

LITERATURE SURVEY

1.Development of the Health Information Analytics Dashboard Using Big Data Analytics [By Anisatul Afifah,2020]

This study's methodology makes use of big data analytics. Users can more easily comprehend the results and interpretation of the data analysis by viewing the data analysis results in display charts and graphs. With an accuracy rate of 98%, this dashboard is helpful for facilitating decision-making so that stakeholders can learn more quickly and effectively respond. It also improves the quality of health services in order to increase the level of public health.

2.Length-of-Stay Prediction for Paediatric Patients with Respiratory Diseases Using Decision Tree Methods [Fei Ma,2020]

The prediction of LOS for paediatric patients with respiratory illnesses will be discussed in this paper. Using decision tree methods, they are forecasting the LOS. We employ the bagging, adaboost, and random forest types of decision trees. The bisection test and periodic test are two tests that are used to support the performance of prediction techniques. All three techniques work, however Adaboost is somewhat more effective than the other two. Leo Breiman suggested bootstrap aggregation (Bagging) to increase classification precision. The adaptive boosting algorithm (AdaBoost) is a well-known ensemble technique that builds a stronger classifier from weak learners, or simple classifiers. Another kind of ensemble learning classifier called random forest uses independently developing decision trees based on separate training sets. Adaboost performs better in periodic test while bagging approach performs best in bisection test. Accurate patient LOS prediction allows for more effective and efficient management of healthcare resources.

3. Health Data Analytics: A Proposal to Measure Hospitals Information Systems Maturity [Joao Vidal de Carvalho,2018]

In this situation, using a maturity model is a good technique to pinpoint the HIS maturity's strong points and areas in need of development. This essay makes a recommendation on how to assess the DA maturity of hospital information systems. The study's conclusion is a maturity model with six phases of HIS growth and maturity progression and a 94% accuracy rate.

4. Predictive Analysis in Health Care[Conference: Predictive Analysis in Health Care At: Dubai,UAE,2019]

Data mining is the fusion of several fields (such as business intelligence, artificial intelligence, and analytics) that uses statistics and data warehouse technology to extract knowledge from a large amount of data. Correct illness analysis and medication prescription following accurate diagnosis require a number of corrective actions. The right data analytics can overcome these difficulties. This study discusses a few methods for disease prediction with a 97% accuracy rate in order to enhance healthcare.

5. Predicting Length of Stay Across Hospital Departments [MiguelAngel Sicilia, Elena García-Barriocanal et al,2021]

They present a length of stay (LOS) forecasting model in this paper, along with a research of trends and patterns that aid in a better comprehension of how LOS differs among various hospital departments and specialties. Large volumes of administrative data are produced by healthcare systems concerning patients, departments, the price of medical supplies, the availability of beds, illnesses, etc. The resource consumption in healthcare systems is assessed using this method rather than easily accessible administrative data. In order to optimise hospital resources more effectively within departments and give patients and hospital entities an additional advantage, machine learning techniques are being used in hospital management. These techniques include data preparation, training and testing setup, and method evaluation criteria. Hospital divisions that do better

in comparative tests were taken into account when comparing departments based on the algorithms employed to forecast outcomes. This study demonstrates that it is feasible to lower hospital expenses while improving patient care quality.

6. The impact of inpatient bed capacity on length of stay [Brendan Walsh, Samantha Smith et al,2021]

Inpatient duration of stay and the number of available beds has significantly decreased recently across all health systems. The causal relationship between duration of stay and bed supply is frequently ignored, though. The duration of stay for emergency inpatients in Ireland between 2010 and 2015 is examined in this study in relation to changes in the availability of inpatient beds as a result of changes in healthcare spending brought on by the recession. Between 2010 and 2015, U-shaped patterns were seen for both the supply of inpatient beds and the average length of stay. All regression models reveal a continuous, strong positive association between the number of beds available and the average number of nights spent. Our data indicate that while length of stay decreased by 6.4% between 2010 and 2012, losses in bed supply were responsible for almost 42% (2.7% points) of this decrease. In Ireland, variations in the number of beds available between 2010 and 2015 were strongly correlated with variations in the length of stay for emergency inpatients. The context of other health system modifications should be considered when utilising duration of stay as an efficiency metric. In contrast to decreased demand for care or the relocation of treatment to other venues, a shorter duration of stay may be an indication of a shortage of resources or beds.

Project Description

Recent Covid-19 Pandemic has raised alarms over one of the most overlooked areas to focus: Healthcare Management.

While healthcare management has various use cases for using data science, patient length of stay is one critical parameter to observe and predict if one wants to improve the efficiency of the healthcare management in a hospital.

This parameter helps hospitals to identify patients of high LOS-risk (patients who will stay longer) at the time of admission. Once identified, patients with high LOS risk can have their treatment plan optimized to minimize LOS and lower the chance of staff/visitor infection. Also, prior knowledge of LOS can aid in logistics such as room and bed allocation planning.

Suppose you have been hired as Data Scientist of Health Man – a not for profit organization dedicated to manage the functioning of Hospitals in a professional and optimal manner.

Goal:

The goal is to accurately predict the Length of Stay for each patient on case-by-case basis so that the Hospitals can use this information for optimal resource allocation and better functioning. The length of stay is divided into 11 different classes ranging from 0- 10 days to more than 100 days.

Technical Architecture:

