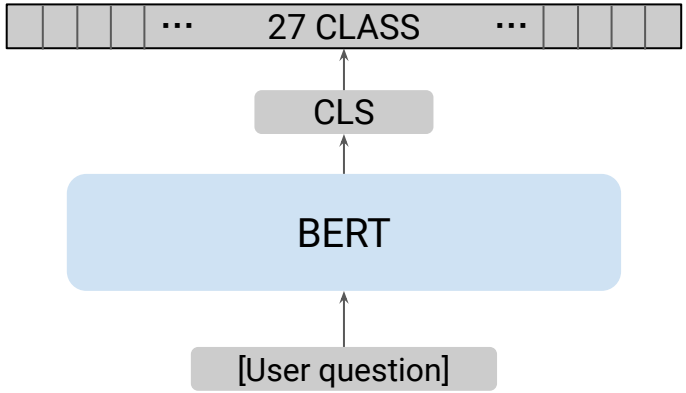


Architecture



Contents

Experiment setup



Hyper parameters

- Training
  - train ratio=0.8, batch size=32, Epoch=50, Adam optimizer(learning rate=5e-5), warmup_ratio=0.2, maximum token length=300.
- Model
  - beomi/kcbert-base [1]

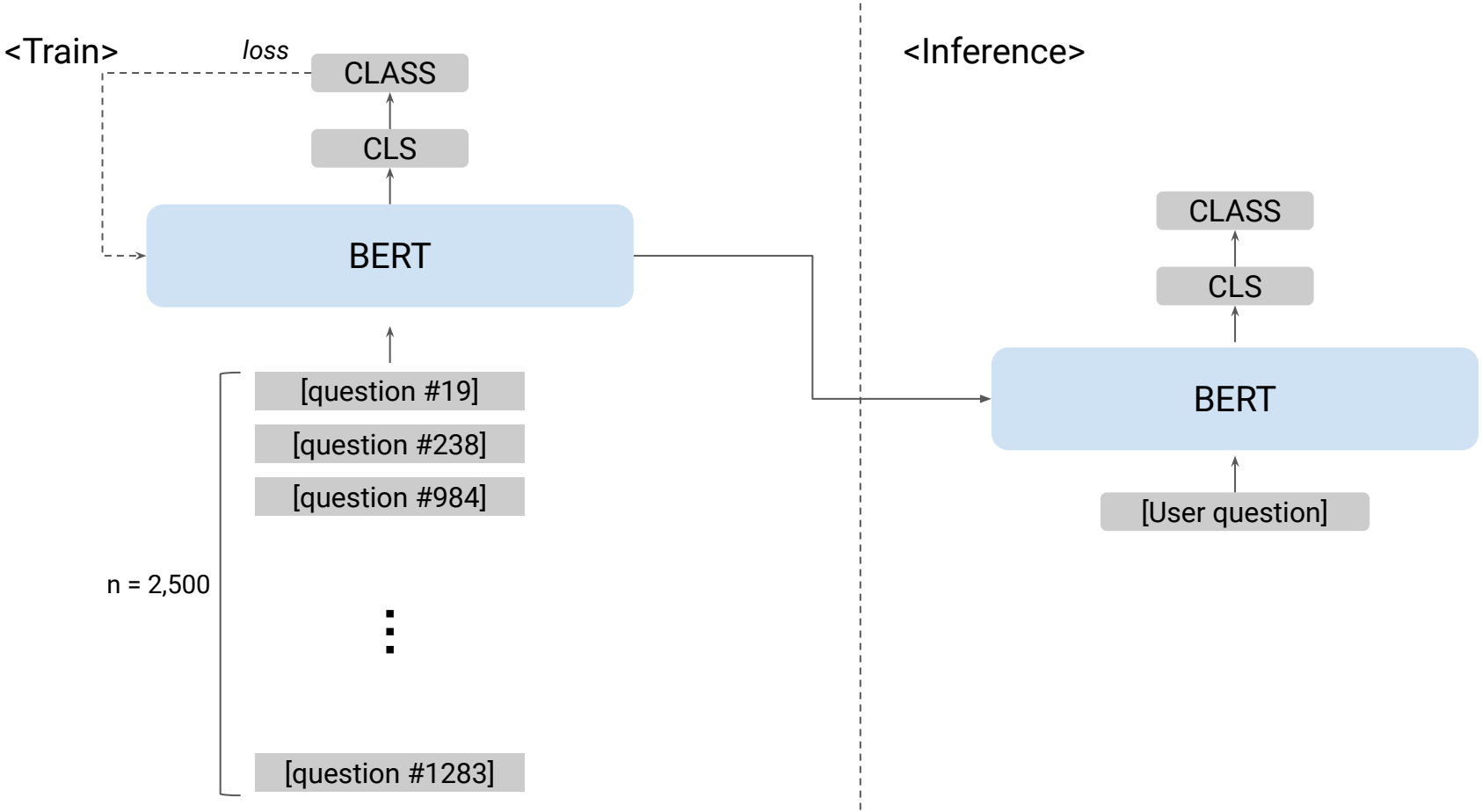
Classification

- The data was classified into a total of **27 categories**.
  - 'Database', 'Storage', 'Compute', 'Global Infrastructure', 'Member', 'Blockchain', 'AI Services', 'Hybrid & Private Cloud', 'Security', 'Application Services', 'Developer Tools', 'Management & Governance', 'Solution', 'Error', 'Networking', 'Migration', 'Payment', 'Big Data & Analytics', 'Internet of Things', 'Gaming', 'Media', 'Content Delivery', 'Containers', 'Digital Twin', 'Business Applications', 'Certificate', 'Others'.

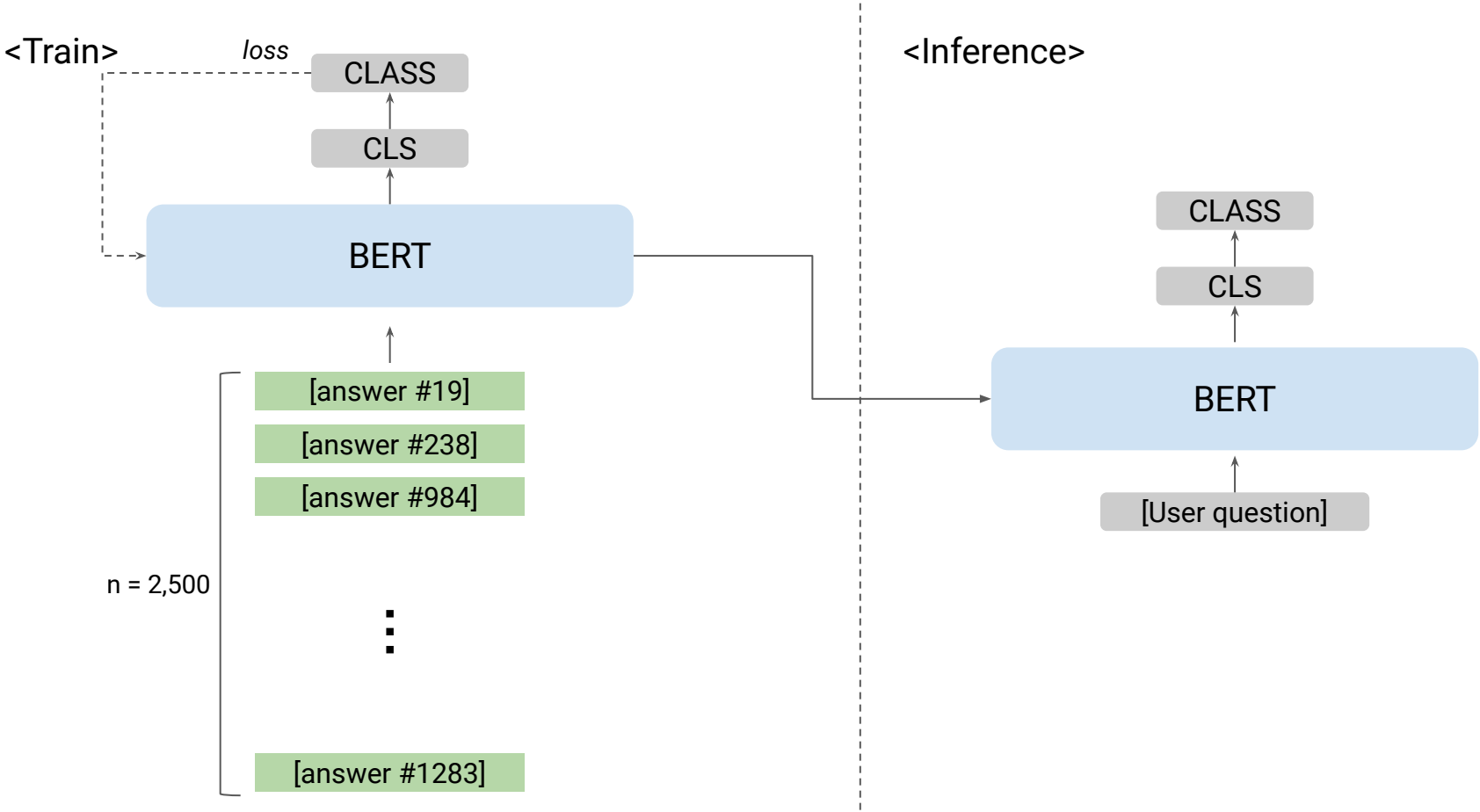
Evaluation metrics

- **Accuracy**, similarity(Q-A)

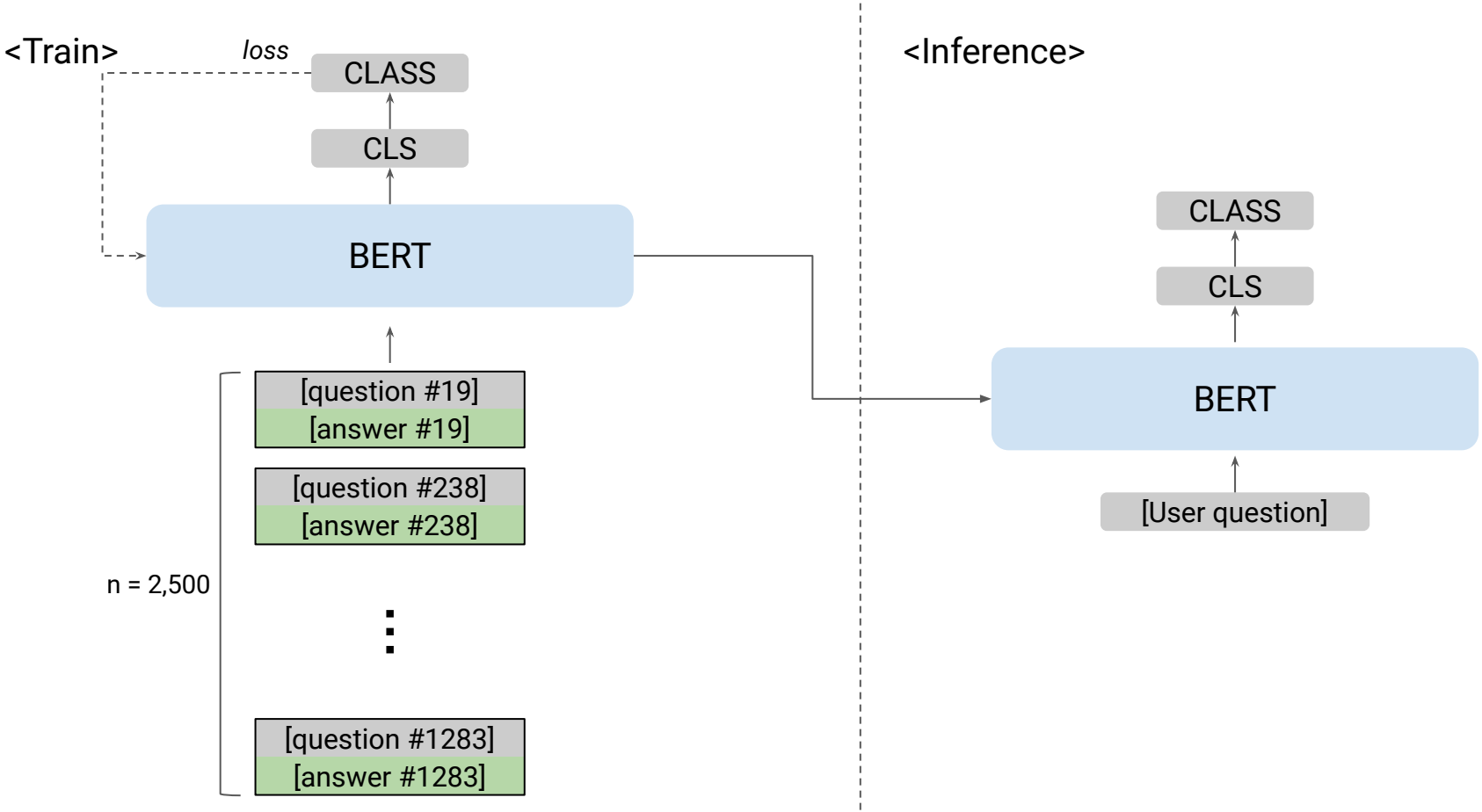
Baseline model - 1



Baseline model - 2



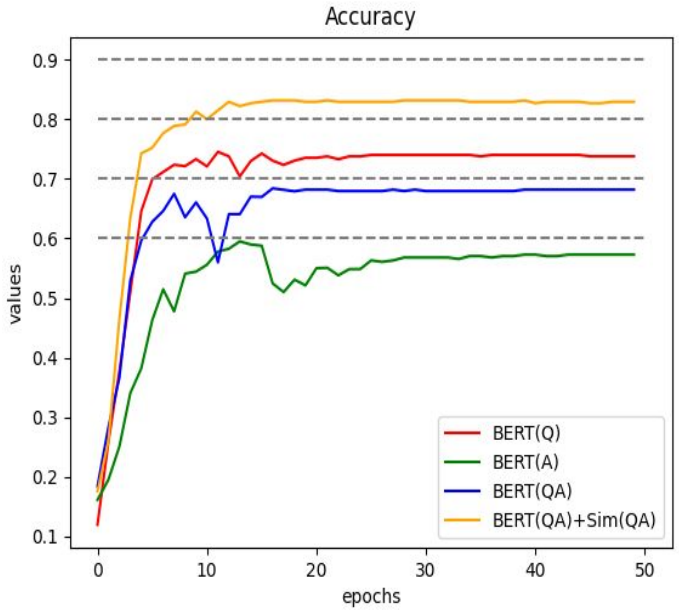
Baseline model - 3

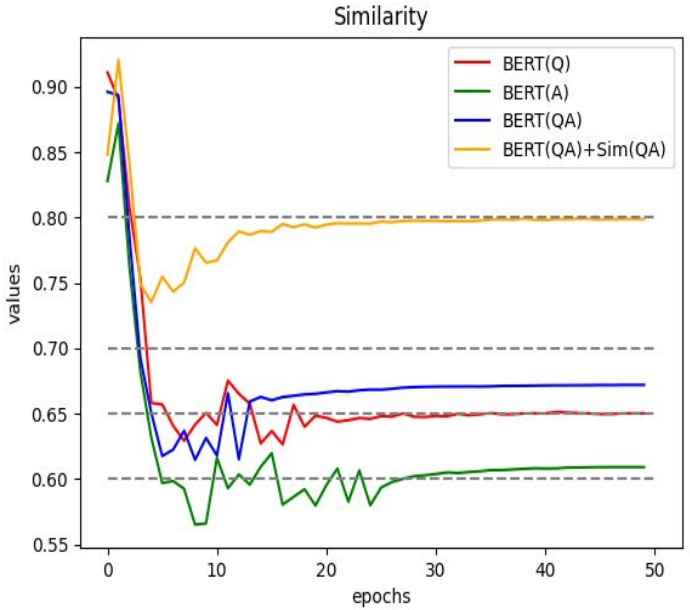


Contents

Results - Validation

BERT(QA)+Sim(QA) showed **higher accuracy** than other methods while steadily **increasing the similarity** between questions and answers in validation set as training progressed.





Results - Test

BERT(QA)+Sim(QA) showed the **highest accuracy** as well as **similarity** in test set.

	Accuracy	Similarity
BERT(Q)	0.748	0.65
BERT(A)	0.518	0.605
BERT(QA)	0.61	0.63
BERT(QA) + sim(QA)	**0.814**	**0.78**

Contents

Conclusion

- This study proposed a model that uses **BERT** and **contrastive learning** to manage users' questions and automatically classify them into appropriate categories.
- The proposed approach does not require users to have **domain knowledge** and improves the overall user experience of the FAQ system by **automatically performing questions classification**.
- In future research, it is recommended to investigate how the proposed model can be applied to **other domains** and how it can be extended to handle more complex Q&A system.