



# PRESIDENCY UNIVERSITY

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## BANGALORE



### A Project Report

On

## PREDICTION OF HEART DISEASE USING ML

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## 1. Introduction about Project

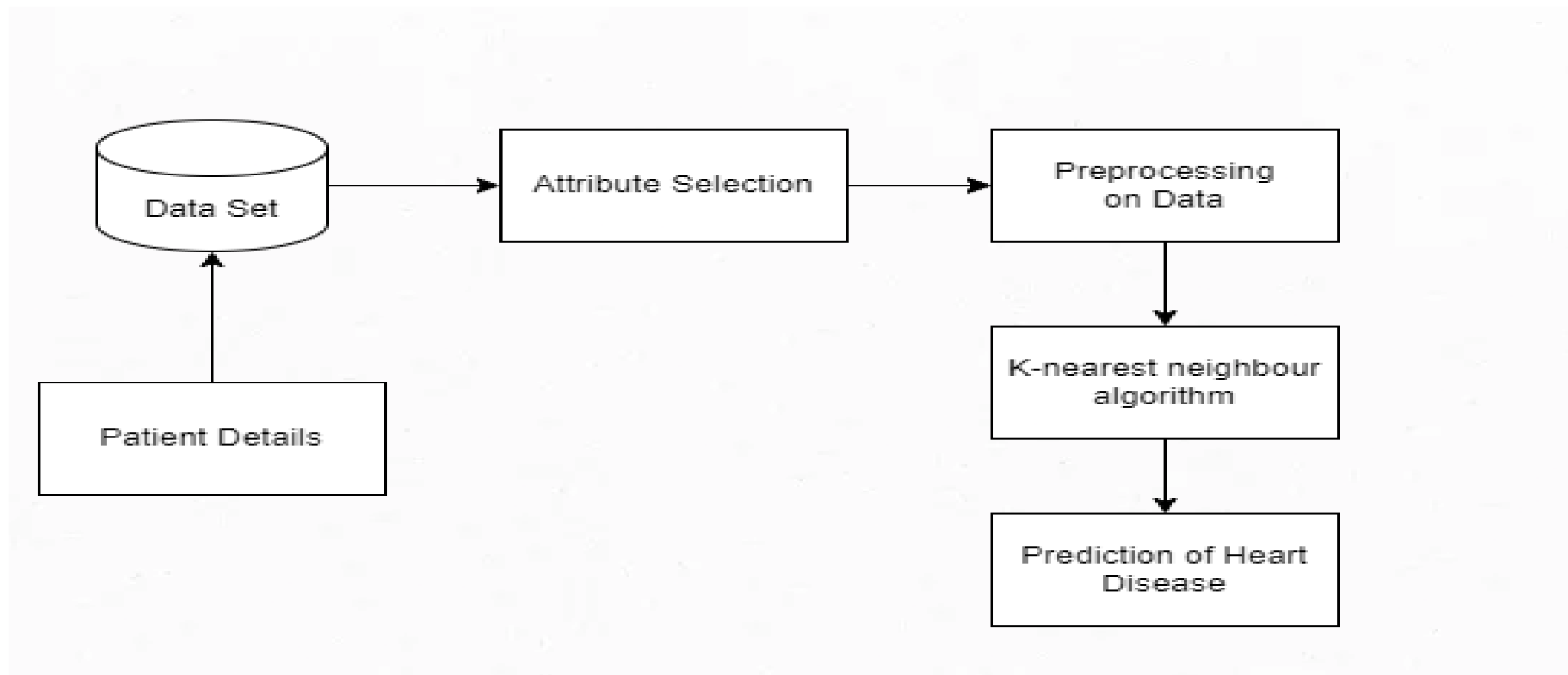


- The heart is a vital organ responsible for pumping blood. Heart disease, like Coronary Artery Disease (CAD) and heart failure, is a major health concern.
- Machine Learning is one of the efficient techniques for the testing, which is based on training and testing[1].
- These models can help in early diagnosis, risk assessment, and personalized treatment plans for individuals at risk of heart diseases.
- As in ML, there are likely to be four major algorithms comparison done in the terms of accuracy of predictions of a heart disease in the below sections[2].
- Hence it's found out that the most and accurate ML algorithm that can be used for predicting the heart disease is the **K-Nearest Neighbour** algorithm.

## 2.Literature Review

- This literature review provides a brief overview of studies related to heart disease prediction using ML. Machine learning techniques have become increasingly prevalent in healthcare applications due to their ability to analyze large datasets and discover complex patterns.
- The early and accurate prediction of heart disease is critical for improving patient outcomes and reducing healthcare costs. Machine learning has emerged as a powerful tool in healthcare for predicting heart disease[3].
- ML can be applied to various aspects of heart disease prediction, from risk assessment to diagnosis and treatment planning. Machine learning holds substantial promise in enhancing the accuracy of heart disease prediction.
- As research in this field progresses, the potential for earlier diagnosis and more effective prevention and treatment of heart disease continues to grow[4].
- Summarize various studies and their outcomes related to predicting heart disease using KNN. Highlight different datasets, preprocessing techniques, and feature selection methods employed in these studies.
- Explore recent advancements in KNN-based heart disease prediction, such as hybrid models combining KNN with other algorithms or incorporating deep learning techniques. Discuss potential future research directions in this field[5].
- Sum up the key findings from the reviewed literature, emphasizing the strengths and weaknesses of using the KNN algorithm for heart disease prediction. Highlight the gaps in existing research that could be explored in future studies.

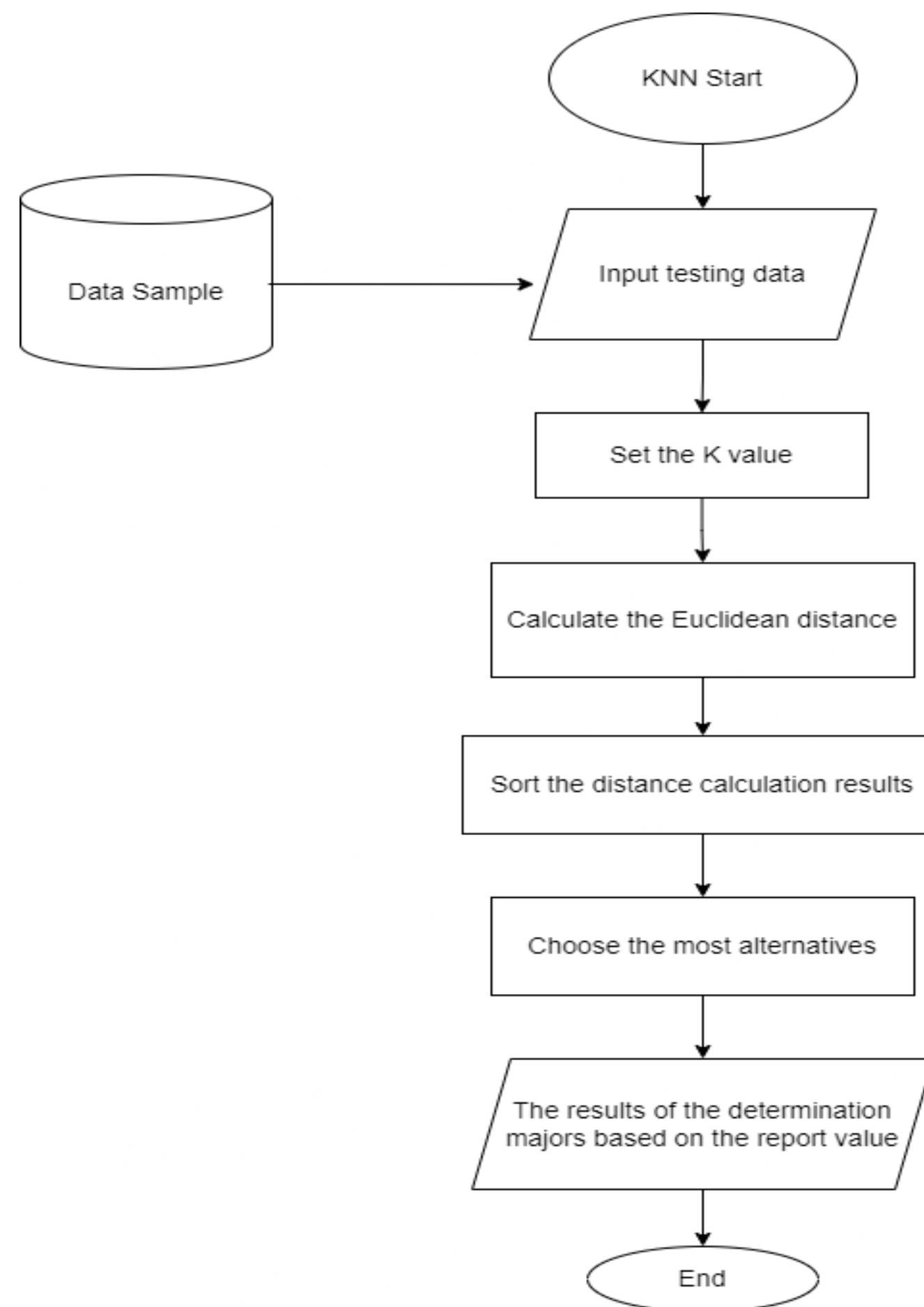
### 3.Block Diagram



### 4.Proposed Methods

- The proposed methods aim to address the critical issue of heart disease prediction and diagnosis.
- It is found that K-Nearest Neighbour Algorithm is one of the most effective and accurate Machine Learning algorithm for the prediction of heart disease.
- The steps involved are-
  - i) Data Set(Patient Details)
  - ii) Attribute Selection
  - iii) Pre Processing on Data
  - iv) Algorithm selection(KNN algorithm)

## 5.K-Nearest Neighbour Architecture



## 6.Objectives

The Primary objectives are :-

- To predict heart disease using K-Nearest Neighbour.
- To detect heart disease in the early stage to prevent further complication.
- Detecting Heart Disease in the early stage reduces the cost for the individual.

## 7.Methodology

**1.Data Collection** – First step for prediction system is data collection, and to decide about the training and testing dataset.

**2. Attribute Selection** – In the Data Set various attributes like Heart Beat of the person, Gender, Age , Cholestrol Level ,Fasting Blood Sugar etc.

**3. Preprocessing of data** –Preprocessing needed for achieving prestigious result from the machine learning algorithms. Preprocess the dataset to handle missing value , outliers and ensure data consistency.

**4. Feature Selection-** Choosing the features that are most relevant for predicting heart disease. This step can improve the performance of the algorithm.

**5. Splitting the Data-** Divide the dataset into a training set and a testing set. The training set is used to train the KNN model, and the testing set is used to evaluate its performance.

**6. Choosing K-** Select an appropriate value for K which represents the number of nearest neighbours to consider when making a prediction which can be used during cross validation.

**7. Training the model-** Train the KNN algorithm on the training data. This involves storing the features and labels of the training set in memory, so that the algorithm can use them to make prediction.

**8. Making Prediction-** For each data point in the testing set calculates its K nearest neighbour from the training set and determine the majority class among these



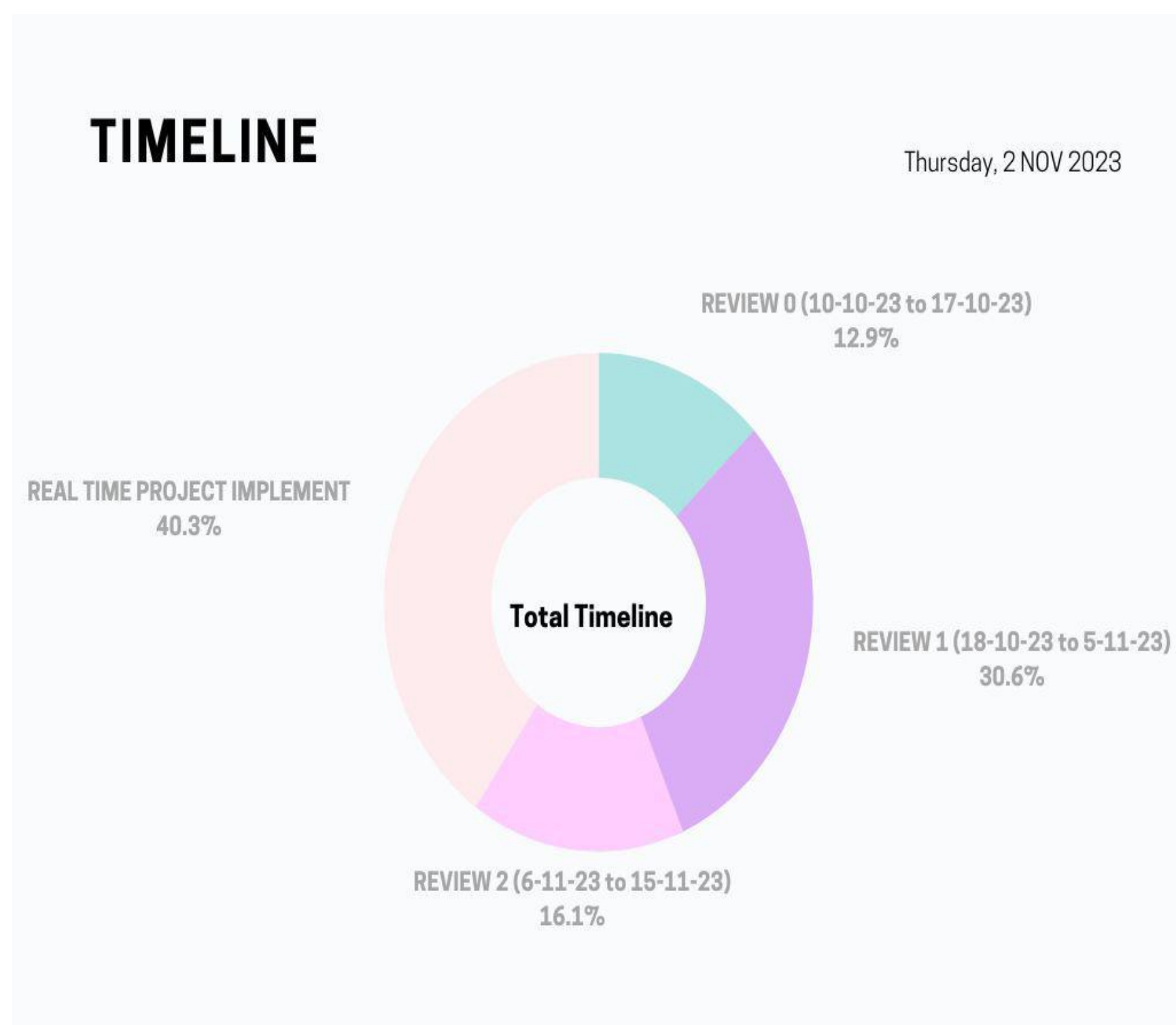
neighbours.

**9. Evaluating the model-** Measure the performance of the model using metrics such as accuracy. These metrics help assess how well the model is predicting heart disease.

**10. Tuning the model-** If the model's performance is not satisfactory consider experimenting with different values of K.

**11. Deployment-** Once you are satisfied with model's performance, you can deploy it to make predictions on new unseen data.

## 8. Timeline of Project





## 9. Expected Outcomes

**1.Early Intervention:** ML models can help in identify individuals at high risk of heart disease early, allowing for timely interventions, lifestyle modifications and medical treatments to prevent or manage the condition effectively.

**2.Reduction in Mortality:** Early detection and personalized interventions will significantly reduce the mortality rates associated with heart diseases, leading to improved overall survival rates among patients.

**3.Cost Savings:** Early identification and preventive measures can reduce the healthcare costs in the long run by minimizing the need for expensive health treatments, surgeries, and hospitalizations associated with advanced stages of heart diseases.

**4.Personalized Treatment Plans:** ML-based predictions enable the customization of treatment plans based on individual patient profiles, leading to more effective and tailored healthcare solutions.

## 10.Conclusion

In conclusion, the prediction of heart disease using machine learning holds immense promise in revolutionizing healthcare

These outcomes not only lead to improved patient outcomes, reduce mortality rates, and enhanced quality of life but also to contribute to substantial cost savings and public health impact.

As research and technology progress, the accuracy and efficiency of heart disease predictions are expected to further improve, making a significant difference in the lives of individuals at risk

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