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Hospital Admissions Using Data Mining

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ABSTRACT-
The quality of health care is affected due to crowding of Emergency Department(ED). To avoid the adverse effects of inconvenience and improve patient care, there is a need to explore ideas and innovative technology methods for predictions of admissions in ED. The analysis of data gathered from hospitals like the patient age, previous history, month of the year, day of the week and time of the day in which the patient was admitted in the ED for health care work as the key for predictions of future admissions using data mining techniques with the help of some machine learning algorithms. The usage of data mining techniques combined with the following three techniques logistic regression, decision trees, and (GBM) Gradient Boosted Machines give the final method for predictions of patient admission in ED. The advantages of using data mining.

1.INTRODUCTION:

The law passed by Emergency Medical Treatment and Active Labour Act (EMTALA) of 1986 stated that any person seeking medical attention should be provided with a complete medical screening examination regardless of the nationality, legal status and ability to pay the bill, hence it is necessary for Emergency Departments (EDs) in hospitals to give required attention to every patient visiting the hospital for medical care. If the staff present at the hospital is not sufficient for the health care of increasing number of incoming patients and the inpatients, the other hospitals are at a long distance from the patients, the capacity of beds available in the hospital is not enough for admitting all the ED patients and they have to be transferred to other nearby hospitals for further treatment. In all the mentioned and many other possible cases, the patients suffer more than any staff member of the hospital. Hence, the hospital acquired solutions from the new emerging technical methods.

One of the most efficient methods used by hospital EDs is Data Mining with some machine learning techniques. The previous data from the records of the hospital's EDs play an important role for extracting patterns. The model created by use of data mining techniques is helpful to increase the performance of ED. Stress caused to the waiting patients can be reduced by the previous prediction by keeping alert of the probable number of bed for the patients to be admitted ,the storage of resources and all the necessary requirements of the EDs required for complete patient care .The result of the model designed by using data mining techniques ,logistic regression model, gradient boosting machine can differ from the actual number. Prior to start the implementation of prediction model testing is important.

2.EXISTING SYSTEM:

In Existing system, the single data mining technique is used to predict hospital admissions from the emergency department. There is no previous research that identifies which data mining technique can provide more reliable accuracy in identifying suitable treatment for hospital admissions from the emergency department. Practical use of hospital database systems and knowledge discovery is difficult in hospital admissions from the emergency department.
Analysisofthemethodsusedinpast,techniqueusedincurrentsystemandthepossibilityofchangesthatcanbedoneinpreviousandcurrentmodelorlookingfortherequirementofanewperspectiveandideasforenhancementisnecessary.Individualconceptandmodelwereusedinpreviouspredictionsystems.Combin

ationofdatapatternfromdataminingalongwithmachinelearningtechniquesrequirestobetestedandevaluatedforchangesandaccuracy.Themethodshavetheirownindividualpropertieswhichare tedious.Thesolution need to be provided for the purposeofanalysisistofindamodelwhichissuitableto manage thehospitalsemergencydepartmentandprovidecaretothepatientswithoutarisinganybottleneckintheprocess.

3.RELATED WORK:

Using a range of clinical and demographic data relating to elderly patients, La Mantiana used logistic regression to predict admissions to hospital, and ED re-attendance. predicted admissions with moderate accuracy, but were unable to predict ED re-attendance accurately. The most important factors predicting admission were age, Emergency Severity Index (ESI) triage score, heart rate, diastolic blood pressure, and chief complaint. Baumann and Strout also find an association between the ESI and admission of patients aged over 65. Sun et al. [8] developed a logistic regression model using two years of routinely collected administrative data to predict the probability of admission at the point of triage. Risk of admission was related to age, ethnicity, arrival mode, patient acuity score, existing chronic conditions, and prior ED attendances or admission in the past three months. Although their data showed the admission of more females than males, sex was not significant in the final model. Similarly, Cameron et al. developed a logistic regression model to predict the probability of admissions at triage, using two years of routine administration data collected from hospitals in Glasgow.

Hospitals do not provide the same quality of service even though they provide the same type of service. There is no previous research that identifies which data mining technique can provide more reliable accuracy in identifying suitable solution to predict hospital admissions from the emergency department. By applying data mining techniques to help emergency department in hospital to predict hospital admissions from the emergency department. Hybrid data mining techniques are used for selecting the suitable to predict hospital admissions from the emergency department.

4.SYSTEM ARCHITECTUTRE:

By applying data mining techniques (Hybrid) tothe identify suitable solution to predict hospital admissions from the emergency department. Apply single data mining techniques to predict hospital admissions from the emergency department is benchmark dataset to establish baseline accuracy for each single data mining technique to predict hospital admissions from the emergency department.

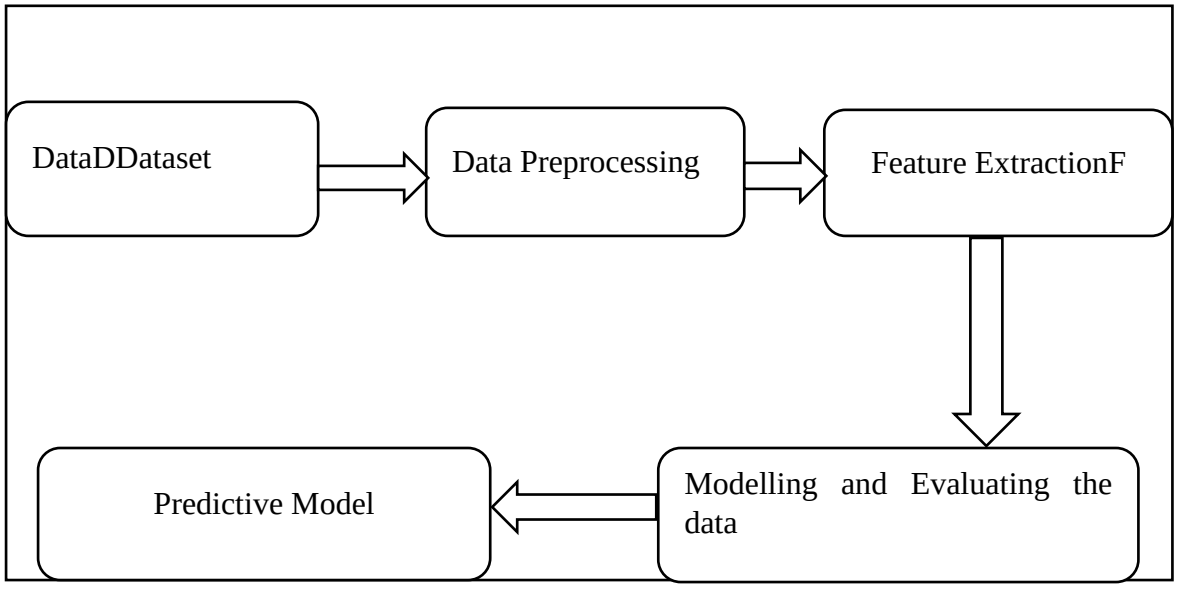

Figure 1. SYSTEM ARCHITECUTRE

By using the concept of data mining for predicting the hospital admissions in case of emergency is a major task. A busy area say a highway we will be having a hospital. There are many chances for accidents to happen in highways which is unstoppable. So incase of emergeny the suffering patients has to be admitted in priority by using the concept of data mining which will helps in prediction, preprocessing, feature extraction through amalgamation and used to predict the exact admissions in demand.

5. CONCLUSION:

The overall study involved a survey of different methods used for the prediction model of hospital admission. Along with this study it also has comparison of three different machine learning algorithms namely, decision tree, random forest and gradient boosted machine which are used for predicting the hospital admission from emergency department. Overall the random forest performs better when compared to the decision tree and gradient boosted machine. Implementation of these models could help the hospital decision makers for planning and managing the hospital resources based on the patient flow. This would help for reducing the emergency department crowding.

In future, different algorithms regarding deep learning and machine learning can be used to implement the model. Even ensemble of different algorithms can also be done. Different demographics as predictor can be taken into consideration for future enhancement.

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