Prioritising Hospital Admission According To Emergency By using Machine Learning

SHAIK MASTAN , Sravanthi kalal
Dept. Of Master of Computer Application
AMC Engineering College Bengaluru,India
mastanmastan237@gmail.com

Abstract

This review categorizes the pertinent research into three main areas: hospital admission, discharge, and mortality prediction; ML-based triage systems; and disease prediction and detection. Intelligent systems and data-driven algorithm techniques being rapidly deployed in emergency medicine.

The Advanced computational techniques, specifically machine learning algorithms, are utilized to the field of disease prediction, using datasets from medical photos and electronic health records (EHRs). Numerous methods have demonstrated efficacy in detecting patterns and predicting the course of diseases, including techniques such as logistic regression and naive Bayes classification, which enable random forests, multi-layer perceptrons (MLP), support vector classifiers (SVC), and long short-term memory networks (LSTM). Large amounts of structured and unstructured data can be analyzed and used to find subtle trends and statistical relationships, including correlations, which help uncover that human healthcare professionals might miss.

Keywords—*Logistic Regression, Naive Bias, Random , Forest, MLP, SVC, LSTM*

I. INTRODUCTION

One creative Improving medical diagnosis: AI can diagnose disease faster and more accurately than most medical professionals. is the prioritization of hospital admissions in emergency scenarios through Leveraging machine learning capabilities.

By analyzing vast amounts of data, machine learning algorithms can uncover hidden patterns, enabling healthcare professionals to pinpoint high-risk patients and prioritize their care, ensuring timely interventions and improved outcomes.

Machine learning algorithms take into account a range of factors, including patient age, medical history, symptoms, vital signs, and illness severity, to generate predictive models that assign risk scores. These scores enable healthcare professionals to prioritize care, ensuring timely interventions and improved patient outcomes. While machine learning models offer valuable insights, it's important to note that they augment, rather than replace, human clinical judgment and expertise. Additionally, ethical considerations, such as transparency in algorithmic decision-making and avoiding biases in data and outcomes, are essential in the development and deployment of these models.

II. LITERATURE SURVEY

Xu, Wu, Nemati, and Zha (2017) developed a method for predicting patient flow by employing discriminative learning of mutually-correcting processes. Their study, published in IEEE Transactions on Knowledge and Data Engineering, focused on enhancing the of predicting how patients move through healthcare systems.

Occupational rehabilitation services in Hong Kong, typically integrated within broader medical care, do not prioritize workinjured workers adequately. The principle of work trial arrangements in the private sector has emerged to improve coordination in occupational rehabilitation. However, private services lack clear standards and guidelines for offering rehabilitation plans to injured workers. Leveraging Electronic Health Records (EHRs) data, this project aims to develop a machine-learning-based approach for predicting disability duration and crafting effective rehabilitation plans for workrelated injuries and illnesses.

An interactive dashboard was also developed to visualize machine learning outcomes, facilitating better understanding. Initial results using variational autoencoder technology showed promising improvements, achieving a 30% reduction in prediction errors compared to human estimates. Future plans include enhancing the system for better management of work injury cases.

III. EXISTING SYSTEM

The absence of clear guidelines on data visualization poses a significant challenge to integrating machine learning algorithms into the existing system. Although previous research has developed models to evaluate emergency cases in hospitals, the limited size of available datasets often undermines their effectiveness. To address this constraint, we propose the use of Naive Bayes, Multilayer Perceptron (MLP), and Long Short-Term Memory (LSTM) classifiers in our study, aiming to enhance the accuracy and reliability of emergency case evaluations.

IV. PROPOSED SYSTEM

Emergency departments are often overwhelmed with patients presenting a wide range of conditions, from minor injuries to life-threatening illnesses. The challenge lies in quickly identifying those who need immediate attention and those who can wait. Manual triage processes, while effective, can be inconsistent and prone to human error. Machine learning algorithms can analyze vast amounts of patient data in real-time, providing consistent and objective assessments.

Data Collection

The first step in developing an ML-based triage system is data collection. This involves gathering comprehensive patient information, including:

Demographic Data: Age, gender, and patient history.

Clinical Data: Vital signs, symptoms, laboratory test results, and severity scores.

Admission Data: Time and date of admission, type of admission, and initial triage assessment.

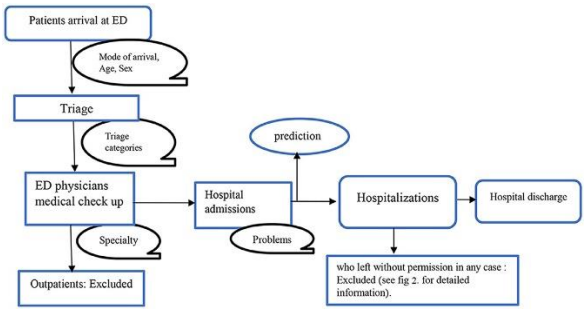

Fig 1 : Hospital Prolonged Admission Flow

Model Training

Using historical patient data, machine learning algorithms can be trained to predict the urgency of new patient admissions. Commonly used ML algorithms in healthcare include:

Logistic Regression: For binary classification of urgency.

Random Forest: For handling a large number of features and interactions.

Support Vector Machines: For high-dimensional data classification.

Neural Networks: For complex patterns and non-linear relationships.

V. CONCLUSION

The paper "Prioritizing Hospital Admission According to Emergency Using Machine Learning" highlights the challenges associated with utilizing machine learning techniques, including the resource-intensive and complex process of developing random forest, logistic regression, and support vector classifier (SVC) models, which require significant computational power and expertise to create models.

Despite the challenges, statistical models have shown remarkable effectiveness in prioritizing hospital admissions based on emergency severity. This study highlights the model's accuracy in predicting admissions and ranking patients, resulting in enhanced patient outcomes and reduced hospital congestion. The integration of machine learning techniques into healthcare practices is crucial for optimizing resource allocation and improving patient care in emergency situations. Further research is essential to validate and expand the applications of these technologies in emergency settings, ultimately leading to more efficient and effective healthcare delivery.

V. REFERENCES

1 .O. Karan, C. Bayraktar, H. Gümüşkaya, and B. Karlık developed a method for diabetes diagnosis using neural networks on compact mobile devices, as documented in their article published in Expert Systems with Applications in 2012, volume 39, issue 1, pages 54-60.

2. Ma, R. Chitta, J. Zhou, Q. You, T. Sun, and J. Gao introduced "Dipole," a method for healthcare diagnosis prediction using attention-based bidirectional recurrent neural networks, presented in 2017.

3.Z. Liang, G. Zhang, J. X. Huang, and Q. V. Hu explored the healthcare decision-making using electronic medical records (EMRs), in their presentation in 2014.

4.C. M. Bishop authored "Pattern Recognition and Machine Learning," published by Springer in Berlin, Germany, in 2006.

5.Y. Bengio, J. Louradour, R. Collobert, and J. Weston presented research in 2009.