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Heart Diseases Diagnosis using CNN Algorithm

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Abstract: *Machine learning is frequently used to enable computers to learn from fresh data and generate predictions. Due to numerous developments in machine learning, there are numerous approaches that can be used to forecast a person's risk of developing heart disease. One of the most common ailments impacting people worldwide is heart disease. Heart disease is caused by a number of risk factors. A unique method for predicting cardiac disease is made possible by the combination of analysis with neural networks.[1]The neural network receives the significant factors that result as input. In order to determine if a person has heart disease or not, a neural network is trained for the risk factors found using logistic regression. In order to predict cardiac disease, logistic regression and neural networks are combined.[2].*

Keywords: Neural networks, prediction, heart diseasees

I. INTRODUCTION

Currently, when someone has a specific illness, they must make an expensive and time-consuming doctor visit. Additionally, if the user is far from a doctor or hospital, it could be difficult for them to diagnose their illness. Therefore, it might be simpler for the patient and the process if the aforementioned procedure could be carried out utilising an automated programme that can save time and money. There are other systems that use data mining techniques to examine the patient's risk status and predict heart-related diseases. Desktop-based software called heart Disease Predictor makes heart disease predictions for users based on their reported symptoms. The heart Disease Prediction System comprises data sets gathered from several websites that deal with health. The user will be able to determine the likelihood of the condition based on the listed symptoms with the use of the heart disease predictor. People are always interested in learning new things as internet usage increases daily. When an issue happens, people always try to turn to the internet for.assistance. Compared to hospitals and doctors, people have access to the internet. When someone has a certain ailment, they do not immediately have a choice. In light of the fact that people have access to this system.[3]

II. OBJECTIVES

Objective

- To put into practise the CNN Classifier, which categorises the illness based on the user's input.
- To create a desktop -based platform for illness prediction in the heart.
- To provide users with immed

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III. SYSTEM ARCHITECTURE

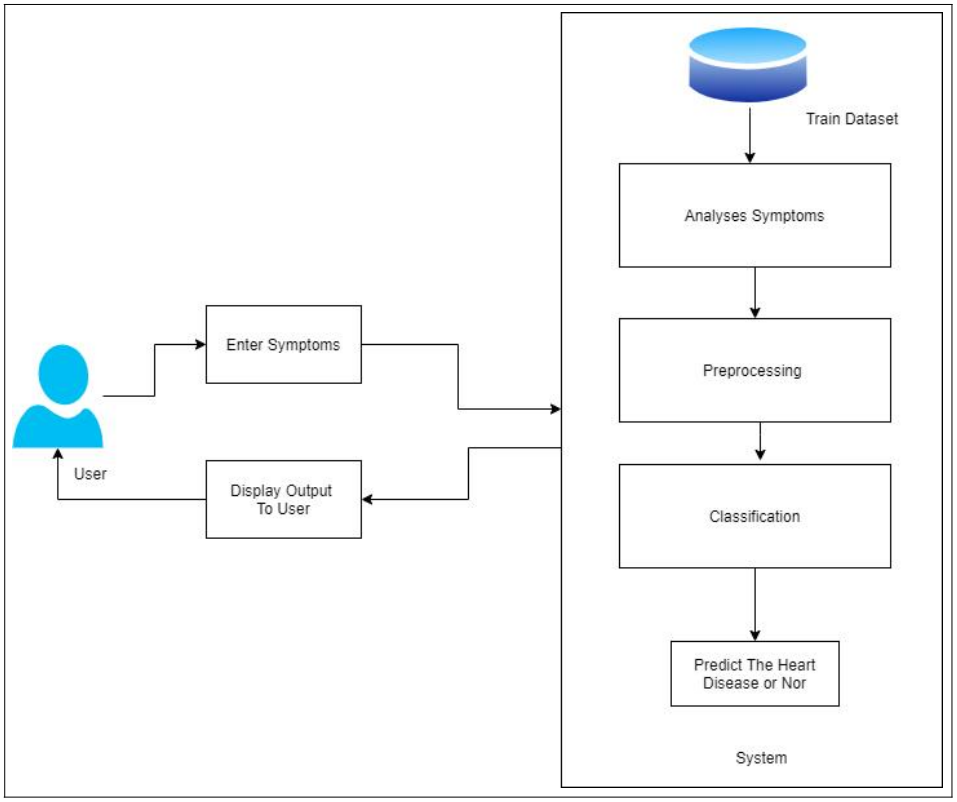

Figure 1: System Architecture

IV. ALGORITHM

Convolutional Neural Network

Convolutional Neural Networks specialized for applications in image & video recognition. CNN is mainly used in image analysis tasks like Image recognition, Object detection & Segmentation.

There are Four types of layers in Convolutional Neural Networks:

1. Convolutional Layer: In a typical neural network each input neuron is connected to the next hidden layer. In CNN, only a small region of the input layer neurons connect to the neuron hidden layer.
2. Pooling Layer: The pooling layer is used to reduce the dimensionality of the feature map. There will be multiple activation & pooling layers inside the hidden layer of the CNN.
3. Flatten: Flattening is converting the data into a 1-dimensional array for inputting it to the next layer. We flatten the output of the convolutional layers to create a single long feature vector.
4. Fully-Connected layer: Fully Connected Layers form the last few layers in the network. The input to the fully connected layer is the output from the final Pooling or Convolutional Layer, which is flattened and then fed into the fully connected layer.

V. SOFTWARE REQUIREMENT SPECIFICATION

6.1 Functional Requirement

Proposed system consists of 4 modules:

1. Feature point extraction: Feature points of each Dataset parameters gets detected.
2. Feature correspondence matching: Matching of selected feature points across various parameters.
3. Point estimation: Position estimation and vision system orientation during navi- gation.

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6.2 External Interface Requirement

6.2.1 User Interface

- Application Based On Heart disease detection.

6.2.2 Hardware Interfaces:

- RAM : 8 GB
- Hard Disk : 40 GB
- Processor : Intel i5 Processor
- Operating System : Windows 10

6.2.3 Software Interfaces

- Operating System: Windows 10
- IDE: Spyder
- Programming Language : Python

6.3 Nonfunctional Requirement

6.3.1 Performance Requirements

The performance of the functions and every module must be well. The overall performance of the software will enable the users to work eciently. Performance of encryption of data should be fast. Performance of the providing virtual environment should be fast safety Requirement

The application is designed in modules where er- rors can be detected and xedeasily. This makes it easier to install and update new functionality if required.

6.3.2 Safety Requirement

The application is designed in modules where errors can be detected and fixed easily. This makes it easier to install and update new functionality if required.

6.3.3 Software Quality Attributes

Our software has many quality attribute that are given below:-

- Adaptability: This software is adaptable by all users.
- Availability: This software is freely available to all users. The availability of the software is easy for everyone.
- Maintainability: After the deployment of the project if any error occurs then it canbe easily maintained by the software developer.
- Reliability: The performance of the software is better which will increase the relia- bilityof the Software.
- User Friendliness: Since, the software is a GUI application; the output generated is much user friendly in its behavior.
- Integrity: Integrity refers to the extent to which access to software or data by unau- thorized persons can be controlled.
- Security: Users are authenticated using many security phases so reliable security is provided.
- Testability: The software will be tested considering all the aspects.

6.4 System Requirements

6.4.1 Database Requirements

- Database: DBSQlite

6.4.2 Hardware Interfaces

- RAM : 8 GB

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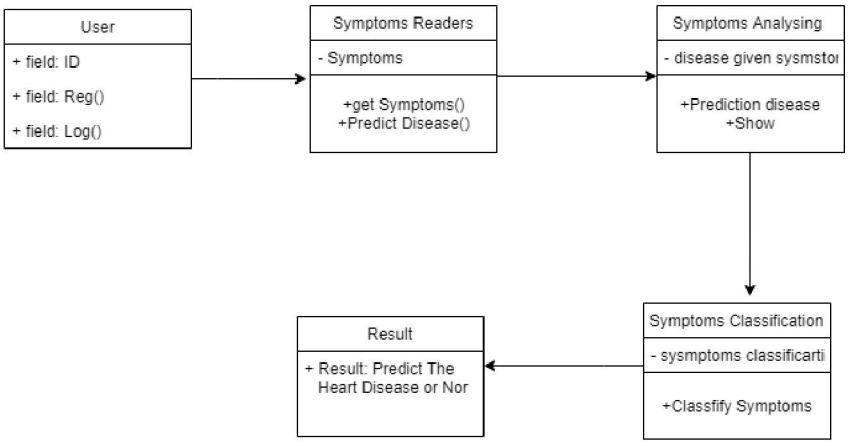
- Hard Disk : 500 GB
- Processor : Intel i5 Processor

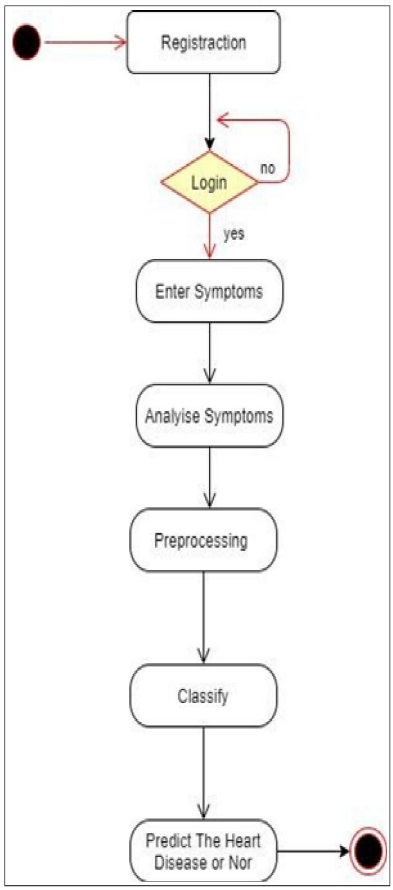
6.4.3 Software Interfaces

- IDE : Spyder
- Coding Language : Python Version 3.8
- Operating System : Windows 10 (64 Bit)

VII. MODELING AND DESIGN

CLASS DIAGRAM





USE CASE DIAGRAM

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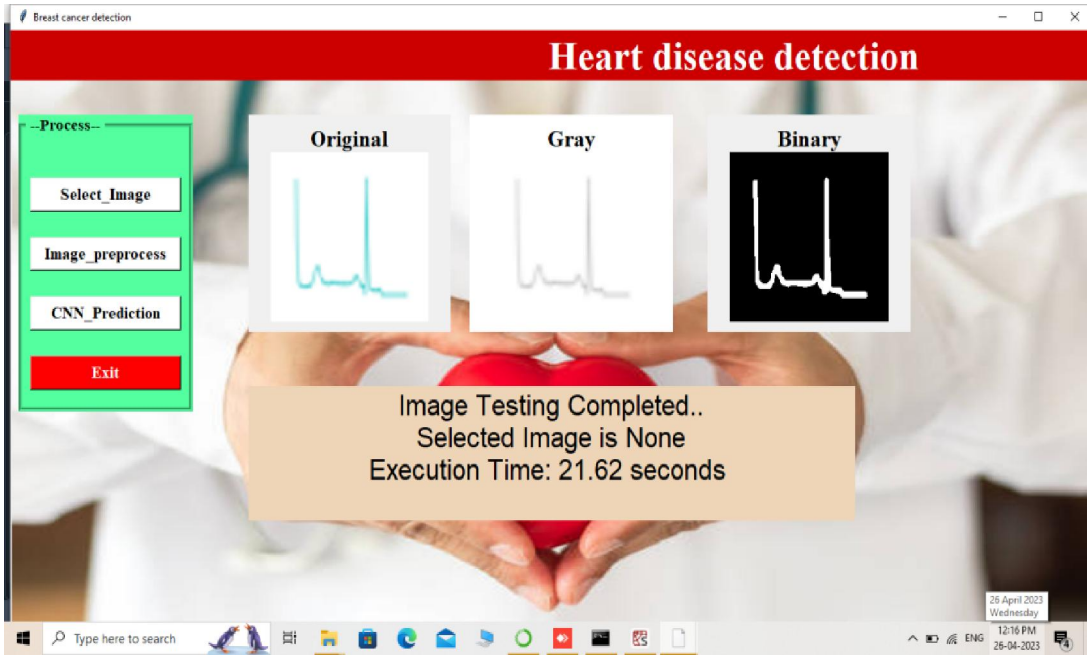
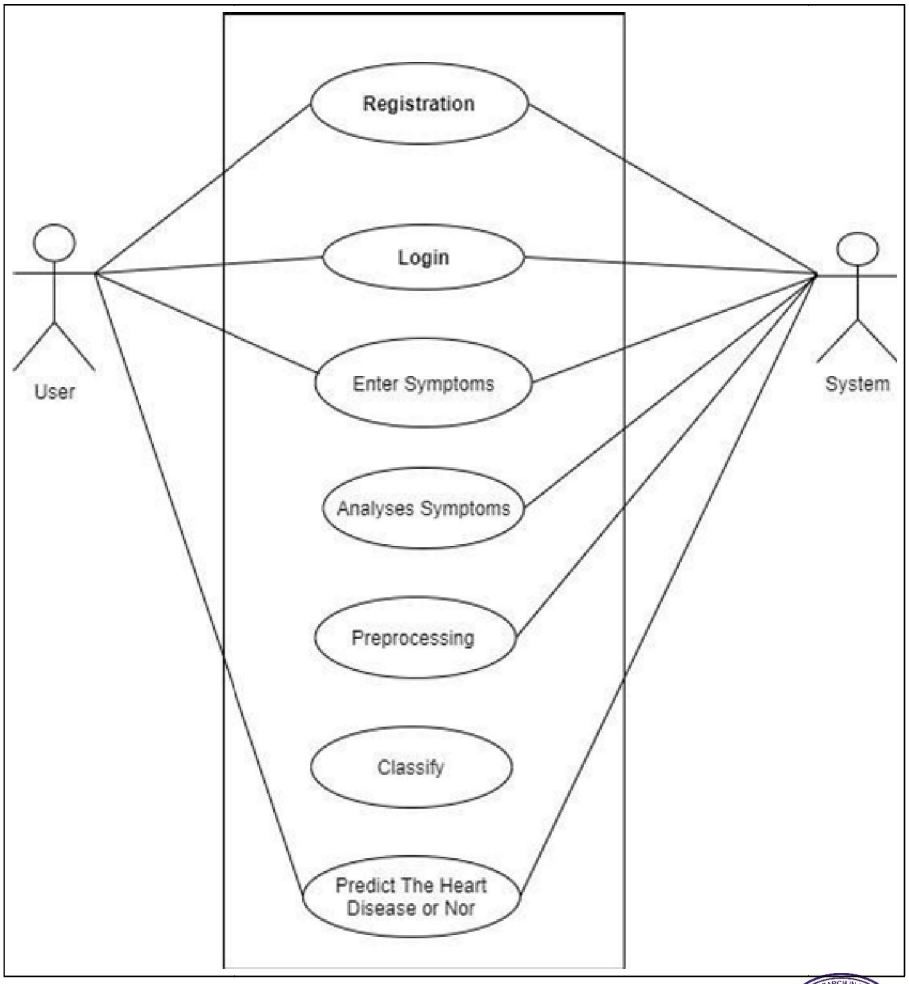


FIGURE:- RESULT



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VIII. CONCLUSION

This project aims to predict the heart disease on the basis of the symptoms. The project is designed in such a way that the system takes symptoms from the user as input and produces output i.e. predict heart disease. Average prediction accuracy probability of 55obtained. heart Disease Predictor was successfully implemented using grails framework. In the future, to predict disease we want to try different diseases such as lung cancerby using image detection. In this way, the dataset becomes complicated and we can apply convolutional neural network to make accuracy predictions. This involved analysis of the heart disease patient dataset with proper data processing. Then, 4 models were trained and tested with maximum scores.

IX. FUTURE SCOPE

The project's scope is that integrating clinical decision support with computer-based patient records could reduce medical errors, improve patient safety, reduce unwanted practise variation, and improve patient outcomes. This suggestion is intriguing because data modelling and analysis tools, such as data mining, have the potential to create a knowledge-rich environment's.

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