

Analysis of Hospital Resources with Mortality Rates using Apriori Algorithm

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Abstract - Apriori algorithm is something which is useful in mining frequent item sets and relevant association rules. This algorithm is usually operated on a database containing a large number of data. We use this algorithm in our project to try and predict the mortality rates of a hospital based on the various fields like the number of doctors with the hospital, the number of duty doctors, the ratio of nurses to patients, number of empty beds, number of wards in the hospital. The project can use a database or a csv file as the input data. The frequent item sets are mined from the input using the apriori algorithm and then the association rules are generated. The project is beneficial for public survey and as a third eye point of view for the hospitals to try and improve their services. The website is developed for the hospitals to upload their data set and to analyze and improve themselves as well as the public to view the hospitals in their city and to get the overview of the hospital.

Key Words: Hospital, Mortality Rates, Apriori algorithm, Hospital Resources, Mining.

1. INTRODUCTION

Health care is one of the most vital services in the world and yet it has not been permeated by the advances in software technology. Looking at the statistics obtained from various hospitals, government and non-government organizations we can see a hike in mortality rates, and the availability of other data such as the number of doctors associated with the hospital, the number of duty doctors present, the number of wards, the modalities within the hospital, the number of empty beds and the ratios of nurses to hospital, one can't help but to try and apply a trending area of technology, the data mining to analyze and try to predict the dependencies of mortality rates with fields mentioned above.

The apriori algorithm uses the association rules and tries to get the relation between mortality rates and the various fields of the hospital, which can then be used by the hospitals to improve themselves by uploading their data set and also the public can view the various hospitals in their cities and how they fair for a particular disease or condition.

Since this is related to the sensitive field of medicine, one cannot be fully accurate and one must be careful not to take the outcome of this too seriously and the patient data is

something which is very confidential and care must be taken not to cause issues to the patients.

2. EXISTING SYSTEM

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 software's are used to make payments. Online appointment System used to book appointments online. All these existing systems are maintenance software's and tools and currently there is no tool which analyzes hospital data and discovers the association between hospital resources and mortality rates.

Drawbacks of existing system:

- Only Maintenance Software's are used.
- Manual Process.
- Time Consuming.
- No automation to discover correlation among hospital resources and mortality rates.

3. PROPOSED SYSTEM

In terms of data analysis, the relationship between hospital resources and mortality is necessary task for public health's policy deployment. Good health services is the 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 is 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.

Advantages of proposed system:

- System aims at improving the hospital resources pertaining to diseases.
- System discovers the association between

health resources and affected crowd.

- System uses data mining techniques to analyze health data.
- System predicts the relationship using the previous data collected and suggests improvements that can be made.
- System is a real world application used by health departments and the objective is to reduce the mortality rates and improve hospital resources.

4. SYSTEM DESIGN

Fig.1 shows the three system components namely, Admin, Visitors and Hospitals. The Admin has full control over the system and he grants access to Visitors and Hospitals alike. The Visitors can access and view the Hospital data and the results of the Mortality rates prediction. The Hospital (the individual hospital using the system) uploads the data set and then the suggestions are given to it and they can access only their respective data.

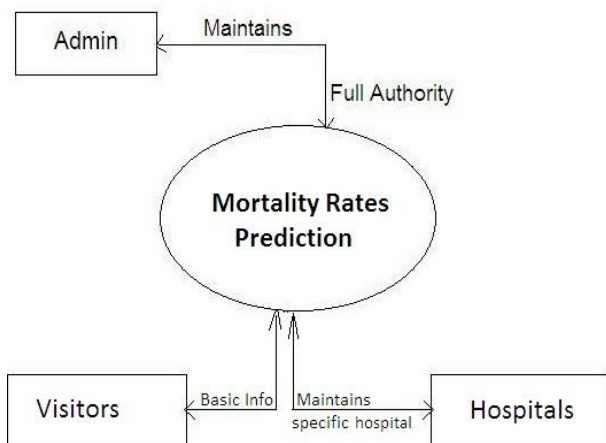


Fig.1

The Visitors and Hospitals have login credentials granted by the Admin. The Prediction algorithm then works on the data set provided by the hospital and then works to get the association rules. This is then displayed to others.

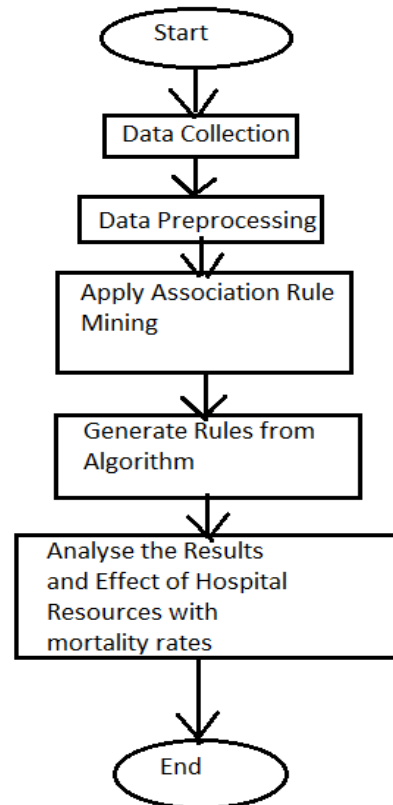


Fig.2

Fig.2 shows the working of the apriori algorithm in this project, Data is first collected in the form of database or Excel sheet and then the data is preprocessed i.e. the noise and other fields are removed, then the association rule is applied on it and the rules of association are generated by the algorithm. Then the effects of the Hospital resources on mortality rates are observed.

5. THE APRIORI ALGORITHM

The Apriori algorithm takes each part of a larger data set and "scores" it or contrasts it with other sets in some ordered way. The resulting scores are used to generate sets that are classed as frequent appearances in a larger database for aggregated data collection.

The Apriori algorithm may be used in conjunction with other algorithms to effectively sort and contrast data to show a much better picture of how complex systems reflect patterns and trends.

Algorithm:

STEP 1: Scan the data set and determine the support(s) of each item.

STEP 2: Generate L1 (Frequent one item set).

STEP 3: Use Lk-1, join Lk-1 to generate the set of candidate k - item set.

STEP 4: Scan the candidate k item set and generate the support of each candidate k - item set.

STEP 5: Add to frequent item set, until C=Null Set.

STEP 6: For each item in the frequent item set generate all non-empty subsets.

STEP 7: For each non empty subset determine the confidence. If confidence is greater than or equal to this specified confidence .Then add to Strong Association Rule.

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6. CONCLUSION

A technical system like this in the critical field like healthcare will do wonders to help and improve the services provided by the hospitals and also give an option for the public to check and choose a suitable hospital based on their needs. This system also protects the confidentiality of the patient data as only the respective hospitals have access to their data. This might help save lives as the algorithm suggests the optimal parameters to improve the mortality rate and the public can check and choose an appropriate Hospital.

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