

Design and Implementation of Diabetes Prediction App

Submitted by:

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Problem Statement:

Diabetes is a chronic disease that affects millions of people worldwide. Early detection and prevention of diabetes can lead to better outcomes and quality of life. However, many people are unaware of their diabetes risk factors, and traditional screening methods can be costly and time-consuming. The objective of this project is to design a diabetes prediction app that utilizes the Pima Indians Diabetes Database to predict an individual's risk of developing diabetes based on their demographic and clinical data. It provides an easy-to-use and accessible tool for individuals to assess their risk of developing diabetes and make informed decisions about their health.

Market/Customer/Business Need Assessment:

Market Assessment

The global diabetes prevalence is on the rise, with an estimated 422 million people living with this disease as of 2023. This number is projected to increase to 700 million by 2045. Diabetes is a chronic disease that can have serious health consequences if not managed properly. Early detection and intervention can prevent or delay the onset of complications and improve health outcomes. There is a growing need for accurate and accessible tools that can predict an individual's risk of developing diabetes and provide personalized recommendations for prevention.

Customer Need

The Diabetes Prediction App is designed to meet the needs of individuals who are at risk of developing diabetes or who have been diagnosed with prediabetes. These individuals are typically interested in managing their health proactively and are looking for tools that can help them make informed decisions about their lifestyle and medical interventions.

Business Need Assessment

The Diabetes Prediction App is a valuable product for businesses in the healthcare industry, including hospitals, clinics, and insurance providers. The app can be used as a tool for patient engagement and education, reducing the need for expensive interventions and hospitalizations. The app can also be used to collect and analyze health data, providing valuable insights for healthcare providers.

External Search:

To begin the implementation of our diabetes prediction app, we conducted an external search for online information sources and references related to diabetes prediction and management. The following are some of the resources we found useful:

1. Pima Indians Diabetes Database - <https://www.kaggle.com/datasets/uciml/pima-indians-diabetes-database>
2. World Health Organization - <https://www.who.int/diabetes/en/>

3. Centers for Disease Control and Prevention (CDC) -
<https://www.cdc.gov/diabetes/index.html>

4. National Institute of Diabetes and Digestive and Kidney Diseases
- <https://www.niddk.nih.gov/health-information/diabetes>

Existing products/services:

Before proceeding with the development of the Diabetes Prediction App, it is important to benchmark alternate products to understand their features, strengths and weaknesses. This will enable the development team to incorporate the best practices and create a competitive product. Some of the existing products/services that can be benchmarked are:

- 1) MyFitnessPal: This app allows users to track their daily calorie intake, water consumption, and exercise routines. It also provides personalized recommendations for a healthy diet and lifestyle.
- 2) Diab Trend: This app is designed specifically for people with diabetes to track their blood glucose levels, insulin dosage, and medication intake. It also provides reminders for testing and medication schedules.
- 3) Glucose Buddy: This app provides users with a comprehensive view of their physical activity, nutrition, and sleep data.

All these services are highly paid and are not feasible and as well as affordable for Indian customer. The Diabetes Prediction App will differentiate itself by offering predictive analytics based on machine learning algorithms and will also be cheaper in comparison with existing services. The app will be user-friendly and easy to navigate, with a

simple interface that allows users to input their information quickly and easily. It will not be only used predicting diabetes but will also have features like tracking physical activity, diet plan to provide for users to reduce their risk of developing diabetes, direct consultation with the doctors and personalized recommendations for lifestyle changes.

Business Model (Monetization Idea):

- 1) Subscription Model: The app could be offered as an affordable subscription-based service, where users pay a monthly or yearly fee.
- 2) Partnership with doctors and hospitals: The app can generate revenue by charging a referral fee to doctors and hospitals for each patient that uses the app's services. Additionally, the app can partner with hospitals to offer diabetes prevention programs and generate revenue through program fees.
- 3) In-App Purchases: The app could offer premium features, such as personalized health coaching, diet plan and recommendations for lifestyle changes.
- 4) Advertising: The app could display targeted advertisements to users, based on their health data and preferences.
- 5) 2-day Trial: The app will offer a 2-day trial for just 49 rupees, giving users access to all the app's features. This strategy will allow users to experience the full functionality of the app and increase the likelihood of conversion to a full paid subscription. Additionally, the low price point will make it easier for users to try out the app without a significant financial commitment.

- 6) Affiliation with companies: The app could partner with companies that sell health products and services and earn a commission on sales generated through the app.

Concept Generation:

- 1) Identify the Problem: The first step in the concept generation process is to identify the problem that the app is trying to solve. In this case, the problem is the growing prevalence of diabetes globally and the need for early detection and prevention.
- 2) Conduct Market Research: Next, research should be conducted to determine the current market for diabetes prediction apps, the features they offer, and their target audience. This research will help identify gaps in the market that the Diabetes Prediction App can fill.
- 3) Define Target Audience: Once the gaps in the market have been identified, the target audience for the app should be defined.
- 4) Add Features: Based on the research and target audience, add features to the Diabetes Prediction App. Other than predicting diabetes Some potential features can also be included such as tracking physical activity, diet plan to provide for users to reduce their risk of developing diabetes, direct consultation with the doctors and personalized recommendations for lifestyle changes.
- 5) Design User Interface: After defining the features, the user interface of the app should be designed. The app should be user-friendly and easy to use.
- 6) Develop Prototype: A prototype of the app should be developed, which can be tested and refined based on user feedback. This will

help ensure that the app meets the needs of its target audience and is effective in predicting diabetes.

- 7) Test and Launch: The final step is to test the app thoroughly and launch it in the market. User feedback should be continuously monitored and used to improve the app over time.

Final Product Prototype:

The proposed product is a Diabetes Prediction App that aims to predict the likelihood of an individual developing diabetes based on their medical history, lifestyle and user's data information. The app will utilize the Pima Indians Diabetes Database, which contains medical records of over 750 individuals, to train and validate the predictive algorithm.

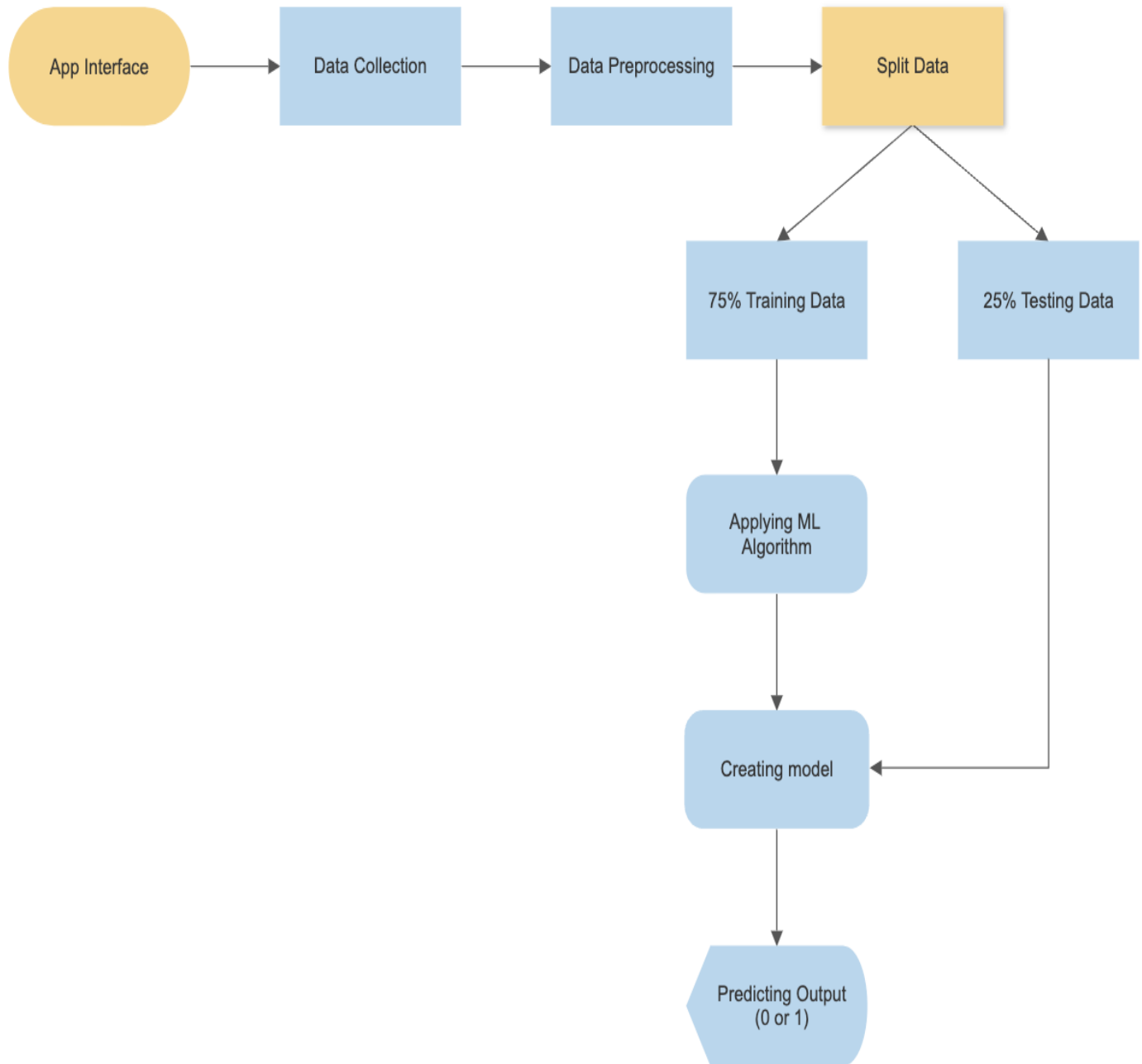
The app's interface is divided into several sections to provide a seamless user experience. These sections are:

- 1) User Registration: The user is required to register on the app using their basic details such as name, age, gender, and contact information. The user is also required to input their medical history and family medical history, which will be used to calculate their risk factors.
- 2) Data Collection: The app collects the user's data such as Number of pregnancies the patient has had, blood Glucose level, Blood Pressure, Insulin level, their BMI etc. This data is used to predict the user's risk of developing diabetes.
- 3) Risk Assessment: The app uses a predictive algorithm to calculate the user's risk of developing diabetes based on their data and

medical history data. The user is given a risk score, which indicates their likelihood of developing diabetes.

- 4) Personalized Recommendations: Based on the user's risk score, the app provides personalized recommendations to help the user reduce their risk of developing diabetes. These recommendations include diet and lifestyle changes, exercise routines and access to medical interventions.
- 5) Tracking and Monitoring: The app allows the user to track their progress in reducing their diabetes risk score. The user can input their biometric data at regular intervals, and the app provides feedback on their progress towards reducing their risk of developing diabetes.

The Diabetes Prediction App is a valuable tool for individuals who want to take proactive measures to prevent the onset of diabetes. The app's predictive algorithm and personalized recommendations provide users with valuable insights into their risk factors and help them make informed decisions about their health.



Product details:

How does it work?

The Diabetes Prediction App will collect data from users about their medical history, family history of diabetes, and other relevant health information. This data will be used to train an algorithm that will predict the likelihood of the user developing diabetes. The algorithm will take into account various factors such as age, BMI, blood sugar levels etc.

Once the user inputs their data into the app, the algorithm will generate a prediction of their likelihood of developing diabetes. The prediction will be presented to the user in an easy-to-understand format, such as a percentage or color-coded risk level.

Data Sources

The Diabetes Prediction App will use the Pima Indians Diabetes Database as its primary data source. The database contains information on over 750 individuals of Pima Indian heritage, including medical history, lifestyle factors and laboratory test results. The app will use this data to train its prediction algorithm and generate predictions for users.

Algorithms, frameworks, software Needed

The Diabetes Prediction App will use machine learning algorithms to generate its predictions. The algorithm will be trained using Logistic Regression. The model will use Python and its libraries such as NumPy, pandas and scikit-learn to implement the algorithms. The app will be developed using web development technologies such as HTML, CSS, JavaScript.

Code Implementation:

https://colab.research.google.com/drive/14yuGXXYw9pwFJs16JW0SwjQqLveL_raD?usp=sharing

Conclusion:

The primary goal of this product was to design and implement diabetes prediction using machine learning methods, which was accomplished with 79% classification accuracy. The Diabetes Prediction App is a useful tool for people who want to take preventative measures to avoid developing diabetes. The app's predictive algorithm and personalized recommendations provide users with valuable insights into their risk factors and assist them in making informed health decisions.