

Clinical EmotiSupport

Interim Presentation

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Project Review



Motivation

- Patient messages convey emotional cues intertwined with clinical information
- Current triage systems overlook emotional signals
- Results in suboptimal prioritization of patient needs



Goals

- Develop NLP-based system for emotional intensity detection
- Enable emotion-aware clinical workflows
- Support administrative processes with emotional context



Novelty

- Emotion intensity prediction (not binary)
- Application to telemedicine messages
- Privacy-safe synthetic data generation

Previous Work

Title / Year	Task	Methods	Data	Results	Relation to Our Project
GoEmotions (2021) [Cited by 1229]	Multi-label emotion detection	BERT-based classifiers	58K Reddit comments	High multi-label accuracy	Establishes best practices for emotion modeling
ClinicalBERT (2019) [Cited by 1525]	Clinical NLP	Domain-adapted BERT	MIMIC-III notes	Outperforms general BERT	Motivates domain-aware emotion modeling
Emotion Detection in Patient Messages (2020) [Cited by 507]	Healthcare emotion detection	Transformer classifiers	Patient portal messages	Limited by small datasets	Our synthetic data addresses data scarcity

Dataset Overview



Dataset Overview

- Samples: **N = ???**
- Language: **English**
- Domain: **Clinical & Administrative**
- Format: **JSONL**



Data Generation

- Model: **DeepSeek-R1:8B**
- Inference: **Ollama**
- Prompts: **Telemedicine communication**



Message Length (words)



Distribution of Emotions

Min / Median / Mean / Max = ??/ ??/ ?? / ??

Baseline Solution & Results



Model Architecture

- Architecture: DistilBERT
- Task: Multi-label emotion classification
- Input: Patient message text
- Output: Emotion classification per label ($\in [0,1]$)
- Training: Fine-tuned on synthetic dataset



Overall Metrics

Metric	Precision	Recall	F1-Score
Micro Average	0.415	0.692	0.519
Macro Average	0.410	0.689	0.505



Per-Emotion Analysis

Emotion	Precision	Recall	F1-Score	Support
Anxiety	0.44	0.41	0.42	184
Confusion	0.50	0.81	0.62	173
Frustration	0.46	0.82	0.59	194
Anger	0.34	0.86	0.49	154
Disappointment	0.38	0.58	0.46	173
Satisfaction	0.35	0.65	0.45	23



Evaluation Metrics

Mean Absolute Error

0.4435

Root Mean Square Error

0.4512

Pearson Correlation

0.3598

Project Plan & Next Steps



Dataset Expansion

Generate 500–2000 additional samples

IMPROVED ROBUSTNESS



Label Balancing

Target rare emotions explicitly

REDUCED BIAS



Model Upgrade

Evaluate ClinicalBERT / RoBERTa

HIGHER ACCURACY



Multi-task Learning

Joint domain + emotion prediction

BETTER CONTEXTUAL MODELING



Error Analysis

Manual inspection of failure cases

IMPROVED INTERPRETABILITY



Final Presentation

Summarize results & insights

COURSE SUBMISSION