

# MACHINE LEARNING BASED PATIENT CLASSIFICATION IN EMERGENCY DEPARTMENT

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## ABSTRACT

In Emergency Departments (EDs), timely and accurate patient classification is essential to ensure effective medical intervention. Manual triage methods, often based on human judgment and basic clinical assessments, may lead to inefficiencies, inconsistencies, and treatment delays, especially in critical cases or high-pressure scenarios. This project aims to develop an intelligent system that leverages machine learning techniques to automate the classification of patients based on core vital parameters such as blood pressure, respiratory rate, oxygen saturation, pulse rate, temperature, and blood sugar levels. The proposed solution is expected to enhance the decision-making process during triage by identifying high-risk and low-risk patients more efficiently. By integrating such a system into hospital workflows, the burden on healthcare professionals can be significantly reduced, leading to improved patient outcomes, especially in emergency and pandemic conditions.

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## EXISTING SYSTEM

In current healthcare settings, patient triage in Emergency Departments is performed manually by medical personnel. This process depends heavily on the staff's clinical experience and judgment, which may vary under stress, time constraints, or patient influx. As a result, patients in critical condition might not always receive timely attention, and overall efficiency may be compromised.

## PROPOSED SYSTEM

The proposed system introduces an intelligent approach for triaging patients in Emergency Departments using **Decision Trees** and other **machine learning algorithms**. The goal is to automatically classify patients into critical and non-critical categories based on their vital signs such as blood pressure, oxygen saturation, pulse rate, temperature, and more. The classification model will be trained on relevant patient data to identify patterns and correlations that indicate a patient's risk level. Various machine learning techniques will be explored and compared to determine the most effective approach for accurate classification, depending on the dataset characteristics, evaluation metrics, and implementation feasibility. This system is intended to

support medical personnel in making faster, more reliable triage decisions and improving overall emergency response efficiency.

## KEYWORDS

- **Generic Technology Keywords:** Machine Learning, Data Preprocessing, Classification, Healthcare Informatics
- **Specific Technology Keywords:** Python, scikit-learn, Pandas, NumPy, Jupyter Notebook
- **Project Keywords:** Vital Signs, Decision Tree, Risk Stratification, Emergency Room, Triage, Classification Models
- **SDLC Keywords:** Problem Definition, Data Collection, Preprocessing, Model Training, Testing, Evaluation, Deployment

## SYSTEM CONFIGURATION

### Hardware Requirements:

- Processor: Intel Core i5 or above
- RAM: 8 GB minimum
- Hard Disk: 100 GB or more
- GPU: Optional (for faster model training)

### Software Requirements:

- OS: Windows 10 / Ubuntu 20.04 or higher
- Programming Language: Python 3.8+
- Libraries: scikit-learn, pandas, numpy, matplotlib, seaborn
- IDE: Jupyter Notebook / VS Code / Anaconda
- Others: Google Colab (for cloud-based model training, optional)