



An Innovative Medical System To Reduce Mortality Rates

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Abstract: Now a day's patient deaths increasing rapidly because of many chronic diseases and many other factors like diseases, lack of medical facilities, resources, medicines etc. According to the number of mortality from public health statistics data of the Strategy and Planning Division, had been increasing consecutively every year, so health service is the most important task to reduce the mortality rate for the country population. It's a challenging factor to reduce the death rates in a hospital. So we need a system which will automatically detect the reasons for death rates. The purpose of this project is to show an association between mortality rates and health services or resources by using unsupervised machine learning algorithms. This is what we are doing in the proposed system where we find the relationship between hospital resources and mortality rates. We build a real time system using Microsoft technologies such as Visual Studio and SQL server to help hospitals to reduce death rates. We consider many parameters like Neurologist, Cardiologist, Gynecologist, Orthopedics, Surgeon, Physician, Beds, ICU, Nurses and Mortality Rate. Also system finds the most important parameter which increases the death rates using ML algorithms.

Keywords: Keywords: Data Science, Machine Learning, Association Learning, Mortality Rates, Visual Studio, SQL Server

I. INTRODUCTION

With the rapid development of big data and artificial intelligence, data analysis and mining are becoming more and more widely used in animal husbandry. In this system, a large number of multi-source electronic medical record data are collected and used the data analysis and mining technology to realize the intelligent diagnosis system for mortality prediction. Manual process of identifying the reasons for mortality rates is too complex and time consuming and also expensive. These systems just collect the data, stores in database and retrieves the same in future, but no extraction of useful information which helps the medical practitioners to handle in a better way. A hospital's crude mortality rate looks at the number of deaths that occur in a hospital in any given year and then compares that against the amount of people admitted for care in that hospital for the same time period. The crude mortality rate can then be set as the number of deaths for every 100 patients admitted. Hospital Management System is a software which is used to maintain daily work of hospitals. Billing Softwares are used to make payments. Online appointment System used to book appointments online. All these existing systems are maintenance softwares and tools and currently there is tool which analyzes hospital data and discovers the association between hospital resources and mortality rates. In our project Association Learning Algorithm "Eclat Algorithm" is used to predict the relationship between different objects using data-sets.

II. RELATED WORK

2.1 Paper 1: Machine learning algorithm in healthcare system: A Review

Authors: Pradeep Kumar Kushwaha, M. Kumaresan

Year of Publications: 2021

Methods Used: Naïve Bayes, Decision Tree, SVM, Regression and KNN algorithms.

Result: review the role of these algorithms in field of healthcare system like diabetic, detection of cancer, brain tumor, bioinformatics and many more.

Remarks: Applied for diabetic, detection of cancer, brain tumor, bioinformatics. won't predict the mortality rates.

2.2 Paper 2: Artificial Intelligence based Comparative Study of Mortality Prediction

Authors: Satyam Prasad Tiwari, Ashutosh Upadhyay, Karthikeyan S

Year of Publications: 2020



Methods Used: logistic regression, random forest, and support vector machine.

Result: We observed from performance that the logistic regression perform better, hence we selected regression model for predicting the mortality of the patients

Remarks: Mortality prediction can be very helpful for taking critical decisions which can help in optimizing the resources available in the Hospital and also an extra opinion for doctors and family members. Supervised learning algorithms used. This topic does not finds the relationship between resources with mortality rates.

2.3 Paper 3: Prediction of mortality in patients with cardiovascular disease using data mining methods

Authors: Damir Imamovic, Elmir Babovic, Nina Bijedic

Year of Publications: 2020

Methods Used: data tree mining, neural network and logistic regression.

Result: The aim of this research is to compare the effectiveness of these methods in modeling the effectiveness of Predicting mortality in patients with cardiovascular disease..

Remarks: This concept is applied for only cardiovascular disease. CNN methods used, CNN for data processing many require more time. Huge amount of data required. Less accurate results

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III. PROPOSED SYSTEM

In terms of data analysis, analysis the relationship between hospital resources and mortality is necessary task for public health's policy deployment. Good health services is a most important task to reduce the mortality rates. System discovers the correlations among health services and mortality rates using the data mining techniques. Proposed system helpful to the medical departments so as to reduce the mortality rates.

Proposed system discovers the hidden correlations between hospital resources such as doctors, dentists, pharmacy, nurses, technical nurses, scanning departments and mortality rates. Finding hospital resources which increases the deaths rates of patients will help hospitals to handle things to reduce patient death rates. Leading organization effectively & efficiently to deliver key results and ensure high standards.

Mortality rates of patients will come down. Improvises the hospital services and reputation. Machine learning techniques used to get accurate results. Appropriate disease parameters used for prediction. Faster decision making. System works for dynamic data using ML techniques.

ADVANTAGES

- The proposed system is an application in the medical sector.
- The system focuses on reducing mortality in hospitals.
- The system detects the connection between health resources and mortality.
- The system uses data mining techniques to analyze health data.
- The system uses data from hospital resources such as doctors, dentists, pharmacy, nurses, nurse technicians, scanning department and mortality.
- The system predicts the relationship between health resources and mortality rates using the "Association Rules" data mining technique.
- The system is a real application used by health departments and the aim is to reduce.



IV. METHODOLOGY

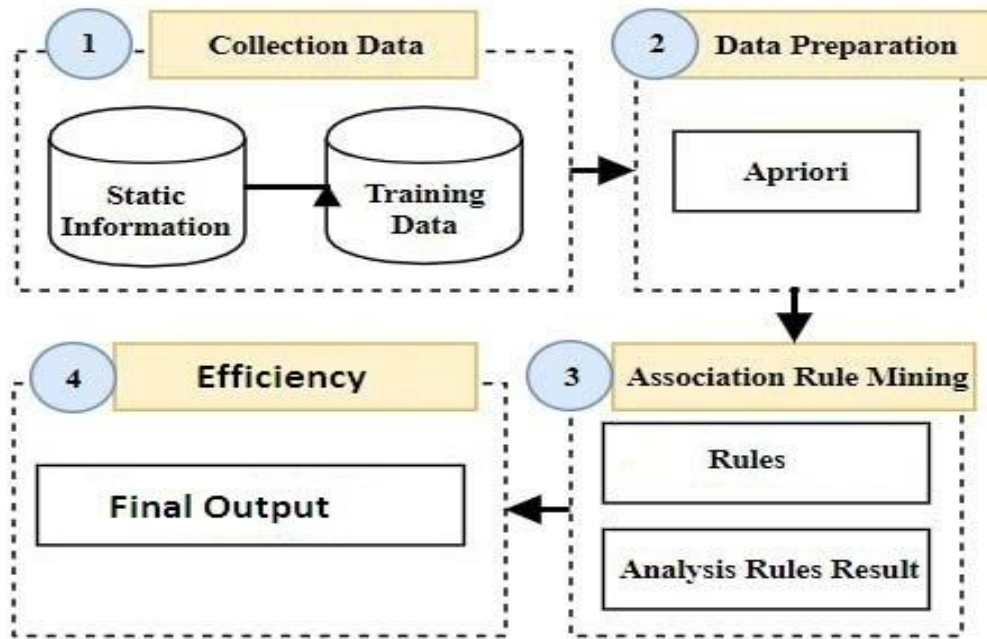


Fig.1 Methodology Diagram

A. Implementation Steps

Step 1: Data Collection

We are working on real time application, we build a new application which contains data servers (used to store data). Data collection means collecting data from different sources. Data includes hospital resources and death rates.

Step 2: Data Preparation

Here data from servers extracted and analyzed. Complete data extracted and analyzed where we remove irrelevant data and retain data required for processing. According to the project only hospital resources and mortality rates are considered for pattern prediction.

Step 3: Specify Constraints

Constraints means the factors we are using in the proposed system such as count of heart specialist, count of neurologist, count of nurses, pharmacy, count of physicians, number of beds etc. and death rates.

Step 4: Association Learning (Apriori Algorithm/Apriori TID Algorithm)

Efficient algorithms applied to process the training datasets. We use these algorithms to process data and to find the patterns. *Algorithm is selected because of the following reasons.*

1. Quicker Results (takes less time for Prediction)
2. Works fine for small data set as well as huge data set.
3. One scan of Database is enough.
4. Works fine for multiple constraints.

Step 5: Patterns Prediction Here system predicts the correlation b/w hospital resources and mortality rates based on old datasets using apriori and apriori TID algorithms.

Step 6: Results**Patterns generated (showing relationship)**

- HeartSpecialist_Low ->DeathRate_High
- Neurologist_High ->DeathRate_Average
- Physician_Low ->deathrate_high



Step 7: Visual Representation

Final patterns displayed for the users on GUI. When users gets login to the application system displays outputs on a GUI.

B. Experiment Result

Result Analysis

APRIORI Algorithm

Performance Factor

Data Structure – array based

Memory Utilization – depends on the data set [less for small datasets]

No.of.scans - single scan required

Execution time - execution time depends on producing candidates

No of Instances (records)	Execution Time (milli Secs)
Around 2k	6557
Around 1k	6495
Around 500 records	6465
100 records	6445

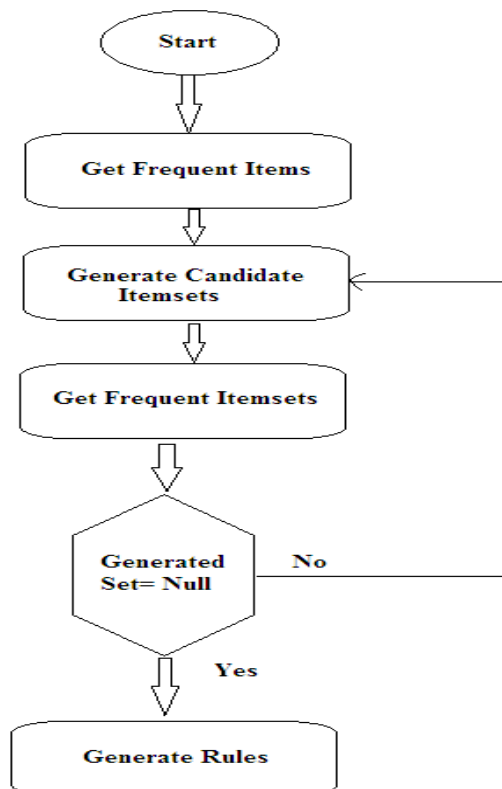


Fig.2 Flow of Algorithm



V. IMPLEMENTATION

Implementation can be described as the realization of an application or execution of a plan, idea, model, proposal, specification, standard, algorithm or policy. In computer science, implementation is explained as the realization of a technical specification or algorithm as a program, software component, or any other computer system through computer programming and deployment. There may be many implementations for a given specification or standard.

VI. CONCLUSION

Patient mortality prediction and reasons for mortality plays a vital role in the current medical sector. It is very important to identify the factors for increase in patient mortality. Proposed system uses efficient unsupervised learning algorithms such as apriori and apriori TID algorithms to process medical datasets and finds the relationship between hospital resources and patient mortality rates. System also finds the most important factor for increase in patient mortality. System helpful for hospitals.

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