**IBM PROJECT REPORT**


**ANALYTICS FOR HOSPITALS HEALTH-CARE DATA**


**TEAM ID    :    PNT2022TMID05005**

**BATCH  :    Team 1**


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GitHub & Project Demo Link

# 1. INTRODUCTION :

PROJECT OVERVIEW:

Recent covid-19 pandemic has increased the most overlooked areas to focus on healthcare management. While the health care management has various use case for using data science, patient length of stay in one critical parameter to observe and predict one wants to improve the efficiency of the health care 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.

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.

PURPOSE:

The main purpose to know the fundamental concepts of data analytics and can work on the IBM cognos analytics.
To gain a broad understanding of plotting different visualization to provide the suitable solution.
Able to create a meaningful visualization and the dashboards.

## 2. LITERATURE SURVEY:

Existing problems & references:

| S.no. | Title | Author | Year of publication | Problem identification | Techniques used | Drawbacks |
|---|---|---|---|---|---|---|
| 1. | Big data analytics: Understandingits capabilities and potential benefits for healthcare organizations. | Yinchuan Wang, et. al., | February 2016 | Our findings will helphealthcare organizations understand the big data analytics capabilities and potential benefits. | Apache. | To address this lack, this study examines the historical development, architectural design, and component functionalities ofbig data analytics. |
| 2. | Big data analytics solution for intelligent health care management. | Alejandro Bal dominos, et.al., | March 2017 | The users to help able to see understand the valuable information provided by data care, the visual analytics. | Apache spark, Mongo DB. | Big data can alsopose risk and undermine pose doctors. |
| 3. | Analysis of healthcare bigdata. | Zhihan Lv, et.al., | March 2020 | Hospitalization cost, and the insured population all show a trend of increasing yearby year. | Hadoop | the hospitalization costs show a trend of increasing year by year in recent years. |

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|---|---|---|---|---|---|---|
| 4. | Healthcare analytics inEra: A survey. | Mohammad zunnunkhan,et.al., | March 2019 | It helps new data and security models for measuring security & quality of data using health care environment. | Machine learning | Data sets can gain unwanted attention from hackers and important information canbe leaked to competitors. |
| 5. | A Framework for Data Analytics-Based Healthcare Systems. | V.Muneeswaran, et.al., | February 2021 | Data analytics is becoming a future escalating tool of all industries including medicine, roboti | generic XML | the term data is unavoidable and certainly, nothing is possible without its usage. |

| | | | | cs, etc., | | |
|---|---|---|---|---|---|---|
| 6. | A survey on Data mining approaches for health care . | Divya Tomer,et.al., | October 2013 | Data mining offers novel information regarding health care helpful for making administrative as wellas prediction of disease, selection of treatment, health insurance policy. | classification, clustering, association, regression in health domain | Decision regarding selection of merge of split point. Once a decision is made it cannot be undone. |
| 7. | A Framework for Pandemic Prediction Using Big Data | Imran Ahmed HYPERLINK "https://www.sciencedirect.com/science/article/pii/S2214579621000071#!", et.al., | January 2021 | the novel corona virus pandemic (COVID-19) outbreak is seriousl | machine ele | prescriptive analysis applying big data analyticsusing a novel disease real data set, |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Analyti cs. | | | y threate ning human health. | a r n i n g | focusin g on differe nt pande mic sympto ms. |
| 8. | Big- Data Anal ytics for IoT- Enab led Smar t Health care System . | Syed Rooh UllahJan. | Januar y 2021 | Securit y Optimi zation, Implem enting and testing on real world patient s. | M a c h i n e l e a r n i n g | Precisio n, Interop erability .Real time, Single Draback s subject, Low accuracy . |
| 9. | Big Data Analyti cs in Health care Medica l Image Proces sing from Big Data Point of View. | Daniel A, et, al., | May 2015 | The user to help able to informa tion provide d by healthca re. | M a c h i n e l e a r n i n g | Delayed enhance d MRI has been usedfor exact assessm ent of myocar dial infarctio n scar. |

Problem statement definition:

1. Improper maintenance of the patient health care data.
2. Improper information about the availability of medicine, bed availability and stay of each patient.
3. Disappointed about lack maintenance of patient data and back history.
4. How many days a patient will stay in the hospital?

So we can predict the stay of each patient admitted in the hospital. We can maintain the proper data sheet about each patient so that the doctors can get appropriate data to give proper treatment for a patient.

The main goal is maintain proper database that shows the complete information about every patient and hospital, so that we can increase the efficiency of hospital reduce stay of patients in the hospital.

3. **IDEATION & PROPOSED SOLUTION:**

EMPATHY MAP CANVAS:

- What do they think and fell – it is easier to view the number of patients in hospital, it can dynamically the change the details using the dashboard, more health of the patients.
- What do they see – automation of hospital administrative process, hospital can predict length of stay of each patients, hospital can easily predict the treatment given to each patients using stored case sheet.
- What do they say and do – explore and visualize the hospital dataset effectively, effective use of hospital dashboard.
- What do they hear – more effective sharing of patient data, easy to identify the number of patients in the hospital and available beds in hospital.

IDEATION & BRAINSTORMING:
- Gathering everyone in team and invite brainstorming session and collect everyone's opinion about the idea.

- Set the goal and time table to work and finish the project.
- Everyone should listen to other ideas and finalize the solution according to the priority of the solution and related to the goal of the project.
- Discuss about the feasibility everyone solution and distribute the work to everyone in the team according to specialization individual.
- Then develop the strategies blueprint to work .

PROPOSED SOLUTION:

- It is develop interactive web application to maintain the hospital database automation of hospital administration using the IBM cognos analytics tool, create interactive dashboard, story and report of the hospital data base .

PROBLEM SOLUTION FIT:

The proposed solution is suitable for main goal of this project and also future scope for this project.

4. **REQUIREMENT ANALYSIS:**

FUNCTIONAL REUIREMENTS:

We need a good hospital data sheets to develop an interactive view of the hospital database and understand the usage of the tools like IBM cognos for data analytics, visualization techniques to understand clearly about the dataset.

Easy to access the tools given for data analytics and data visualization.

5. **PROJECT DESIGN:**

DATA FLOW DIAGRAMS:

[OBJ]

SOLUTION AND TECHNICAL ARCHITECTURE:

The data set cleared loaded in the IBM cognos tool and then the data is explored and create a useful visualization to administrate the hospital is done.

## 6. PROJECT PLANNING & SCHEDULING:

- There are totally four sprint for planning and scheduling the work to the team members.
- Each sprint takes six days to complete the work.
- Sprint 1 started at 24 oct 2022 and ended in 29 oct 2022, as a health care I have to create account in the IBM cloud and collect the data about the patients.
- Sprint 2 started at 31 oct 2022 and ended at 05 nov 2022, collected data should be cleaned and uploaded to the database or IBM cloud, using IBM cloud account uploading of datasets in the dashboard.
- Sprint 3 started at 07 nov 2022 and ended at 12 nov 2022, prepare the uploaded data visualize the data properly to get   an overall view of data about the patients in the hospital.
- Sprint 4 started at 14 nov 2022 and ended at 19 nov 2022, to represent the data in my dashboard and predict the length of stay of patients in the hospital.

## 7. CODING & SOLUTIONING:

- Interactive web application development and show the hospital database by exploring, visualizing, reporting and story of the dataset.

Features:
- Using the HTML and CSS create the web application, we can get the details of each patient and predict the length of stay of the patient in the hospital and complete case sheet about the patient.
- Every patient can individually monitored by the hospital administrator and we can give the appropriate treatment to the patient,
- Time is important factor in the health care sector so that we can save life by create the web application.

- Administration of hospital can be get automated and correct treatment and case history of every patient is stored in the database safety and reference.

8. **TESTING:**

   - Performance test, endurance test, scalability test, load test and efficiency test.
   - All the test are done and increase its efficiency of web application.
   - Thus we can predict the length of stay in the hospital.

9. **RESULTS:**

   Thus we can monitor and give treatment to the every patient in the hospital and the database getting updated frequently.

   We can automate the function of the hospital and prediction also taken accurately about the length of stay of every patient.

10. **ADVANTAGES & DIS-ADVANTAGES:**

    ADVANTAGE:

    Easy to predict the length of stay of each patient admitted in the hospital.
    We can visualize the data set and know availability of beds in the hospital accurately.
    DIS-ADVANTAGE:

    It is difficult to maintain error free database and it highly important when it comes to touch the lives of the patients.
    The interactive data visualization slows down the application.

11. **CONCLUSION:**

    Thus expected is output is achieved using this web application and predicted the length of stay patients admitting in the hospital.

    **Links:**

- **Git hub - [https://github.com/IBM-EPBL/IBM-Project-5112-1658747859](https://github.com/IBM-EPBL/IBM-Project-5112-1658747859)**
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