**Existing System**

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The existing system for machine learning based patient classification in emergency department involves the following steps:

1. **Data collection and preparation:** The system collects patient data, including vital signs (e.g., blood pressure, heart rate, respiratory rate, temperature, oxygen saturation), demographic information, medical history, and presenting symptoms. This data can be gathered from various sources, including electronic health records (EHRs), wearable devices, and manual input by medical staff.
2. **Feature selection:** Feature selection involves selecting and preprocessing relevant features from the collected data. Feature selection may include extracting or transforming variables to make them suitable for machine learning algorithms..
3. **Model training:** Train the selected models using the training dataset.Tune hyperparameters using techniques like grid search or randomized search to optimize model performance.
4. **Model evaluation:** The trained model is evaluated on a held-out test set to assess its performance. The evaluation metrics typically include accuracy, precision, recall, and F1 score.
5. **Model deployment**: Once the model is evaluated and deemed to be performing well, it can be deployed to production for patient classification in emergency department prediction.

**Proposed System**

The proposed system employs various machine learning algorithms to build a system that classifies patients into different risk categories based on their basic vital statistics.

We have considered 2 classes according to the patients risk level

Class 1: high risk level and

class 0: low risk level.

**Advantages in the proposed system:**

**Faster Triage:** Machine learning can quickly assess and classify patients based on their critical conditions and urgency, helping medical staff prioritize care for those who need it most urgently. This can lead to faster treatment for high-risk patients.

**Improved Patient Outcomes:** Faster and more accurate patient classification can lead to better outcomes, particularly for critical cases that require immediate attention.

**Patient Safety:** Faster triage and identification of high-risk patients enhance patient safety by ensuring that critical cases receive immediate attention.

**Emergency Planning**: Historical data and insights generated by the system can aid in emergency planning and resource allocation during disasters or crises.

**Scalability:** It can handle a large volume of patient data and adapt to varying patient loads, making it suitable for busy Emergency Departments.