Classification of Patient Free-Text Symptom Descriptions by Urgency

Project Proposal

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Problem Statement

Hospitals, especially emergency rooms (ERs), are flooded with patients with a wide range of medical complaints. Medical staff must quickly assess the urgency of each case to prioritize care and ensure that critical patients are treated first. This process takes time, which can lead to delays in treating critically ill patients and slow decision-making.

Input: Patient Free-Text description
Output: Predicted urgency label (Critical, Urgent, Non-Urgent)

Relevant NLP Tasks:

- Text classification – Assign urgency labels to medical texts.
- Named Entity Recognition (NER) – Identify key symptoms, diagnoses, and risk factors.

challenges

Why is it difficult?

- Patients describe symptoms in free-text, often vaguely or informally
- Ethical and regulatory issues

Why is this Important?

- Faster decision-making in real time
- NLP urgency classifying model helps triage
- Reducing wait times for critical patients
- Reducing workload

📌Triage - the preliminary assessment of patients in order to determine the urgency of their need for treatment and the nature of treatment required.

Training and test data

For this project, we used ChatGPT to generate patient symptom descriptions.
The dataset includes a diverse range of symptoms, from critical conditions to common issues.
Each record contains a unique patient ID along with demographic details (age, gender, marital status).

Example Input:
Patient_ID: ‘85146293'
Description: “Occasional sharp pain in my heart that lasts for a few seconds”
Age: 80
Gender: Male
Marital_Status: Married

Desired output:
Urgency level - Critical

Evaluation

Metrics

- Accuracy, Precision, F1-Score, Recall.
- Confusion Matrix will show how the model distinguishes between levels of urgency.
- Splitting the data into 80% training and 20% testing for performance evaluation.

Baseline & Comparison Methods

The baseline will be Naïve Bayes or Logistic Regression with TF-IDF.

Model comparison against advanced approaches, including fine-tuned LLMs (DistilBERT or BioBERT).