Minor Project

Heart Disease Risk Level Predictor

Website link- bit.ly/heartriskpredictor

Presented by

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Presentation

Heart Disease Risk Level Predictor

Introduction

- Heart Disease Risk Level Predictor is a website which detect risk of heart disease build using different algorithms of Machine Learning in backend.

- We use algorithms such as Linear Regression and multivariable polynomial regression to output the risk percentage which indicates the chances of having heart disease and it gives us the best accuracy of 75.8%.

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Problem Statement

- One of the most important issues facing the globe today is heart disease.
- The prediction of cardiovascular illness presents a significant problem for clinical data analysis.
- Hybrid Machine learning (ML) has been showing an effective assistance in making decisions and predictions from the large quantity of data produced by the healthcare industries and hospitals.

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How this website works?

- Website page contains the form which is required to be filled by the user to calculate the heart risk.
- It contains all the features like gender, age, tc, hdl, sbp, smoke, blood pressure medication, diab which are required by the machine learning model to predict the result.
- After this website will display the calculated result along with some reference data which can help the user to compare his/her data with the given normal range.

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Steps for risk prediction

STEP 1- Homepage User Interface

STEP 2- Data Input

STEP 3- Data Processing Using Flask

STEP 4- Output Generated Using ML Algorithms

STEP 5- Output Displayed On Website

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Software & Hardware Requirements

A. Software Requirement

Operating System

Network (Wi-Fi or cellular Network)

VS Code Editor

Any Web Browser

Python anywhere (For free hosting)

Flask Module

Software & Hardware Requirements

B. Hardware Requirement

A system with

Processor- intel i3 & above

Ram: 4GB & above

Space on disk: 200MB minimum

A smartphone (To check mobille responsiveness)

For running the application:

- Device: Any device that can access the internet
- Minimum space to execute: 20MB

Technologies Used

A. Frontend Software Technologies

HTML (Hyper Text Markup Language)

CSS (Cascading Style Sheet)

JavaScript

Bootstrap

Google Chrome

Github

Technologies Used

B. Backend Software Technologies

Visual Studio Code

Python

Jupyter Notebook

Machine Learning

Flask

Frontend Working and Building

We created a website by using HTML, CSS and Bootstrap for taking the input from the user and displaying the calculated result.

The website has several pages:-

• **Home page:** This is the first page of the website which contains the navigation bar and footer along with the (click here) button which will navigate the user to the patient detail page which contains the form.

• **Patient detail page:** This page contains the form which is required to be filled by the user to calculate the heart risk. It contains all the features (gender, age, tc, hdl, sbp, smoke, blood pressure medication, diab) which are required by the machine learning model to predict the result.

• **Patient Result page:** This page will display the calculated result along with some reference data which can help the user to compare his/her data with the given normal range.

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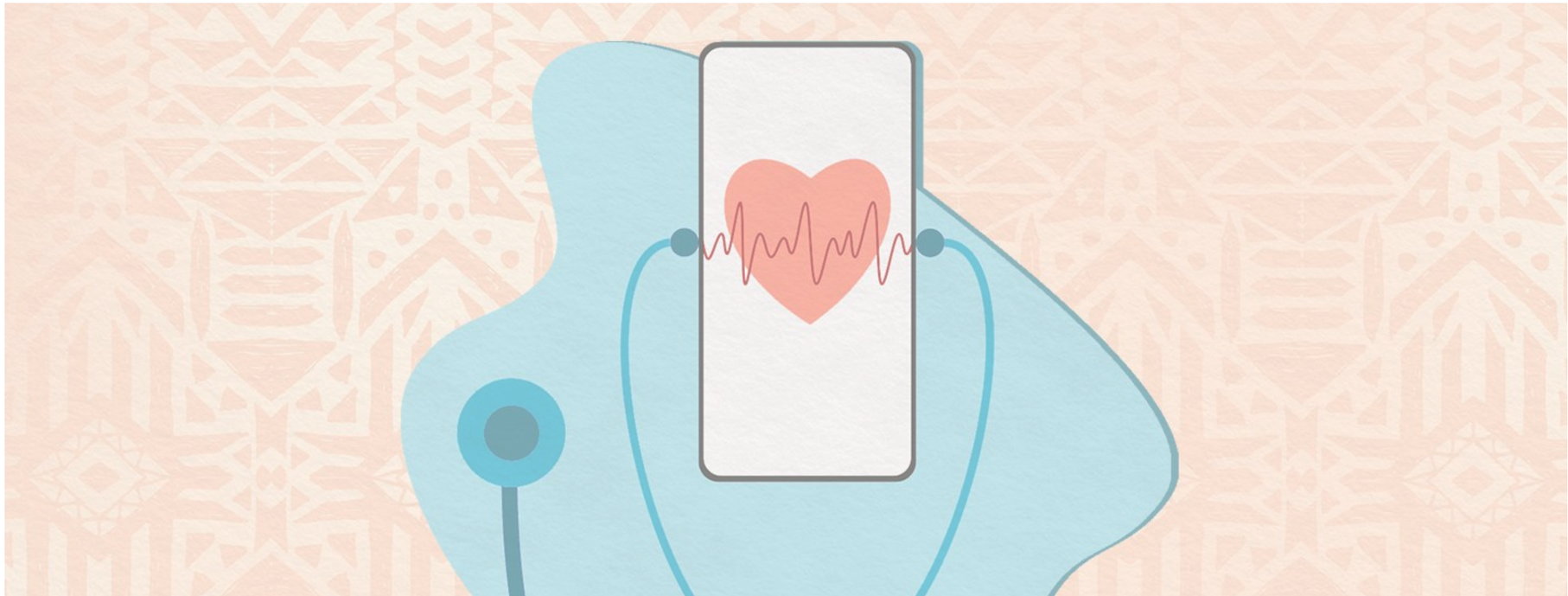
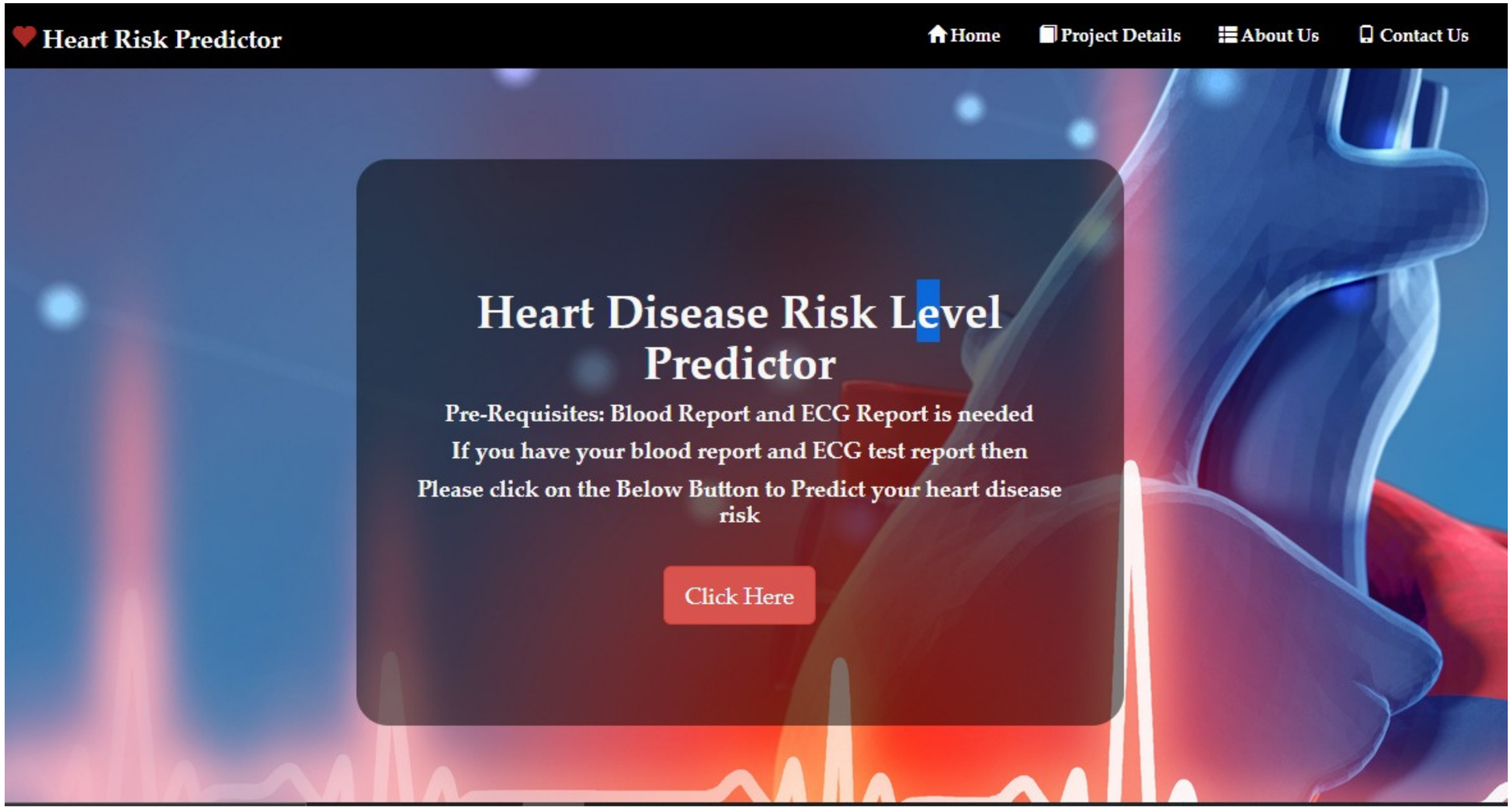
Backend Working and Building

- In the backend we have used flask(a framework of python) for deploying the machine learning model and processing that data and used two algorithms-linear regression and multivariable polynomial regression.
- The machine learning model was trained using the available data set using the linear regression and multivariable polynomial regression one by one.
- Many libraries of python was used/imported for doing this like matplotlib for data visulaization , numpy for performing array operations, pandas, sklearn.

How our website will look like



Website Homepage User Interface



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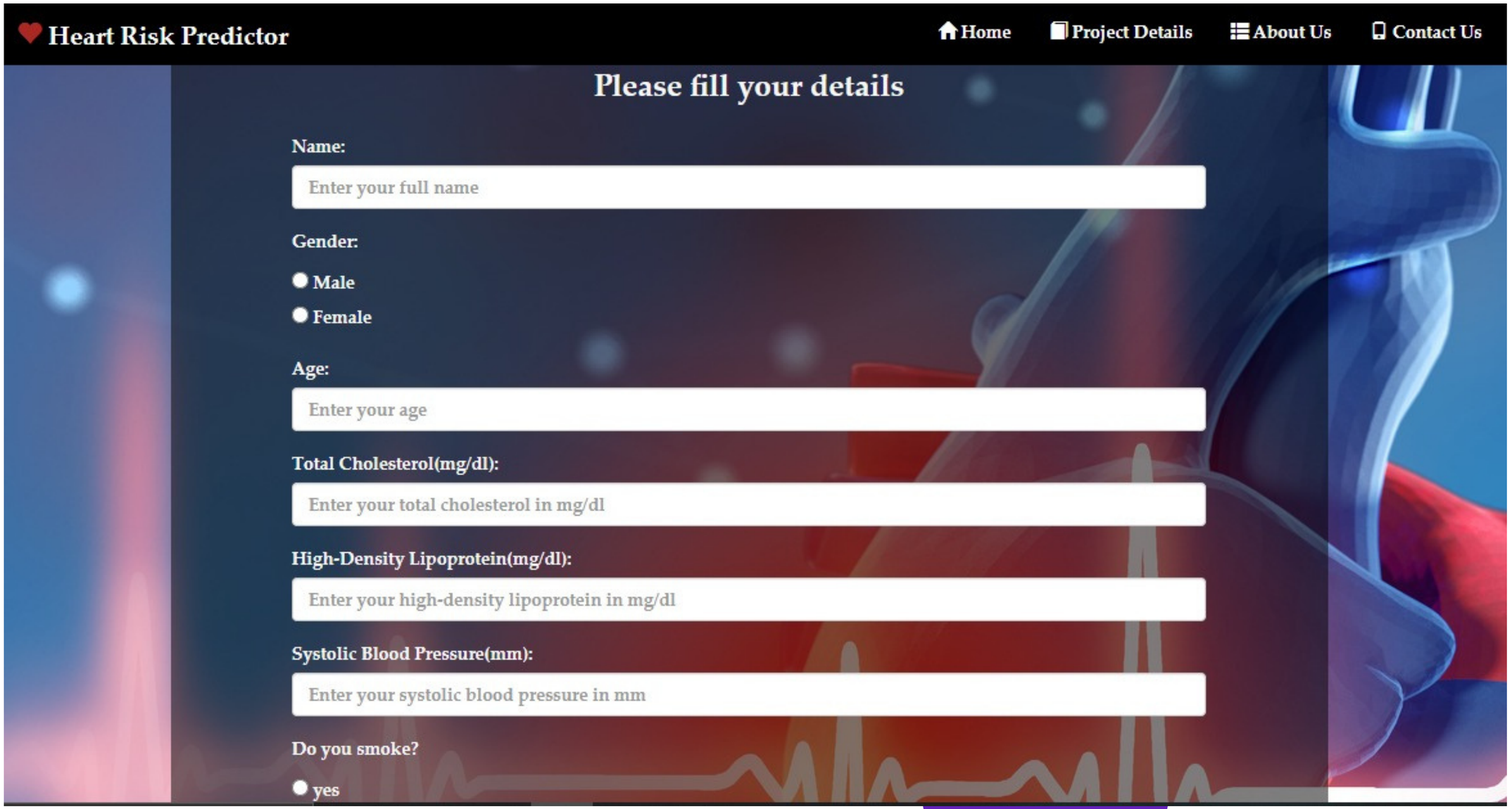
Website Patient Details UI



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Website Patient Result UI

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Conclusion

- In this project we successfully deployed a website which can be used to predict heart disease risk level by taking patient detail as input.
- After the experiments, the algorithm of Multivariable Polynomial Regression gives us the best test accuracy, which is 75.8%. T
- The reason why it outperforms others is that it is not limited to the property of the dataset. Regression techniques mostly differ based on the number of independent variables and the type of relationship between the independent and dependent variables.

Future Scope

• The project presently gives the result according to the pre-trained model.

• In future the project can be made to update its model and increase the dataset size in order to gain more precision.

• And more ways could be found where we can integrate heart-diseasetrained ML and DL models with certain multimedia for the ease of patients and doctors for a better and reliable prediction of the cause.

References

[1] Soni, Jyoti, et al. "Predictive data mining for medical diagnosis: An overview of heart disease prediction." International Journal of Computer Applications 17.8 (2011): 43-48.

[2] Baccouche, Asma, et al. "Ensemble Deep Learning Models for Heart Disease Classification: A Case Study from Mexico." Information 11.4 (2020): 207.

[3] https://archive.ics.uci.edu/ml/datasets/Heart+Disease

[4] https://www.kaggle.com/ronitf/heart-disease-uci

Thank You

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