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ICU PATIENT RISK LEVEL MONITORING SYSTEM USING SUPERVISED LEARNING APPROACHES

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***ABSTRACT*:**
Modern Intensive Care Units (ICUs) provide continuous monitoring of critically ill patients susceptible to many complications affecting morbidity and mortality. ICU settings require a high staff-to-patient ratio and generates a sheer volume of data. For clinicians, the real-time interpretation of data and decision-making is a challenging task. Machine Learning (ML) techniques in ICUs are making headway in the early detection of high-risk events due to increased processing power and freely available datasets such as the Medical Information Mart for Intensive Care (MIMIC). Techniques in ICU settings using MIMIC data. We assembled the qualified articles to provide insights into the areas of application, clinical variables used, and treatment outcomes that can pave the way for further adoption of this promising technology resource allocation, and enhancing clinical decision-making in intensive care settings. By continuously monitoring and analysing patient data, it provides valuable insights that help healthcare providers intervene promptly and prevent adverse outcomes.

Keywords: intensive care unit, critical care, MIMIC, machine learning

I INTRODUCTION

ICU patient risk level monitoring system utilizing supervised learning techniques. This system would assist healthcare professionals in assessing and monitoring the risk levels of patients in intensive care units (ICUs) in real-time. Gather a comprehensive dataset consisting of patient demographics, vital signs, laboratory results, medical history, medication records, and other relevant variables for ICU patients. This dataset will serve as the input for training and validating the supervised learning models. Split the collected data into training and validation sets. Use the training set to train the supervised learning models, tuning their hyper parameters and optimizing their performance. Real-Time Risk Level Monitoring: Implement a system that continuously collects real- time patient data from the ICU, applies the trained models, and provides risk level predictions for individual patients. This system can generate alerts or it's important to note that the specific implementation details and choice of supervised learning algorithms may vary depending on the available data, healthcare institution, and desired performance objectives. The proposed system provides a high-level overview of the key components involved in developing an ICU patient risk level monitoring system using supervised learning techniques. Notifications to healthcare professionals when a patient's risk level exceeds a predefined threshold, enabling early intervention and timely medical attention

LITERATURE SURVEY:

A literature review is a body of text that aims to review the critical points of current knowledge on and/or methodological approaches to a particular topic. It is secondary sources and discuss published information in a particular subject area and sometimes information in a particular subject area within a certain time period. Its ultimate goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as future research that may be needed in the area and precedes a research proposal and may be just a simple summary of sources. Usually, it has an organizational pattern and combines both summary and synthesis. A summary is a recap of important information about the source, but a synthesis is a reorganization, reshuffling of information. It might give a new interpretation of old material or combine new with old interpretations or it might trace the intellectual progression of the field, including major debates. Depending on the situation, the literature review may evaluate the sources and advise the reader on the most pertinent or relevant of them.

SYSTEM STUDY

A core aim of this review is to learn and improve as a result; this is unlikely to happen unless there is clear linkage of the mortality review process with specific quality improvement initiatives and integration within wider clinical governance structures. If reviews are integrated into existing morbidity and mortality meetings this would help to ensure alignment with quality improvement and other sources of quality and safety data.

Objectives: Its objective is to contribute to the improvement of the quality of care by evaluating and analysing in-hospital environment and channelling the improvement actions proposed as a result of this analysis. MRC brings together experts who guarantee that the actions take into account different points of view, experiences, knowledge and skills, and those are produced in a harmonious and synchronised way within the hospital.

Exploration data analysis of variable identification

- Loading the given dataset
- Import required libraries packages
- Analyze the general properties
- Find duplicate and missing values
- Checking unique and count values

Uni-variate data analysis

- Rename, add data and drop the data
- To specify data type

Exploration data analysis of bi-variate and multivariate

- Plot diagram like pair plot, heat map, bar chart and Histogram

Method of Outlier detection with feature engineering

- Pre-processing the given dataset
- Splitting the test and training dataset
- Comparing the Decision tree and Logistic regression model and random forest etc.

Comparing algorithm to predict the result

- Based on the best accuracy

Scope of the Project

Here the scope of the project is that Predicting quality of patients condition with computer-based prediction could reduce errors and improve prediction outcome. They provide a snapshot of current health problems, suggest persistent patterns of risk in specific communities, and show trends in specific causes of death over time. Many causes of death are preventable or treatable and, therefore, warrant the attention of public health prevention efforts.

Feasibility study:

Data Wrangling: In this section of the report will load in the data, check for cleanliness, and then trim and clean given dataset for analysis. Make sure that the document steps carefully and justify for cleaning decisions.

Data collection: The data set collected for predicting given data is split into Training set and Test set. Generally, 7:3ratios are applied to split the Training set and Test set. The Data Model which was created using Random Forest, logistic, Decision tree algorithms and Support vector classifier (SVC) are applied on the Training set and based on the test result accuracy, Test set prediction is done.

Machine learning needs data gathering have lot of past data's. Data gathering have sufficient historical data and raw data. Before data pre-processing, raw data can't be used directly. It's used to pre-process then, what kind of algorithm with model. Training and testing this model working and predicting correctly with minimum errors. Tuned model involved by tuned time to time with improving the accuracy.

CONCLUSION

The analytical process started from data cleaning and processing, missing value, exploratory analysis and finally model building and evaluation. The best accuracy on patient test set is higher accuracy score will be find out. This application can help to find the prediction of patients whom at risk.

FUTURE WORK: Prediction methods to connect with cloud model. To optimize the work to implement in IOT System.

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