

INTEL UNNATI INDUSTRIAL TRAINING 2024

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Group Members:


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Problem Statement

P04-Introduction to GenAI and Simple LLM Inference on CPU and fine-tuning of LLM Model to create a Custom Chatbot

Domain: Emotion recognition and classification

A few use cases of this model can be:

- ☐ Customer support
 - ☐ Mental Health Support
 - ☐ E-commerce
 - ☐ Social Media Monitoring
 - ☐ Human Resources
 - ☐ Student Support
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Unique Idea Brief (Solution)

For our project we have used Bert-base-uncased model. It is a transformers model pre trained on a large corpus of english data in a self supervised way. It is a lightweight model which has the bare minimum requirements for our use case.

Model: [google-bert/bert-base-uncased](#) · Hugging Face

Dataset: [dair-ai/emotion](#) · Datasets at Hugging Face

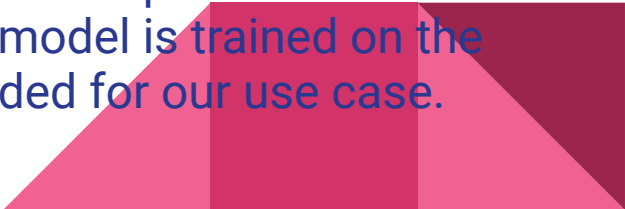


Features Offered

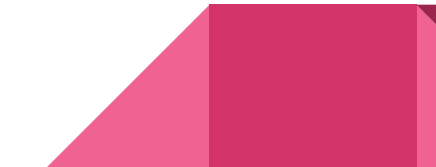
Using the users input the chatbot can classify the emotions into these 6 emotions-

1. Sadness
2. Joy
3. Fear
4. Anger
5. Surprise
6. love

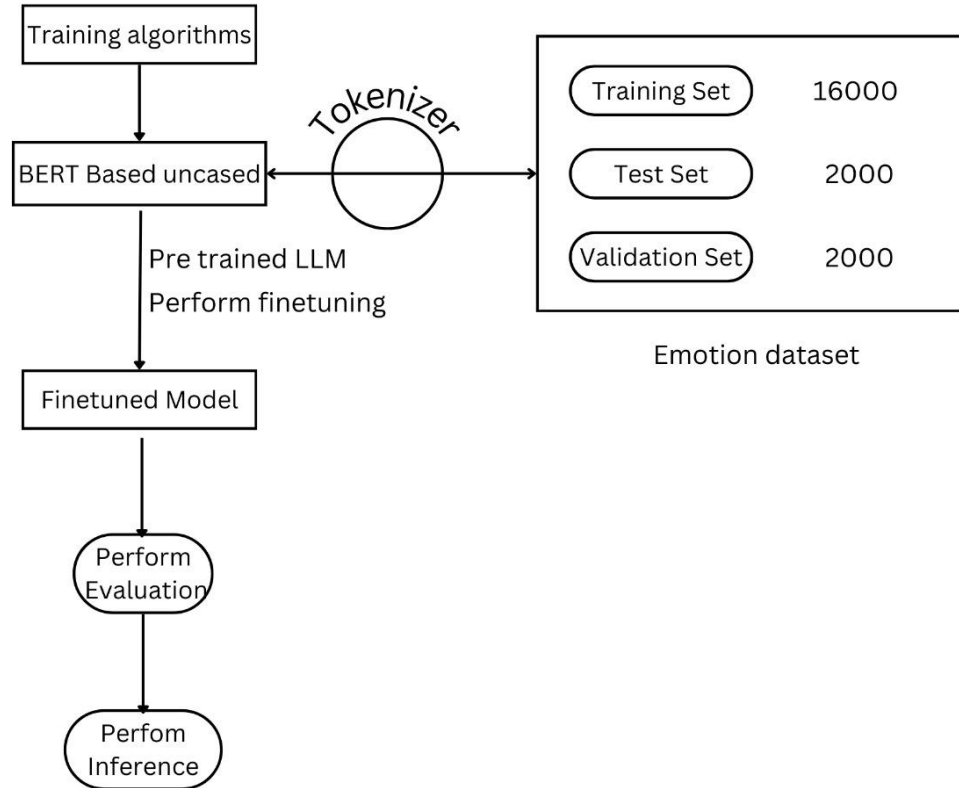
Input can consist of text like tweets,captions or comments from social media. Since we are using a toned down version of the BERT LLM we require a lot less hardware resources to train and to perform inference.The model is trained on the very basics of the english language which is all that is needed for our use case.



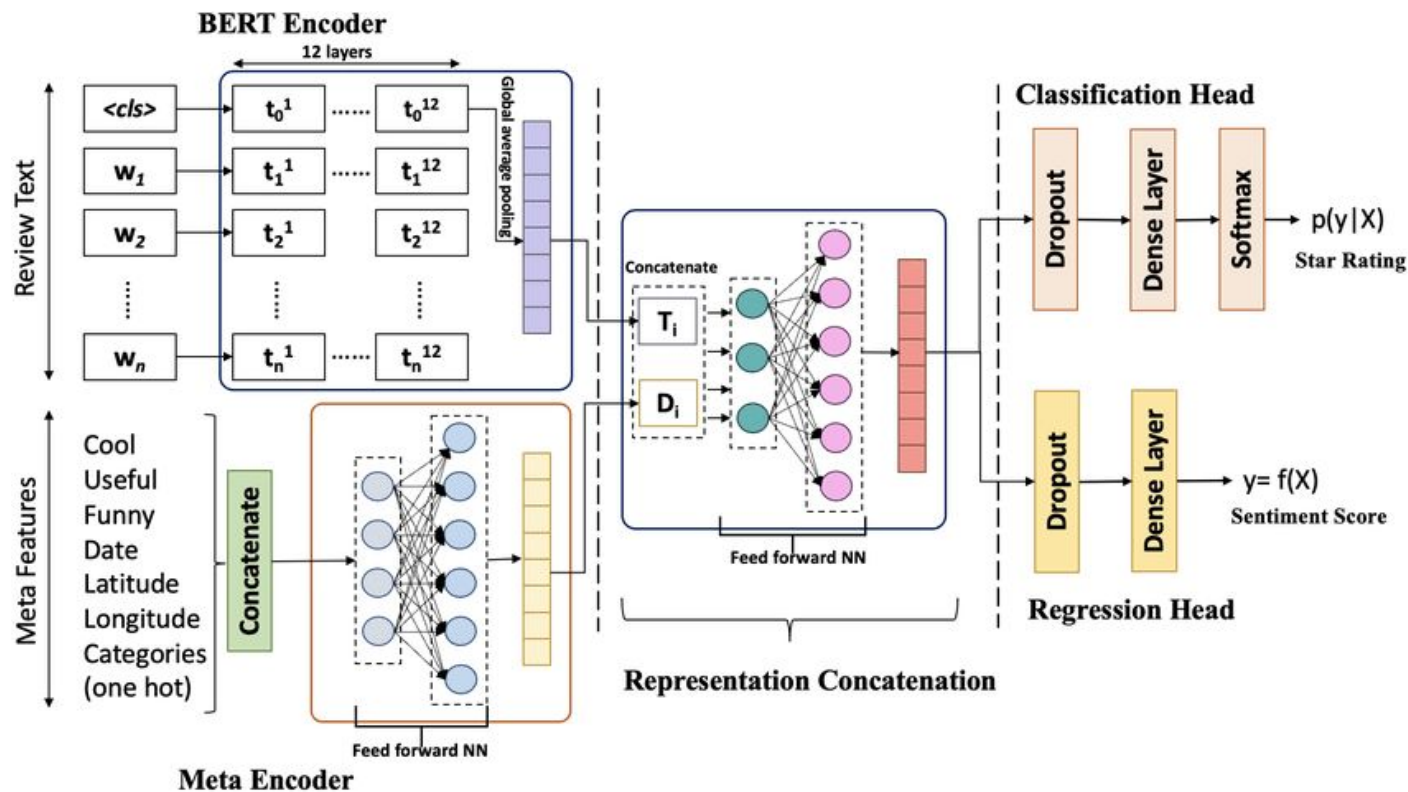
Process flow

- Load dataset from the huggingface platform
 - Tokenize the text column of the dataset
 - Mapping the training,testing and validation data
 - Conversion of the mapped dataset into torch format with the following columns-input_ids,attention_mask,label
 - Load model and tokenizer from the huggingface platform
 - Defining a function for accuracy and f1 score
 - Defining the batch size and training arguments
 - Training and validation of the model
 - Perform evaluation on the trained model
 - Perform inference
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Architecture Diagram



Architecture of BERT



Technologies Used

- Language and framework: python, pytorch
- Hugging Face(model, dataset, tokenizer)
- Data processing - numpy, datasets
- Hardware - Intel Developer Cloud - 4th Generation of Intel® Xeon® Scalable Processors Sapphire Rapids.
- Fine tuning libraries - hugging face, PEFT
- Metrics and Evaluation - accuracy and F1 score



Team members and contribution:

Joel Biju- Data Procurement, Processing

Jovan Antony-Data processing, Testing, Chat interface

Saandep C Sijo- Data processing, Testing, Fine tuning

Tanisha Ravi- Data procurement, Documentation of the project

Midhun Saji- Training and Testing of the model



Conclusion

In this project, we leveraged **BERT** (Bidirectional Encoder Representations from Transformers), a pre-trained language model, to create an emotion recognition and classification system. By fine-tuning BERT on emotion-labeled data, we achieved accurate predictions for different emotional states. BERT's bidirectional context modeling allowed it to capture nuanced patterns in text, making it effective for this task. We have achieved an **accuracy of 93%** with this model.

