

Introduction

- Explore a cutting-edge Natural Language Processing (NLP) algorithm designed to summarize complex medical records from the MIMIC-IV dataset, employing state-of-the-art techniques in text summarization.
- Addressing the escalating volume of electronic health records (EHRs), our algorithm utilizes transformer-based models to automate the summarization process, extracting critical information and providing efficient access to meaningful insights from extensive clinical documents.
- Evaluated on dimensions such as content coverage, conciseness, readability, and clinical relevance, the algorithm's performance is quantitatively measured using metrics like ROUGE and F1-score. This research contributes to advancing medical NLP, and improving the decision-making and patient care through enhanced data extraction and summarization.

Method

- We compile a comprehensive medical records dataset, ensuring adherence to HIPAA regulations, and then preprocess the records through text cleaning and structural analysis.
- Employing state-of-the-art NLP T5 transformer architecture, we fine-tune our models on annotated record-summary pairs. Additionally, we incorporate attention mechanisms and transfer learning to enhance the model's ability to provide contextually relevant summarizations.
- Strategically partitioning our datasets into training, validation, and testing sets, we assess model accuracy using ROUGE metrics. Our analysis includes identifying potential limitations in summary accuracy, especially in cases involving complex medical jargon or intricacies.

Results

- The flan-t5 transformer model achieved a notable average Rouge score of 0.6, and a F1 score of XX indicating strong performance in the responses
- The model demonstrated a robust ability to understand and leverage contextual information within medical records
- The flan-t5 transformer model holds promise for enhancing question-answering tasks in the medical domain given further tuning and optimization.

Conclusion

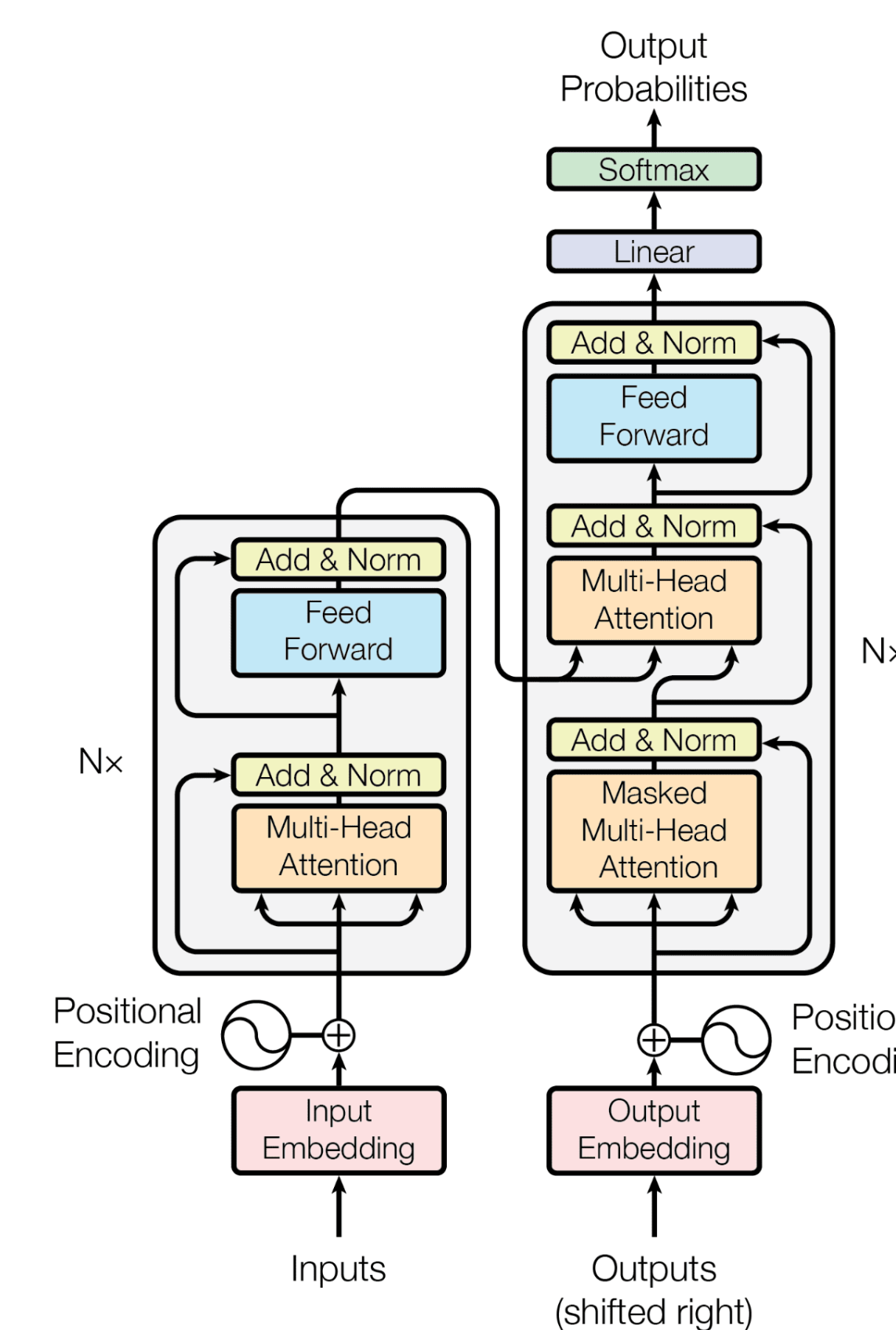
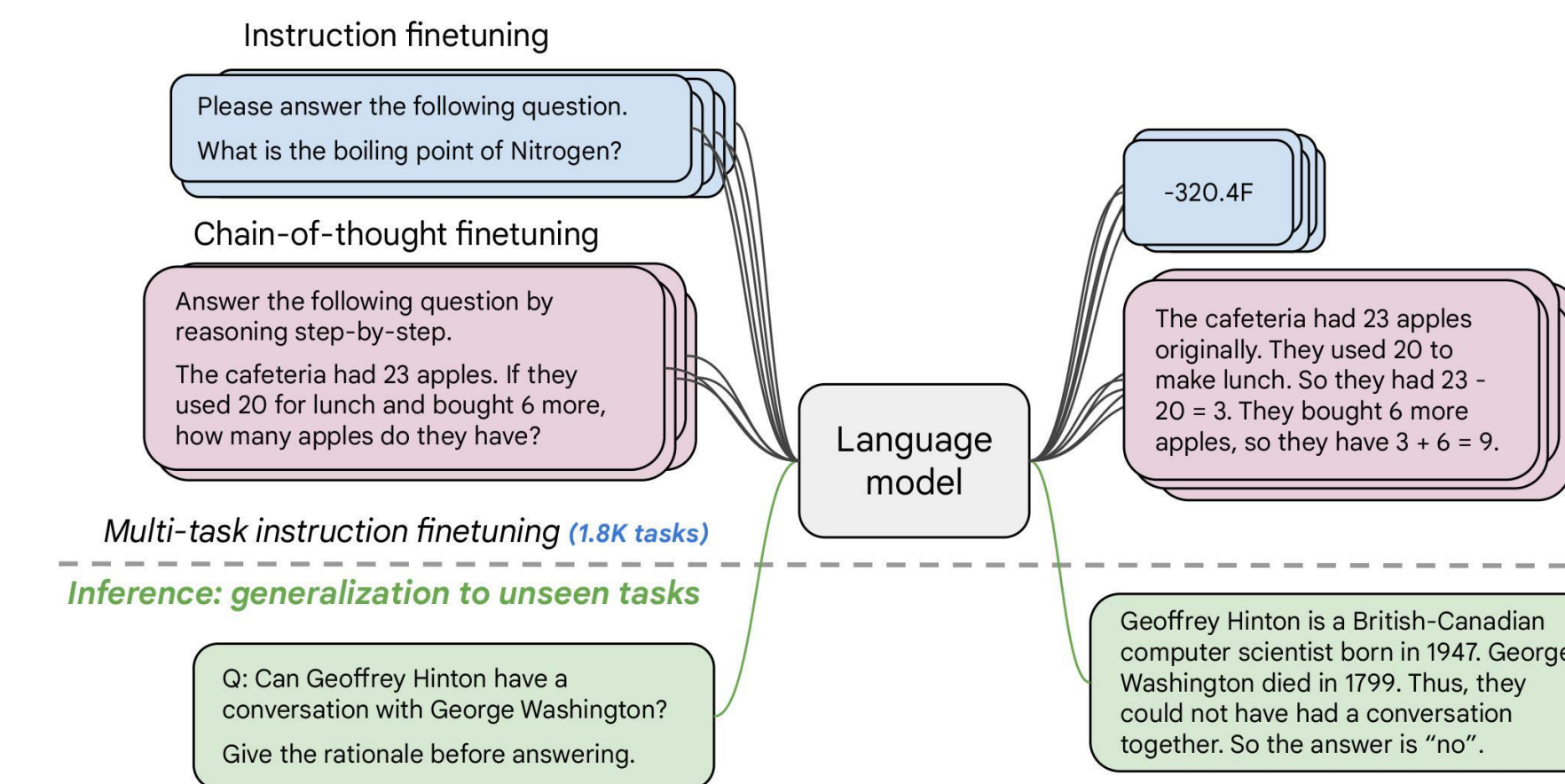
Our approach, combining advanced NLP techniques and strategic data handling, validates the effectiveness of our summarization framework in distilling complex medical records into accurate and meaningful answers to user prompts. The success of our model holds promise for clinical decision-making and patient care by providing healthcare professionals with efficient access to critical insights from vast and intricate medical records.

References

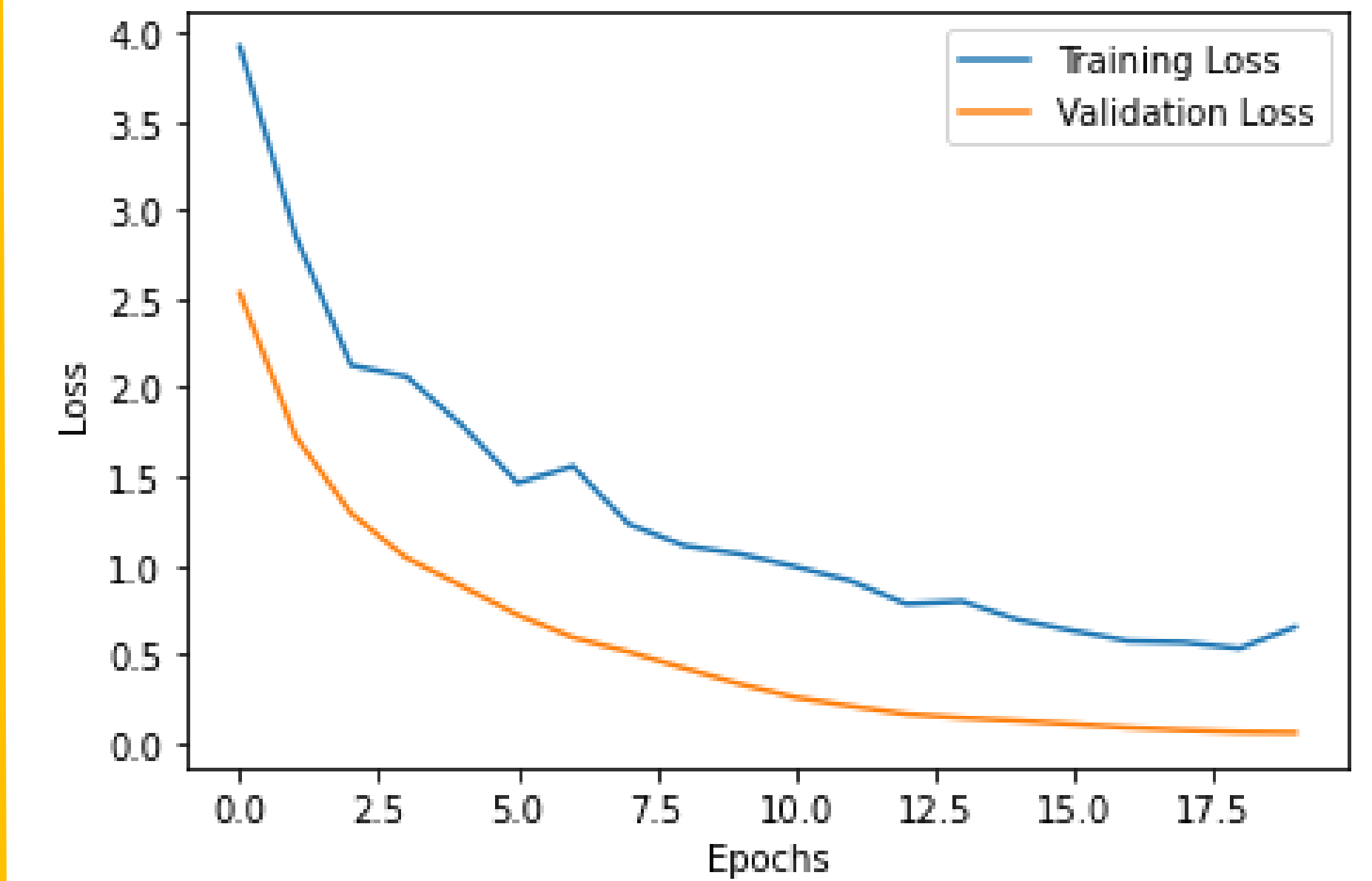
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Fine-tuned FLAN-T5 Transformer



Learning Rate approximation

Question-Answer Output

context = "admission date: [**2199-3-18**] discharge date: [**2199-3-22**] date of birth: [**2153-5-26**] sex: f service: medicine allergies: latex V doxycycline attending: [**first name3 (lf) 2880**] chief complaint: chest pain and nausea for 5 days major surgical or invasive procedure: cardiac catheterization [**2199-3-20**] history of present illness: patient is a 45 yo f with pvd, dm, hl, htn and osa, no known cad, no history cath who presents with chest pain and pressure for 5 days....."

question="does the patient have any history medicine allergies"

reference_answer = "medicine allergies: latex V doxycycline"

predict_answer = "latex, doxycycline"