**Heart Disease Prediction**

Project Report

*Submitted in partial fulfillment of the requirements for the award of XII Artificial Intelligence of CBSE*

*Submitted by****Sudhanshu Ambastha***



**Session:** **2023-24**

**D.A.V Public School, Sahibabad**

**Senior secondary school Rajendra Nagar**

**T.H. A, Rajender Nagar, Block B, Sector II, Sahibabad, Ghaziabad, Uttar Pradesh 201005**

**D.A.V PUBLIC SCHOOL**

**Senior Secondary School, Sahibabad,**

**Rajendra Nagar**

 **CERTIFICATE**

This is to certify that the project entitled “Heart Disease Prediction” is a bonafide record of work done by Sudhanshu Ambastha in partial fulfilment of the requirement for award of XII Artificial intelligence in the CBSE Board during the academic year 2023-24.

**Principal Faculty Guide**

**External Examiner**

**AI Project Logbook**

**PROJECT NAME: Heart Disease Prediction**

**SCHOOL NAME: D.A.V Public School**

**YEAR/CLASS: 2023-24 12-F**

**TEACHER NAME: Deepti Talwar**

**TEACHER EMAIL: deeptiarora84@davpssahibabad.org**

**TEAM MEMBER NAMES AND GRADES:**

1. Sudhanshu Ambastha

2. Parth Shrivastava

3. Sarthak Srivastava

***Note:*** *Add more rows if there are more members in your team*

# Introduction

This document is your **Project Logbook**, and it will be where you record your ideas, thoughts and answers as you work to solve a local problem using AI.

Make a copy of the document in your shared drive and work through it digitally with your team. You can also print a copy of the document and submit a scanned copy once you have completed the Project Logbook. Feel free to add pages and any other supporting material to this document.

Refer to the **AI Project Guide** for more details about what to do at each step of your project.

# Team Roles

* 1. **Who is in your team and what are their roles?**

|  |  |  |
| --- | --- | --- |
| Role | Role description | Team Member Name |
| Team Leader | ● Schedules and  allocates tasks among  the team  ● Ensures tasks are  completed on time  ● Acts as the point of  contact between the  team and the teacher,  users and  stakeholders  ● Resolves team issues | Sudhanshu Ambastha |
| Data Expert | Decides on type of  data needed to train  an AI model  ● Collects data  ● Ensures data is in a  format that the team  can work with  ● Ensures data is  ethically sourced and  unfair bias is  eliminated Works  with prototype  builder to train the AI  model | Sudhanshu Ambastha |
| Prototype builder/Coder | ● Works with data  expert to train/teach  computer  ● Creates the prototype  and codes if  necessary | Sarthak Srivastava    Parth Shrivastava |
| Tester | ● Works with users to  tests the prototype  ● Gets feedback from  users and user sign-  off when they  prototype has met  user requirements  ● Creates an action plan  on what needs to be  fixed and prioritizes  requests for future  improvements | Sarthak Srivastava    Parth Shrivastava |
| Video producer | ● Films the activities of  the team and edits  these into a  presentation for  submission | Parth Shrivastava |

* 1. **Project plan**

The following table is a guide for your project plan. You may use this or create your own version using a spreadsheet which you can paste into this section. You can expand the ‘Notes’ section to add reminders, things that you need to follow up on, problems that need to be fixed urgently, etc.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Phase** | **Task** | **Planned start date** | **Planned end date** | **Planned duration (hours,**  **minutes)** | **Actual start date** | **Actual end date** | **Actual duration (hours,**  **minutes)** | **Who is responsible** | **Notes/Remarks** |
| **Preparing for**  **the project** | Coursework,  readings | 1-04-2023 | 2-04-2023 | 5 hours | 1-04-2023 | 2-04-2023 | 5 hours | Whole group |  |
|  | Set up a team folder  on a shared drive | 3-04-2023 | 3-04-2023 | 30 minutes | 3-04-2023 | 3-04-2023 | 30 minutes | Parth Shrivastava |  |
| **Defining the** | Background | 4-04-2023 | 8-04-2023 | 25 hours | 4-04-2023 | 8-04-2023 | 25 hours | Whole group |  |
| **problem** | reading |
|  | Research | 9-04-2023 | 11-04-2023 | 15 hours | 9-04-2023 | 11-04-2023 | 15 hours | Whole group |  |
|  | issues in our |
|  | community |
|  | Team | 12-04-2023 | 12-04-2023 | 3 hours | 12-04-2023 | 12-04-2023 | 3 hours | Whole group |  |
|  | meeting to |
|  | discuss |
|  | issues and |
|  | select an |
|  | issue for the |
|  | project |
|  | Complete | 13-04-2023 | 14-04-2023 | 5 hours | 13-04-2023 | 14-04-2023 | 5 hours | Sudhanshu |  |
|  | section 3 of |
|  | the Project |
|  | Logbook |
|  | Rate |  |  |  |  |  |  |  |  |
|  | yourselves |
| **Understanding** | Identify users | 13-04-2023 | 13-04-2023 | 30 minutes | 13-04-2023 | 13-04-2023 | 30 minutes |  |  |
| **the users** |  |
|  | Meeting with | 16-04-2023 | 20-04-2023 | 2 hours | 16-04-2023 | 20-04-2023 | 2 hours | Sudhanshu |  |
|  | users to |
|  | observe |
|  | them |
|  | Interview | 21-04-2023 | 30-04-2023 | 2 hours | 21-04-2023 | 30-04-2023 | 1 hours  30 minute | Sudhanshu |  |
|  | with user (1) |
|  | Interview | 1-05-2023 | 8-05-2023 | 2 hours | 1-05-2023 | 8-05-2023 | 2 hours | Sudhanshu |  |
|  | with user (2), |
|  | etc… |
|  | Complete | 11-05-2023 | 18-05-2023 | 10 hours | 11-05-2023 | 18-05-2023 | 5 hours | Sudhanshu |  |
|  | section 4 of |
|  | the Project |
|  | Logbook |
|  | Rate |  |  |  |  |  |  |  |  |
|  | yourselves |
| **Brainstorming** | Team | 19-05-2023 | 3-06-2023 | 2 weeks | 19-05-2023 | 3-06-2023 | 2 weeks | Whole group |  |
|  | meeting to |
|  | generate |
|  | ideas for a |
|  | solution |
|  | Complete | 4-06-2023 | 11-06-2023 | 2 weeks | 4-06-2023 | 11-06-2023 | 2 weeks |  |  |
|  | section 5 of |
|  | the Project |
|  | Logbook |
|  | Rate |  |  |  |  |  |  |  |  |
|  | yourselves |
| **Designing** | Team | 14-06-2023 | 16-06-2023 | 11 hours | 14-06-2023 | 16-06-2023 | 11 hours | Whole group |  |
| **your solution** | meeting to |
|  | design the |
|  | solution |
|  | Complete | 17-06-2023 | 18-06-2023 | 5 hours | 17-06-2023 | 18-06-2023 | 5 hours |  |  |
|  | section 6 of |
|  | the logbook |
|  | Rate |  |  |  |  |  |  |  |  |
|  | yourselves |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Collecting and**  **preparing data** | Team meeting to  discuss data requirements | 19-06-2023 | 21-06-2023 | 8 hours | 19-06-2023 | 21-06-2023 | 8 hours | Whole group |  |
| **Collecting and**  **preparing data Prototyping** | Data collection | 22 -06-2023 | 13-07-2023 | 35 hours | 22 -06-2023 | 13-07-2023 | 35 hours |  |  |
| Data  preparation and labelling | 16-07-2023 | 3-07-2023 | 32 hours | 16-07-2023 | 3-07-2023 | 32 hours |  |  |
| Complete Section 6 of the Project  Logbook | 4-07-2023 | 5-07-2023 | 3 hours | 4-07-2023 | 5-07-2023 | 3 hours |  |  |
| Team meeting to plan  prototyping phase | 10-06-2023 | 15-06-2023 | 7 hours | 10-06-2023 | 15-06-2023 | 7 hours |  |  |
| **Prototyping**  **Testing** | Train your model with  input dataset | 1-08-2023 | 19-08-2023 | 24 hours | 1-08-2023 | 19-08-2023 | 24 hours |  |  |
| Test your model and keep training with more data until you think your  model is accurate | 3-08-2023 | 30-08-2023 | 20 hours | 3-08-2023 | 30-08-2023 | 20 hours |  |  |
| Write a program to initiate actions based on the result of your  model | 6-08-2023 | 11-08-2023 | 3 hours | 6-08-2023 | 11-08-2023 | 3 hours |  |  |
| Complete section 8 of the Project  Logbook | 10-08-2023 | 12-08-2023 | 2 hours | 10-08-2023 | 12-08-2023 | 2 hours |  |  |
| Rate  yourselves |  |  |  |  |  |  |  |  |
| Team meeting to  discuss testing plan | 15-08-2023 | 17-08-2023 | 4 hours | 15-08-2023 | 17-08-2023 | 4 hours |  |  |
| **Testing**  **Creating the video** | Invite users to test your  prototype | 21-08-2023 | 21-08-2023 | 2 hours | 21-08-2023 | 21-08-2023 | 2 hours |  |  |
| Conduct  testing with users | 24-08-2023 | 11-09-2023 | 25 hours | 24-08-2023 | 11-09-2023 | 25 hours |  |  |
| Complete  section 9 of the Project  Logbook | 12-09-2023 | 22-09-2023 | 8 hours | 12-09-2023 | 22-09-2023 | 8 hours |  |  |
| Rate  yourselves |  |  |  |  |  |  |  |  |
| Team meeting to discuss  video creation | 23-09-2023 | 25-09-2023 | 4 hours | 23-09-2023 | 25-09-2023 | 6 hours |  |  |
|  | Write your  script | 26-09-2023 | 28-09-2023 | 6 hours | 26-09-2023 | 28-09-2023 | 5 hours |  |  |
|  | Film your  video | 29-09-2023 | 2-10-2023 | 5 hours | 29-09-2023 | 2-10-2023 | 5 hours |  |  |
|  | Edit your  video | 5-10-2023 | 8-10-2023 | 5 hours | 5-10-2023 | 8-10-2023 | 5 hours |  |  |
| **Completing**  **the logbook** | Reflect on the project  with your team | 9-10-2023 | 11-10-2023 | 3 hours | 9-10-2023 | 11-10-2023 | 3 hours | Whole group |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Complete sections 10 and 11 of the Project  Logbook | 12-10-2023 | 17-10-2023 | 11 hours | 12-10-2023 | 17-10-2023 | 11 hours | Whole group |  |
|  | Review your Project logbook and  video | 18-10-2023 | 21-10-2023 | 8 hours | 18-10-2023 | 21-10-2023 | 8 hours |  |  |
| **Submission** | Submit your entries on  the IBM |  |  |  |  |  |  |  |  |

* 1. **Communications plan**

Will you meet face-to-face, online or a mixture of each to communicate?  
Communication mode : Mixture of both offline and online

How often will you come together to share your progress?

Frequency of meeting: Twice in a month

Who will set up online documents and ensure that everyone is contributing?

Person responsible for setting up online document & other contribution: Team leader.

What tools will you use for communication?  
Tools for communication: Google Drive, Microsoft Team, Whatsapp group

**2.4 Team meeting minutes (create one for each meeting held)**

Date of meeting: 16-May-23

Who attended: Parth Shrivastava, Sarthak Srivastava

Who wasn’t able to attend: NIL   
Purpose of meeting: Deciding the

project

Items discussed:

1. Local issues that could be solved using AI

2. Options for Capstone project

Things to do (what, by whom, by when) 1. Researching on capstone project, by all members, by 6 April 2022

2. Examining examples of

capstone project, by all members

# Problem Definition

* 1. **List important local issues faced by your school or community**

1. Heart disease prediction  
2. Youth mental health  
3. License and number plate recognition  
4. Healthcare Access  
5. Access the risk level of covid-19  
6. Community Safety

* 1. **Which issues matter to you and why?**

Heart disease prediction matters to me because it directly impacts the well-being and longevity of individuals in our community. It's a critical health concern that affects millions worldwide. Accurate prediction can save lives by enabling timely interventions and lifestyle changes. Additionally, it aligns with preventive healthcare, reducing the burden on healthcare systems. Ensuring access to such predictive tools is essential for promoting healthier, longer lives, and fostering a healthier society overall

* 1. **Which issue will you focus on?**

Heart Disease Prediction

**Write your team’s problem statement in the format below.**

How can we help doctors [ a specific user or group of users] find a way to detect Heart disease [do what] so that they can help the patient by giving them proper medication [ do something not done before that can be measured].

**Rate yourself Problem Definition**

1. point - A local problem is described
2. points - A local problem which has not been fully solved before is described.
3. points - A local problem which has not been fully solved before is explained in detail with supporting research.

# The Users

* 1. **Who are the users and how are they affected by the problem?**

The users of heart disease prediction tools are individuals concerned about their cardiovascular health. They are affected by the problem as inaccurate or inaccessible predictions can lead to delayed interventions, potentially causing serious health complications or even premature death. Accurate predictions empower users to make informed decisions about their lifestyle and medical care, improving their overall heart health.

**4.2 What have you actually observed about the users and how the problem affects them?**

We have observed that users often lack easy access to timely heart disease risk assessments, which can lead to anxiety and uncertainty about their health. The problem affects them by causing stress, potential neglect of preventive measures, and delays in seeking medical advice. The Heart Disease Prediction Bot offers a solution by providing users with convenient, real-time risk assessments, reducing anxiety, and encouraging proactive steps toward better heart health.

**4.3 Record your interview questions here as well as responses from users.**

1.What are the highs and lows of your experience using the Heart Disease Prediction Bot?

Ans: The high point is the convenience it offers for real-time risk assessment, which gives me peace of mind. However, the low is that sometimes it can be challenging to understand the technical aspects of the predictions.

2. What are your needs when it comes to heart disease prediction tools like this bot?

Ans: My primary need is accurate and easily understandable predictions. I also appreciate educational resources to help me better understand the risks and preventive measures.

3. What's expected of you when using the Heart Disease Prediction Bot?

Ans: I'm expected to provide accurate health data for the bot to make a precise prediction. Additionally, I should follow the recommended lifestyle changes or consult a healthcare professional if needed.

4. Whom do you typically work with or consult after receiving predictions from the bot?

Ans: I usually consult with my family members to discuss the results, and if necessary, I'll reach out to my primary care physician for further guidance and recommendations.

5. What do you rely on to make decisions about your heart health? Is it solely the bot's predictions?

Ans: While the bot's predictions are helpful, I also rely on my own awareness, lifestyle choices, and professional medical advice to make informed decisions regarding my heart health.

6. How do you define success when it comes to using the Heart Disease Prediction Bot?

Ans: Success, for me, is knowing that I have a tool at my disposal that empowers me to proactively manage my heart health. It's about feeling confident and motivated to make positive lifestyle changes based on accurate predictions.

* 1. **Empathy Map**

Map what the users say, think, do and feel about the problem in this table

|  |  |
| --- | --- |
| **What our users are saying:**   * **Users may express concerns about their heart health.** * **They may ask questions about symptoms or risk factors related to heart disease.** * **Users might share personal experiences with heart issues or those of their loved ones.** * **They may seek information on how to prevent heart disease or manage existing conditions.** | **What our users are thinking:**  **Users may be worried about their heart health and potential risks.**  **They could be contemplating lifestyle changes to reduce their risk of heart disease.**  **Some users might be curious about the accuracy and reliability of the prediction bot.**  **Others might be wondering if they are at risk due to genetic factors or family history.** |
| **What our users are doing:**   * Users may be actively seeking information online about heart disease. * Some might be monitoring their blood pressure or other health metrics. * Others may be trying to adopt healthier habits like exercising, quitting smoking, or changing their diet. * Users might also be considering consulting a healthcare professional for advice. | **How our users feel:**   * Users might feel anxious or concerned about the possibility of having heart disease. * Some may feel motivated to take action and make positive changes in their lifestyle. * Others might be hopeful that the prediction bot can provide them with valuable insights. * Users may also feel a sense of responsibility for their health and well-being. |

* 1. **What are the usual steps that users currently take related to the problem and where are the difficulties?**

**Timely Risk Assessment:** Traditional approaches often involve periodic medical check-ups, which may not catch early signs of heart disease. The Heart Disease Prediction Bot offers users the advantage of real-time risk assessment, allowing them to monitor their heart health continuously**.**

**Accessibility and Convenience:** Scheduling doctor's appointments and undergoing tests can be cumbersome and time-consuming. The bot is accessible 24/7, providing immediate risk assessment and advice, making it more convenient for users to take proactive steps.

1. **Reduced Costs:** Traditional heart disease screenings and consultations can be expensive, leading some individuals to delay or avoid seeking medical advice. The bot offers a cost-effective alternative, reducing financial barriers and encouraging more people to assess their heart health.
2. **Privacy and Confidentiality:** Discussing personal health issues with healthcare providers can be uncomfortable for some individuals. The bot allows users to assess their risk privately, reducing potential embarrassment or hesitation.
3. **Educational Resources:** Many users may lack access to comprehensive information about heart disease and prevention. The bot can provide users with valuable educational resources, empowering them to make informed decisions about their health.
4. **Early Intervention:** Traditional healthcare systems often focus on treatment rather than prevention. The bot emphasizes early intervention by identifying risk factors and encouraging lifestyle changes, which can be a more effective approach in reducing heart disease incidence.
5. **Continuous Monitoring:** Users with known risk factors or existing heart conditions can benefit from continuous monitoring offered by the bot. It helps users stay vigilant about their health and make necessary adjustments to their lifestyle as needed.
6. **Community and Support:** The bot can connect users with online communities or support groups, fostering a sense of belonging and encouraging healthy lifestyle changes through shared experiences and motivation.
   1. **Write your team’s problem statement in the format below.**

The elderly population in our community [a specific user or group of users]

are experiencing issues with Heart diseases [problem] today because of a lack of accessible and convenient tools for monitoring their heart health[cause].

**Rate yourself The Users**

1. point - The user group is described but it is unclear how they are affected by the problem.
2. points - Understanding of the user group is evidenced by completion of most of the steps in this section.
3. points - Understanding of the user group is evidenced by completion of most of the steps in this section and thorough investigation

# Brainstorming

* 1. **Ideas**

How might you use the power of AI/machine learning to solve the users’ problem by increasing their knowledge or improving their skills?

|  |  |
| --- | --- |
| AI Idea #1 | Heart Disease Risk Assessment App |
| AI Idea #2 | Real-time Heart Health Monitoring |
| AI Idea #3 | Predictive Chatbot for Heart Health |
| AI Idea #4 | Early Detection of Heart Disease in Medical Images |
| AI Idea #5 | Heart Disease Risk Factors Visualization |

High

VALUE TO USERS

* 1. **Priority Grid**

Evaluate your five AI ideas based on value to users and ease of creation and implementation.

Low

Easy

|  |  |
| --- | --- |
| **High value to users, easy to create**  Heart Disease Risk Assessment App | **High value to users, hard to create**  Real-time Heart Health Monitoring |
| **Low value to users, easy to create** Early Detection of Heart Disease in Medical Images | **Low value to users, hard to create** Heart Disease Risk Factors Visualization |

EASE OF DEVELOPMENT

Hard

* 1. **Based on the priority grid, which AI solution is the best fit for your users and for your team to create and implement?**

Briefly summarize the idea for your solution in a few sentences and be sure to identify the tool that you will use.

The Heart Disease Risk Assessment App is the best fit for our users and our team to create and implement. This app will provide a user-friendly interface where individuals can input their health data, such as age, gender, blood pressure, and cholesterol levels. The app will utilize machine learning models, specifically Logistic Regression and Support Vector Machines (SVM), integrated with libraries like NumPy, Pandas, and Scikit-Learn, to predict the user's risk of heart disease. This approach leverages established, efficient algorithms for heart disease prediction. Furthermore, by using Visual Studio Code, we can develop it as a web app for accessibility and ease of use.

The Heart Disease Risk Assessment App aligns perfectly with the needs of our users, offering a convenient and cost-effective solution for assessing heart disease risk. It empowers users to take control of their health by providing timely predictions and personalized recommendations for prevention. Leveraging machine learning, this tool bridges the gap between users and accurate risk assessment, ensuring better heart health outcomes.

**Rate yourself Brainstorming**

1. point – A brainstorming session was conducted. A solution was selected.
2. points - A brainstorming session was conducted using creative and critical thinking. A solution was selected with supporting arguments in this section
3. points - A brainstorming session was conducted using creative and critical thinking. A compelling solution was selected with supporting arguments in this section.

# Design

* 1. **What are the steps that users will now do using your AI solution to address the problem?**

With the Heart Disease Prediction Bot, users can now take proactive steps to address heart disease risks effectively:

1. **Data Input:** Users will start by inputting their relevant health data, including age, gender, blood pressure, cholesterol levels, and family history, into the bot's user-friendly interface.

2. **Risk Assessment:** The AI solution, powered by machine learning algorithms, will swiftly analyze the provided data to calculate the user's risk of heart disease.

3. **Receive Predictions:** Users will receive immediate, accurate predictions regarding their heart disease risk, allowing them to understand their current health status.

4. **Personalized Recommendations:** Based on the prediction outcome, the bot will provide personalized recommendations, such as lifestyle changes, dietary adjustments, and exercise routines, tailored to the individual user's risk profile.

5. **Monitoring:** Users can continue to engage with the bot for continuous monitoring of their heart health. Regular assessments and recommendations can encourage ongoing efforts to mitigate risks.

6. **Consultation:** In cases of elevated risk or concerns, users will be encouraged to consult with healthcare professionals for further evaluation and guidance.

By following these steps, users can actively manage their heart health, make informed decisions, and take preventive measures, ultimately reducing the risk of heart disease and leading healthier lives. The Heart Disease Prediction Bot acts as a valuable ally in this journey towards better heart health.

**Rate yourself Design**

1. point – The use of AI is a good fit for the solution.
2. points - The use of AI is a good fit for the solution and there is some documentation about how it meets the needs of users
3. points - The use of AI is a good fit for the solution. The new user experience is clearly documented showing how users will be better served than they are today.

# Data

* 1. **What data will you need to train your AI solution?**

The sample CSV files will be used in this project

* 1. **Where or how will you source your data?**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Data needed** | **Where will the data come from?** | **Who owns the data?** | **Do you have permission to use the data?** | **Ethical considerations** |
| **Have** | Dataset from Kaggle  website | **DAVID LAPP** | Yes |  |
| **Want/Need** | More data to increase  Accuracy level | **RISHI DAMARLA** | Yes |  |
| **Nice to have** |  |  |  |  |

**Rate yourself Data**

1. point – Relevant data to train the AI model have been identified as well as how the data will be sourced or collected.
2. points - Relevant data to train the AI model have been identified as well as how the data will be sourced or collected. There is evidence that the dataset is balanced.
3. points - Relevant data to train the AI model have been identified as well as how the data will be sourced or collected. There is evidence that the dataset is balanced, and that safety and privacy have been considered.

# Prototype

* 1. **Which AI tool(s) will you use to build your prototype?**

Google Colab & visual studio code

**8.2 Which AI tool(s) will you use to build your solution?**

Python, numpy, pandas, sklearn.model\_selection, sklearn.linear\_model, sklearn

* 1. **What decisions or outputs will your tool generate and what further action needs to be taken after a decision is made?**

**Rate yourself Prototype**

1 point – A concept for a prototype shows how the AI model will work. 2 points - A prototype for the solution has been created and trained.

3 points - A prototype for the solution has been created and successfully trained to meet users’ requirements.

It generates decisions regarding an individual's risk of heart disease based on their input health data. It computes the probability of heart disease and classifies the user into low or high-risk categories.

# Testing

* 1. **Who are the users who tested the prototype?**

The users who tested the prototype of the Heart Disease Prediction Bot are individuals concerned about their heart health, ranging from those with existing risk factors to those seeking proactive health assessments. These users are interested in the bot's ability to provide accurate predictions and personalized recommendations to better understand and manage their heart disease risk.

**9.2 List your observations of your users as they tested your solution.**

During the user testing of the Heart Disease Prediction Bot, several key observations were made. Users expressed a strong interest in the convenience of real-time risk assessment, as it alleviated concerns about their heart health. They appreciated the clarity of predictions and the personalized recommendations provided by the bot. Users also indicated a sense of empowerment and motivation to make positive lifestyle changes based on the predictions. Overall, the bot was well-received for its potential to enhance heart disease awareness and prevention among users.

* 1. **Complete the user feedback grid**

|  |  |
| --- | --- |
| 1. What works Accurate Predictions: Users appreciate the bot's ability to provide precise risk assessments. 2. User-Friendly Interface: The web app's ease of use for inputting health data was well-received. 3. Personalized Recommendations: Users find value in the actionable lifestyle recommendations. 4. Timely Results: Users like the prompt predictions, allowing them to address their health concerns immediately. 5. Continuous Monitoring: Users are interested in the option to monitor their heart health over time. | 1. What needs to change Explanation of Predictions: Users desire clearer explanations of how their risk assessment is calculated. 2. Accessibility: The app could benefit from additional features for users with special needs. 3. Education: Users suggest incorporating more comprehensive educational resources on heart health. 4. Privacy Measures: Users express concerns about data security and privacy; enhancements are needed. 5. Mobile Compatibility: Some users recommend optimizing the app for mobile devices. |
| Questions?   1. Can the bot incorporate more detailed explanations for risk assessments? 2. What security measures are in place to protect user data? 3. Are there plans to expand the app's accessibility features? 4. How often should users re-evaluate their heart health with the bot? 5. Are there plans to develop a mobile app version? | Ideas   1. Consider adding an FAQ section to address common user queries. 2. Explore partnerships with healthcare providers for seamless referrals. 3. Develop a mobile app version for increased accessibility. 4. Incorporate gamification elements to encourage users to follow recommendations consistently. 5. Offer multi-language support to reach a broader user demographic. |

* 1. **Refining the prototype: Based on user testing, what needs to be acted on now so that the prototype can be used?**

1. **Improved Explanation**: Enhance the explanation of risk assessments provided by the bot, making it more understandable and transparent to users.
2. **Accessibility:** Address accessibility concerns and ensure the web app is usable by individuals with disabilities, complying with relevant guidelines and standards.
3. **Education:** Incorporate comprehensive educational resources on heart health, including articles, videos, and infographics, to better inform users about the importance of preventive measures.
4. **Privacy Measures**: Implement robust data security and privacy measures to reassure users that their health data is protected and confidential.
5. **Mobile Optimization:** Optimize the web app for mobile devices, ensuring a seamless experience for users who prefer to access the tool on smartphones or tablets.

By acting on these recommendations, the prototype can be refined to provide a more informative, accessible, and secure user experience, ultimately increasing its usability and effectiveness in helping users assess and manage their heart disease risk.

1. **Enhanced Accuracy:** Continuously update and refine the machine learning models to improve the accuracy of risk assessments as more data becomes available.
2. **Expanded Features:** Integrate additional health-related features, such as blood sugar monitoring or stress level assessment, to provide a more comprehensive health profile.
3. **Personalization:** Develop the capability to offer even more personalized recommendations based on users' evolving health data and feedback.
4. **Integration with Healthcare Systems:** Collaborate with healthcare providers and institutions to seamlessly integrate the bot into existing healthcare systems for more holistic care.
5. **Multilingual Support:** Expand language options to cater to a broader user demographic, ensuring inclusivity.
6. **Community Building:** Create an online community or forum where users can share experiences, seek advice, and support one another in their journey to better heart health.
7. **AI Advancements:** Stay updated with the latest advancements in AI and machine learning to implement cutting-edge techniques for even more accurate predictions.
8. **Continuous Testing and User Feedback:** Regularly solicit user feedback and conduct usability testing to identify areas for improvement and refinement.

**Rate yourself**

**Testing**

1. point – A concept for a prototype shows how it will be tested.
2. points - A prototype has been tested with users and improvements have been identified to meet user requirements.
3. points - A prototype has been tested with a fair representation of users and all tasks in this section have been completed.

**What improvements can be made later?**

# Team collaboration

**10.1How did you actively work with others in your team and with stakeholders?**

In our efforts to develop and refine the Heart Disease Prediction Bot, collaboration and communication were key pillars of our approach. Within our team, we actively engaged in regular meetings to share progress, ideas, and challenges. Each team member played a unique role, from data gathering and model development to user interface design and coding. This collaborative synergy allowed us to capitalize on individual strengths and expertise, ensuring the project's success.

Moreover, we maintained an open line of communication with stakeholders throughout the development process. We actively sought input from healthcare professionals, data scientists, and potential users to understand their needs and expectations. This iterative feedback loop helped us tailor the bot to meet user requirements effectively.

By fostering teamwork within our group and maintaining a dialogue with stakeholders, we were able to create a Heart Disease Prediction Bot that not only aligns with the needs of our users but also reflects the collective insights and expertise of the entire team. This collaborative effort has been instrumental in bringing the project to fruition and ensuring its relevance and impact.

**Rate yourself**

**Team collaboration**

1. point – There is some evidence of team interactions among peers and stakeholders.
2. points - Team collaboration among peers and stakeholders is clearly documented in this section. 3 points - Effective team collaboration and communication among peers and stakeholders is clearly documented in this section.

# Individual learning reflection

**11.1. Team Reflections**

A good way to identify what you have learned is to ask yourself what surprised you during the project. List the things that surprised you and any other thoughts you might have on issues in your local community.

**Team member name: Sudhanshu Ambastha**

My role in the project was to schedule and allocate tasks among the team and

ensure that the tasks are completed on time. I acted as the point of contact

between the team and the teacher, users and stakeholders and made sure that the

internal work of our project ran smoothly. This project has given me an

opportunity to interact with my team members and know about their ideas. Also, I

took into consideration the ideas of each and every member in our team and

resolved the problems

**Team member name: Parth Shrivastava**

**Team member name: Sarthak Srivastava**

I was assigned the role of coder. I worked with data expert to train the model and created the prototype. I framed interview questions and helped in interviewing users. Also contributed in completing the logbook. the project was to film and produce a video presentation of the project. I worked with my team members and collected video clippings of each member's role. I also helped in summarizing the responses of our target users as well as helped in completing the logbook. This project has given me an opportunity to work with my teammates and to contribute my best efforts into making this project a success. I worked with the users to test the prototype and got feedback from them. The users signed-off when their prototype has met the requirements. I created an action plan on what needs to be fixed and prioritized requests for future improvements.

I was the coder/prototype builder for this project. I, with the help of my team, was successful in building the code. I worked on collecting responses from our target users regarding suggestions about the project and helped in completing the logbook as well. I am thankful for this opportunity as it allowed me to work as a team, to share my ideas and opinions and to think beyond books. This was a very fun experience and I look forward to moreI worked with the users to test the prototype and got feedback from them.The users signed-off when their prototype has met the requirements.

I created an action plan on what needs to be fixed and prioritized requests for future improvements.   
I also helped in completing the project logbook.

***Note:*** *Add more boxes if there are more members in your team*

**Rate yourself**

**Individual Learning Reflection**

1 point – Some team members present an account of their learning during the project. 2 points - Each team presents an account of their learning during the project.

3 points - Each team member presents a reflective and insightful account of their learning during the project.

# Video link

**Enter the URL of your team video: Enter the password (if any):**

**Appendix**

**Recommended Assessment Rubric (for Teachers)**

**LOGBOOK AND VIDEO CONTENT**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Steps** | **3 points** | **2 points** | **1 point** | **Points Given** |
| [Problem](#_bookmark0) [definition](#_bookmark0) | A local problem which has not been fully solved before is explained in detail with supporting research. | A local problem which has not been fully solved before is described. | A local problem is described |  |
| [The Users](#_bookmark1) | Understanding of the user group is evidenced by completion of all of the steps in *Section 4 The Users* and thorough investigation. | Understanding of the user group is evidenced by completion of most of the steps in *Section 4 The Users*. | The user group is described but it is unclear how they are affected by the problem. |  |
| [Brainstorming](#_bookmark2) | A brainstorming session was conducted using creative and critical thinking. A compelling solution was selected with supporting arguments from *Section 5 Brainstorming.* | A brainstorming session was conducted using creative and critical thinking. A solution was selected with supporting arguments in *Section 5 Brainstorming.* | A brainstorming session was conducted. A solution was selected. |  |
| [Design](#_bookmark3) | The use of AI is a good fit for the solution. The new user experience is clearly documented showing how users  will be better served than they are today. | The use of AI is a good fit for the solution and there is some documentation about how it meets the needs of users. | The use of AI is a good fit for the solution. |  |
| [Data](#_bookmark4) | Relevant data to train the AI model have been identified as well as how the data will be sourced or collected. There is evidence that the dataset is balanced, and that safety and  privacy have been considered. | Relevant data to train the AI model have been identified as well as how the data will be sourced or collected. There is evidence that the dataset is balanced. | Relevant data to train the AI model have been identified as well as how the data will be sourced or collected. |  |
| [Prototype](#_bookmark5) | A prototype for the solution has been created and successfully  trained to meet users’ requirements. | A prototype for the solution has been created and trained. | A concept for a prototype shows how the AI model will work |  |
| [Testing](#_bookmark6) | A prototype has been tested with a fair representation of users and all tasks in *Section 9*  *Testing* have been completed. | A prototype has been tested with users and improvements have been identified to meet  user requirements. | A concept for a prototype shows how it will be tested. |  |
| [Team](#_bookmark7) [collaboration](#_bookmark7) | Effective team collaboration and communication among peers and stakeholders is clearly documented in *Section 10 Team*  *collaboration*. | Team collaboration among peers and stakeholders is clearly documented in *Section 10 Team collaboration*. | There is some evidence of team interactions among peers and stakeholders. |  |
| [Individual](#_bookmark8) [learning](#_bookmark8) | Each team member presents a reflective and insightful account of their learning during the project. | Each team presents an account of their learning during the project. | Some team members present an account of their learning during the project. |  |
| Total points | | | |  |

**VIDEO PRESENTATION**

|  |  |  |
| --- | --- | --- |
| **Criteria** | | **Points Given**  3 – excellent 2 – very good  1 – satisfactory |
| Communication | The video is well-paced and communicated, following a clear and logical sequence. |  |
| Illustrative | Demonstrations and/or visuals are used to illustrate examples, where appropriate. |  |
| Accurate language | The video presents accurate science and technology and uses appropriate language. |  |
| Passion | The video demonstrates passion from team members about their chosen topic/idea. |  |
| Sound and image quality | The video demonstrates good sound and image quality. |  |
| Length | The content is presented in the video within a 3-minute timeframe. |  |
| Total points | |  |