A Project Proposal on

**“Diabetes Tracking Web App – Using Data Science”**

Submitted by

**Shourish Kothawale – 19202A0047**

**Shishir Nath – 19202A0054**

**Shubham Jadhav – 19202A0011**

**Piyush Nirbhavane – 19202A0006**

Head of the Department

**Mrs. Yogita Jore**

**Department of Information Technology**

(NBA Accredited)

**Vidyalankar Polytechnic**

**Wadala (E), Mumbai – 400 037**

**Maharashtra State Board of Technical Education, Mumbai**

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**Abstract**

**Diabetes** is a very common and nasty disease; it occurs due to high blood glucose also known as blood sugar levels. It frequently remains undiagnosed which could lead to complications. Diabetes has many types, and some of them can even turn lethal if it isn’t diagnosed on time.

The disease has been linked with the pancreas, as the pancreas is the main organ that controls blood sugar. Since the pancreas are not able to produce enough insulin, this causes the blood glucose level to rise causing the illness. Sometimes the blood is not able to use the insulin produced efficiently, this increases the chances of getting diabetes. The disease is so common that **1 out of 10 people** (2021) suffer from diabetes. Diabetes might not look it, but this vile disease has been apprehended for taking the lives of **1.5 million patients** in 2019. Diabetes can be further categorised into 4 types, **Type 2 Diabetes, Prediabetes, Gestational Diabetes and Type 1 Diabetes** being the most lethal of them all.

Diabetes usually can easily be detected with a **blood test**, but many people are still unaware about it and live about their daily lives. If diabetes is taken lightly it can lead to:

* Risk of Stroke
* Parchedness
* Loss of consciousness
* Risk of heart disease
* Fatigue
* Pancreas malfunction, to name a few…

In order to solve this problem, we have decided to create a web app that will take in variables from the user related to diabetes, and will show whether or not they have diabetes (**Diabetes Detecting System**), and if they have diabetes what level of diabetes do, they have. In addition, we will also provide some information to the user about what they have been diagnosed with and why, and also provide some preventive measures so that the disease doesn’t complicate. We will also add more features like monthly graphs along with alerts, and even a graph tracking their diabetes journey over time. There will also be a HbA1C prediction provided, using data science.

# 1. Modules / Users / Actors in the Project

# 2. Flow chart / Block Diagram (if any needed to explain the topic)

# 3. Applications of the project

* With Ground-breaking research in technology, we are now able to use it to diagnose and cure diseases. With the help of data science, we can detect diabetes, this **will take the load of doctors** since they will not need to analyse the data completely, this will allow them to focus better on other tasks.
* It will be **available to anyone at any time**. Since the app is flexible all people need to do is type in the data and get results. This will help people to detect diabetes easily, without going additionally to a doctor (System may be inaccurate).
* This app can help create more **awareness** about the topic of diabetes. Awareness is key as anyone can get diabetes, and this app is simple to use from the ease of your home.
* It is **affordable**, as this project improves it can reach a high level of accuracy, this means that people will not require to empty their wallets on diabetes test, saving them the money of doing so.
* Blood Glucose levels can be monitored at home, so it is possible to take the diabetes **detection from home**.
* The App can also help **detect diabetes prior** to complications making the user aware of their condition, which will allow them to take further precautions.
* Some websites on Google provide information based on symptoms only. This creates **panic**. This website can help use **proper analysis** to give accurate results.
* It will also help **keep track** of the data the user provides for diabetes and provide them **visualisations** for it.
* We will also allow users **to create an account on the website**. This account will be used to keep a track of the data.
* The user created will help us **send mails** about monthly data entry, as well as the half yearly and yearly data overall.
* We will also be predicting an **HbA1C** result according to the data entered by the user.

**Advantages:**

* It will help you track diabetes and will provide you updates using emails.
* It will be accessible to anyone who has internet, as it will be available as a website.
* Early diabetes prediction using the app, can lead to better treatment.
* The app will also provide suggestions based on the level of diabetes you have.
* It can be taken from the comforts of the home.

**Disadvantages:**

* The model will be less accurate as the datasets and algorithms will improve over time. The algorithm will never be perfect but, will definitely improve with time as more and more data are used to train it.
* Due to modern day limitations, variables required like insulin can’t be taken at home, so they will require tests in the lab. But as technology progresses it would be possible to get all the data at home itself

# 4. Technologies used for the project

* Python for implementation.
* Python Libraries like pandas, matplotlib, seaborn, sklearn, for manipulating data.
* HTML is used to structure the webpage.
* CSS for styling the webpage
* JavaScript for making the webpage more responsive.
* Jupyter Notebook/Spyder for Data Science and Analysis
* MySQL for Database
* Laptop – Win 11
* Text Editor for Client Side Scripting (VS Code)
* Pycharm Python IDE
* Flask Python for web framework
* Algorithm Random forest
* Heroku for app deployment on web

# 5. Reference Paper (in any)

**Reference Website:**

* <https://www.diabetes.org/a1c/diagnosis> (Different Diabetes Detection Methods)
* [https://www.healthline.com/health/diabetes/top-iphone-android-apps#fooducate](https://www.healthline.com/health/diabetes/top-iphone-android-apps) (Different Diabetes detection and tracking apps.)
* <https://www.frontiersin.org/articles/10.3389/fendo.2019.00135/full>
* <https://www.youtube.com/watch?v=v6VJ2RO66Ag>
* <https://play.google.com/store/apps/details?id=com.mydiabetes&hl=en&gl=US>
* <http://tb.test.woza.work/> (Similar app where we got the idea related to TB)
* <https://www.kaggle.com/mathchi/diabetes-data-set> (Data set from national institute of diabetes on Kaggle)
* <https://data.mendeley.com/datasets/wj9rwkp9c2/1> (Another dataset regarding diabetes)
* <https://play.google.com/store/apps/details?id=com.mysugr.android.companion&hl=en_IN&gl=US>
* <https://levelup.gitconnected.com/random-forest-regression-209c0f354c84>
* <https://blog.quantinsti.com/random-forest-algorithm-in-python/?source=google&medium=cpc&campaign=dsaindia&gclid=EAIaIQobChMIhZzOqNvE9AIVCZhmAh3tuAHmEAAYASAAEgIUB_D_BwE>
* <https://clinical.diabetesjournals.org/content/38/5/449> (Use of Diabetes-Related Applications and Digital Health Tools by People with Diabetes and Their Health Care Providers)
* <https://www.sciencedirect.com/science/article/pii/S2352914819300176> (Prediction Model for diabetes)
* <https://www.sciencedirect.com/science/article/pii/S1877050918308548> (Classification algorithm for diabetes)
* <https://www.researchgate.net/publication/321336992_Estimation_of_HbA1c_value_using_artificial_neural_networks> (HbA1C using Artificial Neural Networks)
* <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8258057/> (Random forest approach for determining risk prediction and predictive factors of type 2 diabetes: large-scale health check-up data in Japan)

# 6. Letter of Project Allocation (in case of Industry Project)