| **"VISUALIZING AND PREDICTING HEART DISEASES WITH AN INTERACTIVE DASHBOARD"**  IBM PROJECT BASED EXPERIENTIAL LEARNING PROGRAM  Team Id : **PNT2022TMID29565**  *Submitted by*  **MEENAKSHI S 510419205015**  **ABIRAMI B 510419205001**  **DIVYADHARSHINI V 510419205008**  **ROHINI PRIYA R 510419205020**  **SANDHIYA D 510419205021**  UNDER THE GUIDANCE OF  **NOORUL HASSAN S (Faculty Mentor)**  **MAHIDHAR (Industrial Mentor)**  **SAUMYA (Industrial Mentor)**  in partial fulﬁllment for the award of the degree  *of*  BACHELOR OF TECHNOLOGY  in Department of Information Technology**ARUNAI ENGINEERING COLLEGE** **1. INTRODUCTION**  1.1. Project Overview  1.2. Purpose  **2. LITERATURE SURVEY**  2.1. Existing problem  2.2. References  2.3. Problem Statement Definition  **3. IDEATION & PROPOSED SOLUTION**  3.1. Empathy Map Canvas  3.2. Ideation & Brainstorming  3.3. Proposed Solution  3.4. Problem Solution fit  **4. REQUIREMENT ANALYSIS**  4.1. Functional requirement  4.2. Non-Functional requirements  **5. PROJECT DESIGN**  5.1. Data Flow Diagrams  5.2. Solution & Technical Architecture  5.3. User Stories  **6. PROJECT PLANNING & SCHEDULING**  6.1. Sprint Planning & Estimation  6.2. Sprint Delivery Schedule  **7. CODING & SOLUTIONING**  7.1. Feature 1  7.2. Feature 2  **8. TESTING**  8.1. Test Cases  8.2. User Acceptance Testing  **9. RESULTS**  9.1. Performance Metrics  **10. ADVANTAGES & DISADVANTAGES**    **11. CONCLUSION**  **12. FUTURE SCOPE**    **13. APPENDIX**  Source Code  GitHub & Project Demo Link  **1.INTRODUCTION**    Heart disease describes a range of conditions that affect your heart. Diseases under the heart disease umbrella include blood vessel diseases, such as coronary artery disease, heart rhythm problems and heart defects you’re born with (congenital heart defects), among others.The term “heart disease” is often used interchangeably with the term “cardiovascular disease”. Cardiovascular disease generally refers to conditions that involve narrowed or blocked blood vessels that can lead to a heart attack, chest pain (angina) or stroke. Other heart conditions, such as those that affect your heart’s muscle, valves or rhythm, also are considered forms of heart disease.  **1.1 PROJECT OVERVIEW**  Among all fatal diseases, heart attack diseases are considered as the most prevalent. Medical Prosecutors conduct different surveys on heart diseases and gather information about heart patients, their symptoms and disease progression. Increasingly, there are reports about patients with common diseases who have typical symptoms. In this fast moving world, people want to live a very luxurious life so they work like a machine in order to earn a lot of money and live a comfortable life. Therefore, in this race, they forget to take care of themselves. Because of this, their food habits change their entire lifestyle. In this type of lifestyle, they are more tense, they have blood pressure and sugar at a very young age and they don’t give enough rest for themselves and eat what they get, and they don't even bother about the quality of the food if they don't go for their own medication. As a result of all this small negligence, it leads to a major threat, that is heart diseases.  **1.2 PURPOSE**  Healthcare industries generate amounts of data, so-called big data that accommodates hidden knowledge or patterns for decision making. The huge volume of data is used to make a decision which is more accurate than intuition. Exploratory Data Analysis (EDA) detects mistakes, finds appropriate data, checks assumptions and determines the correlation among the explanatory variables. In this context, EDA is considered as analyzing data that excludes inferences and statistical modeling. Analytics is an essential technique for any profession as it forecasts the future and hidden patterns. Data analytics has been considered as a cost effective technology in the recent past and it plays an essential role in healthcare, which includes new research findings, emergency situations and outbreaks of disease. The use of analytics in healthcare improves care by facilitating preventive care and EDA is a vital step in analyzing data.    **2.LITERATURE SURVEY**  **2.1 EXISTING PROBLEM**    1.A Systematic Framework for Heart Disease Prediction Using Big Data Analytics T. Poongodi, R. Indrakumari , S. Janarthanan & P. Suresh Chapter First Online: 03 September 2021.  2.Using Dash to pilot a predictive model for heart disease Jason Bentley Sep7, 2020.  3.Predicting Heart Disease with Classification Machine Learning Algorithms, Jarar Zaidi, Jun11,2020.  4.A Survey on Prediction Techniques of Heart Disease using Machine Learning Authors: Mangesh Limbitote , Dnyaneshwari Mahajan, Kedar Damkondwar , Pushkar Patil, Paper ID: IJERTV9IS060298, Volume & Issue: Volume 09, Issue 06 (June 2020), Published (First Online): 17-06-2020, ISSN (Online): 2278-0181, Publisher Name: IJERT, License: This work is licensed under a Creative Commons Attribution 4.0 International License.  5. Big Data Analytics in Heart Disease Prediction, Junene 2020 Journal of Theoretical and Applied Information Technology 98:11 Project: Efficient Healthcare System Using IoT Devices Authors: Ahmed Ismail Ebada, Samir Abdelrazek, Ibrahim Mahmoud El-henawy.  6.Design and Development of Real-Time Heart Disease Prediction System for Elderly People Using Machine Learning August 2019 DOI:10.13140/RG.2.2.12199.50081 Authors: Viswanath Reddy, Guttappa Sajjan.  **2.2 REFERENCES**  1.https://github.com/sagnikghoshcr7/Heart-Disease-Prediction /blob/master/Heart%20Disease%20 Prediction.ipynb 2.<https://github.com/undiscovered-genius/>Heart-Disease-Prediction-App 3.https://github.com/tayalmanan28/Heart-Disease-Predictor 4.https://github.com/Ravjot03/Heart-Disease-Prediction/blob /master/Heart\_Disease\_Prediction.ipynb 5.https://github.com/ChriStingo/HeartDisease-Analysis-and-Prediction /blob/main/HeartDiseaseAnalysis-and-Prediction.ipynb  **2.3 PROBLEM STATEMENT DEFINITION**  Heart disease can be managed effectively with a combination of lifestyle changes, medicine and, in some cases, surgery. With the right treatment, the symptoms of heart disease can be reduced and the functioning of the heart improved. The predicted results can be used to prevent and thus reduce cost for surgical treatment and other expenses. Many more input attributes can be taken but our goal is to predict with few attributes and faster efficiency the risk of having heart disease.      **3.IDEATION & PROPOSED SOLUTION**  **3.1. EMPATHY MAP CANVAS**    1. An empathy map is a widely-used visualization.  2.Empathy map is a square divided into four quadrants with the user or client in the middle.  3.Each of the four quadrants comprises a category that helps us delve into the mind of the user.  4.The four empathy map quadrants look at what the user says, thinks, feels, and does.    **3.2. IDEATION & BRAINSTORMING**    The health care industries collect huge amounts of data that contains some hidden information which is useful for making effective decisions. For providing appropriate results and making effective decisions on data, some advanced data mining techniques are used. The system uses 15 medical parameters such as age, sex, blood pressure, cholesterol, and obesity for prediction. Idea 1 To get data from a single person from their starting day of checkup to till up to date by using this we can predict their medical analysis through this. Idea 2 If a particular person avoids taking the checkup we can create an alert notification or message to check out their check up status details. Idea 3 If a particular person arrives for a checkup and the particular doctor is not available at right movement by the dashboard we can set another available doctor to them.        **3.3. PROPOSED SOLUTION**  Heart disease can be managed effectively with a combination of lifestyle changes, medicine and, in some cases, surgery. With the right treatment, the symptoms of heart disease can be reduced and the functioning of the heart improved. The predicted results can be used to prevent and thus reduce costs for surgical treatment and other expenses. The overall objective of my work will be to predict accurately with a few tests and attribute the presence of heart disease. Attributes considered form the primary basis for tests and give accurate results, more or less. Many more input attributes can be taken, but our goal is to predict a few attributes and faster efficiency, the risk of having heart disease. Decisions are often made based on doctors.  **3.4 Problem Solution fit**  The Problem-Solution Fit simply means that you have found a problem with your customer and that the solution you have realized for it actually solves the customer’s problem. It helps entrepreneurs, marketers and corporate innovators identify behavioral patterns and recognize what would work and why.  **Purpose**  1.Solve complex problems in a way that fits the state of your customers.  2.Succeed faster and increase your solution adoption by tapping into existing mediums and channels of behavior.  3.Sharpen your communication and marketing strategy with the right triggers and messaging.  4.Increase touch-points with your company by finding the right problem-behavior fit and building trust by solving frequent annoyances, or urgent or costly problems.        **4.REQUIREMENT ANALYSIS**  **4.1 Functional requirement**  **User Registration:** Enables users to make registration for the application through Gmail or any other sources.  1.UserName  2.User Login Id  3.Mobile number  4.Date of Birth  **User Confirmation:** Once after registration, the user will get confirmation via email. The confirmation mail will be generated within a week. Mail id must be the same as in every registration.  1.The Id should contain some special characters.  2.The Id should be only in the smaller case letters.  3.Every single one should contain unique names for identification.  **Visualizing Data:** Users can visualize the trends on the heart disease through Dash board created using IBM Cognos Analytics.  1. It gives the graphical representation of information and data.  2. It contains some visual elements like charts, graphs, maps, and data visualization tools.  **Generating Report:** Users can view his/her health report and make decisions on their own. If the report is positive their health is good .Else they should get medication from the specialists immediately.  1.Heart attack  2.Heart failure  3.Valve disease  **4.2 Non-Functional Requirements**  **Usability:** The application will have a simple and user-Friendly graphical interface.  1.Users can be able to understand and use all the features of the application easily.  2.Any action has to be performed with just a few clicks.  3.Key documents to gain a deeper understanding of our audience's needs and frustrations.  **Security:** For security of the application the technique known as database replication should be used so that all the important data should be kept safe.  1.In case of any crash, the system should be able to backup and recover the data quickly.  **Reliability:** The application has to be consistent at every scenario and has to work without failure in every environment.  1.It basically depends on how consistently a test measures a characteristic.  2.Administering the same test twice over a period of time to a group of individuals.  **Performance:** Performance of the application depends on the response of the time and the speed of the data submission.  1.The response time of the application is direct and faster which depends on the efficiency of the algorithm.  2.If there is no error the overall performance is success, else we have to work on it.    **Availability:** The application has to be available 24 x 7 for users without any interruption.  1.It displays the amount of time each object has spent.  2.It summarizes the overall objectives.  **Scalability:** The application can withstand the increase in the no. of users and has to be able to develop higher versions.  1.It expands workloads and performs well under increased conditions.  2.Its strategy is about right-sizing research and analysis.    **5.PROJECT DESIGN**  **5.1 Data Flow Diagrams**    A Data Flow Diagram (DFD) is a traditional visual representation of the information flows within a system. A neat and clear DFD can depict the right amount of the system requirement graphically. It shows how data enters and leaves the system, what changes the information, and where data is stored.    **Flow**    1.User creates an account in the application.  2.User enters the medical records in the dashboard.  3.Users can view the visualizations of trends in the form of graphs and charts for his/her medical records with the trained dataset.   4.Users can view the accuracy of probability of occurrence of heart disease in the dashboard.  **5.2 Solution & Technical Architecture**    **Solution Architecture**  Solution architecture is a complex process – with many sub-processes – that bridges the gap between business problems and technology solutions.  1.Find the best tech solution to solve existing business problems.  2.Describe the structure, characteristics, behavior, and other aspects of the software to project stakeholders.  3.Define features, development phases, and solution requirements.  4.Provide specifications according to which the solution is defined, managed, and delivered.    **Technical Architecture**    The Deliverable shall include the architectural diagram as below and the information is given below.    **Components & Technologies**  1.User Interface How the user interacts with applications e.g. Web UI, Mobile App, Chat bot etc.  2. Application Logic-1 Logic for a process in the application Java / Python.  3.Application Logic-2 Logic for a process in the application IBM Watson STT service.  4.Application Logic-3 Logic for a process in the application IBM Watson Assistant.  5.Database Data Type, Configurations etc. MySQL, NoSQL, etc.  6.Cloud Database Database Service on Cloud IBM DB2, IBM Cloudant etc.  7.File Storage File storage requirements IBM Block Storage or Other Storage Service or Local File system.  8.External API-1 Purpose of External API used in the application IBM Weather API, etc.  9.External API-2 Purpose of External API used in the application aadhar API, etc.  10.Machine Learning Model Purpose of Machine Learning Model Object Recognition Model, etc.  11.Infrastructure (Server / Cloud) Application Deployment on Local System / Cloud Local Server Configuration: Cloud Server Configuration: Local, Cloud Foundry, Kubernetes, etc.  **Application Characteristics**    1. Open-Source Frameworks List the open-source frameworks used Technology of Open Source framework  2. Security Implementations List all the security / access controls implemented, use of firewalls etc. e.g. SHA-256, Encryptions, IAM Controls, OWASP etc.  3. Scalable Architecture Justifies the scalability of architecture (3 – tier, Micro-services) Technology used.  4. Availability Justifies the availability of application (e.g. use of load balancers, distributed servers etc.) Technology used.  5. Performance Design consideration for the performance of the application (number of requests per sec, use of Cache, use of CDN’s) etc. Technology used.  **5.3 User Stories**    1. Most prospective customers start at the awareness phase, where a user has a problem or need and looks for an answer.  2.At this point customers mostly seek educational - content about services that could solve their problems.  3.These customers prefer educational thought leadership over promotional or product oriented insights, so organizations shouldn't aggressively push products on customers.  4.During the consideration phase, customers compare one organization's offerings to its competitors.  5.Blog content, success stories, email nurturing campaigns and can help organizations continue engaging with audience members.  6.As CX teams engage with customers, they can reinforce the features their products and services offer so consumers can better understand their benefits.  7.Prospects in this phase may actively engage with brands they already consider.  **6.PROJECT PLANNING & SCHEDULING**  **6.1 Sprint Planning & Estimation**   | Sprint | Functional Requirement (Epic) | User Story number | User Story/Task | Story Points | Priority | Team Members | | --- | --- | --- | --- | --- | --- | --- | | Sprint-1 | Registration | USN-1 | As a user, I can register for the application by entering my email, password, and confirming my password | 8 | High | Meenakshi,Abirami | | Sprint-1 |  | USN-2 | As a user, I will receive confirmation email once I have registered for the application | 5 | High | Meenakshi,Abirami | | Sprint-1 |  | USN-3 | As a user, I can register for the application through Email, Google account and mobile number | 2 | Medium | Meenakshi,Abirami | | Sprint-1 | Login | USN-4 | As a user, I can log into the application by entering email & password | 5 | High | Meenakshi,Abirami | | Sprint-2 | Dashboard | USN-5 | As a user, I can update my profile and medical records for analysis | 10 | High | Meenakshi,  DivyaDharshini | | Sprint-2 |  | USN-6 | As a user, I can view the accuracy of occurrence of heart disease through the report generation | 10 | High | Meenakshi,  DivyaDharshini | | Sprint-3 | Guidelines | USN-7 | As a user, they can view the guidelines and perform the required actions | 10 | Medium | Meenakshi,RohiniPriya | | Sprint-4 | User Profile | USN-8 | As an admin, he/she can update the health details of the users | 5 | High | Meenakshi,  Sandhiya | | Sprint-4 |  | USN-9 | As an admin, he/she can add or delete users | 5 | High | Meenakshi,  Sandhiya | | Sprint-4 |  | USN-10 | As an admin, he/she can manage the user details | 10 | High | Meenakshi,  Sandhiya |   **6.2 SPRINT DELIVERY SCHEDULE**   | Sprint | Total Story Points | Duration | Sprint Start Date | Sprint End Date | Story Points Completed (as on Planned End Date) | Sprint Release Date (Actual) | | --- | --- | --- | --- | --- | --- | --- | | Sprint - 1 | 20 | 6 Days | 01 Nov 2022 | 02 Nov 2022 | 20 | 11 Nov 2022 | | Sprint - 2 | 20 | 6 Days | 01 Nov 2022 | 03 Nov 2022 | 20 | 11 Nov 2022 | | Sprint - 3 | 20 | 6 Days | 01 Nov 2022 | 05 Nov 2022 | 20 | 11 Nov 2022 | | Sprint - 4 | 20 | 6 Days | 01 Nov 2022 | 07 Nov 2022 | 20 | 11 Nov 2022 |   **6.3 REPORTS FROM JIRA**                      **7.CODING & SOLUTIONING**  **7.1 Feature 1**      Using Cognos Analytics, dashboard is created which shows the relation between  attributes and how they are responsible for chances of heart disease. The dashboard is  incorporated in a website using iframe. It is mandatory to have an IBM account to view  the dashboard. As soon as the page is loaded, it asks to sign in to the IBM account.  Once signed in, the user can view the dashboard. Dashboard has multiple tabs, each  containing a chart of relation between attributes. The above code shows how  dashboard is included in the website.  **7.2 Feature 2**      The above code shows how user input is got as form and how it is processed and given  as input to a machine learning model. Which in turn gives if heart disease is present or  absent.  **8.TESTING**  **8.1 Test Cases**      **8.2 User Acceptance Testing**    **8.2.1 Purpose of Document**  The purpose of this document is to briefly explain the test coverage and open issues of the Visualizing and Predicting Heart Diseases with an Interactive Dashboard project at the time of the release to User Acceptance Testing (UAT). Healthcare industries generate enormous amounts of data, so called big data that accommodates hidden knowledge or patterns for decision making. The huge volume of data is used to make decisions which are more accurate than intuition. Exploratory Data Analysis (EDA) detects mistakes, finds appropriate data, checks assumptions and determines the correlation among the explanatory variables.      **8.2.2 Defect Analysis**  This report shows the number of resolved or closed bugs at each severity level, and how they were resolved.   | Resolution | Severity 1 | Severity 2 | Severity 3 | Severity 4 | Subtotal | | --- | --- | --- | --- | --- | --- | | By Design | 10 | 4 | 2 | 3 | 20 | | Duplicate | 1 | 0 | 3 | 0 | 4 | | External | 2 | 3 | 0 | 1 | 6 | | Fixed | 11 | 2 | 4 | 20 | 37 | | Skipped | 0 | 0 | 1 | 1 | 2 | | Won’t Fix | 0 | 5 | 2 | 1 | 8 | | Totals | 24 | 14 | 13 | 26 | 77 |     **8.2.3. Test Case Analysis**  This report shows the number of test cases that have passed, failed, and untested.   | Section | Total Cases | Not Tested | Fail | Pass | | --- | --- | --- | --- | --- | | Print Engine | 7 | 0 | 0 | 7 | | Client Application | 51 | 0 | 0 | 51 | | Security | 2 | 0 | 0 | 2 | | Outsource  Shipping | 3 | 0 | 0 | 3 | | Exception  Reporting | 9 | 0 | 0 | 9 | | Final Report  Output | 4 | 0 | 0 | 4 | | Version Control | 2 | 0 | 0 | 2 |     **9.RESULTS**  **9.1 Performance Metrics**    **10. ADVANTAGES & DISADVANTAGES**    **Advantages**  1. Increased accuracy for effective heart disease diagnosis.  2. Handles roughest (enormous) amount of data.  3. Reduce the time complexity.  4. It can reduce the availability of doctors on any time as it visualizes and  predicts.  5. Users can know about their Heart Disease and get instant diagnosis.  6. Very useful in case of emergency.  **Disadvantages**  1. Accuracy Issues: A computerized system alone does not ensure accuracy, and the warehouse data is only as good as the data entry that created it.  2. The system is not fully automated, it needs data from the user for full diagnosis.  3. Illiterate people may not have knowledge on this.  4. Cannot handle enormous datasets for patient records.  5. Cannot predict the chances of Heart Disease.    **11. CONCLUSION**  These high-end tools really help and provide its customers with advanced features and concepts that drive this project with ease.These tools also offer a wide range of capabilities for exposing data in different visualizations and forms. Apart from the offerings of these tools in terms of utilizing the pre-built data, it is necessary to explore using any statistical programming language. Doing so will help customers to utilize the same application for both customized intensive projects as well as utilizing pre-built applications. Many researchers have previously suggested that we should use DA where the dataset is not that large, which is proven. The conclusion which we found is that the performance is better in this Analysis. It predicts the chances of Heart Disease and classifies patients to check whether the patient is likely to be diagnosed with any cardiovascular heart diseases based on their medical attributes such as gender, age, chest pain, fasting sugar level, etc.      **12. FUTURE SCOPE**  The computational time was also reduced which is helpful when deploying a model. It was also found out that the dataset should be normalized; Otherwise, the training model gets over-fitted sometimes and the accuracy achieved is not sufficient when a model is evaluated for real-world data problems which can vary drastically to the dataset on which the model was trained. It was also found out that statistical analysis is also important when a dataset is analyzed.The difficulty which came here is that the sample size of the dataset is not large. If a large dataset is present, the results can increase very much. The dataset size can be increased and with various other optimizations can be used and more promising results can be achieved. It implements different Conditions that fall within the scope of heart disease including cholesterol level, high blood pressure, heart failure,and serum. Various other optimization techniques can also be used so that the evaluation results can again be increased. More different ways of normalizing the data can be used and the results can be compared. There are more ways that could be found where we could integrate heart- disease-trained models with certain multimedia for the ease of patients and doctors.    **13. APPENDIX**  **Source Code**  <!DOCTYPE html>  <html lang="en">  <head>  <title>Visualizing and Predicting Heart Diseases with an Interactive Dashboard</title>  <meta charset="utf-8">  <meta name="viewport" content="width=device-width, initial-scale=1">  <linkrel="stylesheet"href="https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/css/bootstrap.min.css">  <script src="https://ajax.googleapis.com/ajax/libs/jquery/3.6.0/jquery.min.js"></script> <script src="<https://maxcdn.bootstrapcdn.com/bootstrap/3.4.1/js/bootstrap.min.js>">  </script> <style>  .fakeimg {  height: 150px;  background: #aaa;  }  .indented {  padding-left: 50pt;  padding-right: 50pt;  }  </style>  </head>  <body>  <div class="jumbotron text-center" style="margin-bottom:0">  <h1>Visualizing and Predicting Heart Diseases with an Interactive Dashboard</h1>  <marquee direction"down">  <h5>TEAM ID:PNT2022TMID29565  Visualizing and Predicting Heart Diseases with an Interactive Dashboard</h5>  </marquee>  </div>  <nav class="navbar navbar-inverse">  <div class="container-fluid">  <div class="navbar-header">  <button type="button" class="navbar-toggle" data-toggle="collapse" data-target="#myNavbar">  <span class="icon-bar"></span>  <span class="icon-bar"></span>  <span class="icon-bar"></span>  </button>  </div>  <div class="collapse navbar-collapse" id="myNavbar">  <ul class="nav navbar-nav">  <li class="active"><a href="#">Home</a></li>  <li><a href="C:\Users\ELCOT\Downloads\IBM\code\register.html">Registration</a>  </li>  <li><a href="C:\Users\ELCOT\Downloads\IBM\code\login1.html">Login</a></li>  <li><a href="C:\Users\ELCOT\Downloads\IBM\code\dashboard.html">dashboard</a></li>  <li><a href="C:\Users\ELCOT\Downloads\IBM\code\predict.html">Prediction</a></li>  <li><a href="C:\Users\ELCOT\Downloads\IBM\code\guideline.html">Guidelines</a></li>  <li><a href="C:\Users\ELCOT\Downloads\IBM\code\profile.html">User profile</a></li>  </ul>  </div>  </div>  </nav>  <img align="left" src="C:\Users\ELCOT\Downloads\IBM\code\heart.jpg" width="400" height="225">  <p class="indented" style="text-align:center;" style="font-size: 1.75em";style="font-family:sans-serif;"; >  <b> Among all fatal diseases, heart attack diseases are considered as the most prevalent.<br>  Medical Prosecutors conduct different surveys on heart diseases and gather information about heart  <br> patients, their symptoms and disease progression. Increasingly, there are reports about patients<br>  with common diseases who have typical symptoms. In this fast moving world, people want to live a very <br>  luxurious life so they work like a machine in order to earn a lot of money and live a comfortable life.<br>  Therefore, in this race, they forget to take care of themselves. Because of this, their food habits change <br>  their entire lifestyle. In this type of lifestyle, they are more tense, they have blood pressure and sugar<br>  at a very young age and they do not give enough rest for themselves and eat what they get, and they don't even<br>  bother about the quality of the food if they don't go for their own medication. As a result of all this small <br>  negligence, it leads to a major threat, that is heart diseases.</p>  </body>  </html>  **GitHub & Project Demo Link**  **GITHUB LINK**  <https://github.com/IBM-EPBL/IBM-Project-50916-1660929510>    **PROJECT DEMO LINK**  <https://drive.google.com/file/d/1smXOnSc2Zylo1aAJW6TMwrD6his1th36/view?usp=share_link> |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
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