Title of the Project:-SYNERGETIC FRAMEWORK FOR EYEBALL MOUSE AND GESTURE RECOGNITION USING AI

Name of the College :- Nagarjuna College Of Engineering & Technology, Mudugurki, Venkatagiri Kote, Devanahalli, Bengaluru - 562 110.

Department :- Information Science and Engineering

Name of the students :- Ms. Chanadana P

Ms. Duttapati Harishma

Ms. Sayeeda Suhana

Ms. Yesuri Gayathri

Name of the Guide :- Mr. MOHAN D N

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1.Human Computer Interface
2.Sign Language
3.Open CV
4.EyeBall Mouse
5.CNN
6.Data Set

Introduction :-

As the computer technologies are growing rapidly, the importance of human computer interaction becomes highly notable. Some persons who are disabled cannot be able to use the computers. Eye ball movement control mainly used for disabled people. Incorporating this eye controlling system with the computers will make them to work without the help of other individual. Human-Computer Interface (HCI) is focused on use of computer technology to provide interface between the computer and the human. There is a need for finding the suitable technology that makes the effective communication between human and computer. Human computer interaction plays the important role . Thus there is a need to find a method that spreads an alternate way for making communication between the human and computer to the individuals those who have impairments and give them an equivalent space to be an element of Information Society .

Sign Language for the deaf and mute people is the only means of communication and for communicating with people who don't know sign language, a translator is required. Since it's not possible to be accompanied by a translator always, it becomes difficult for these people to communicate with normal people without a translator. Thus, a system that's able to translate sign

language into words without a human translator would be extremely helpful to the deaf and mute community. The proposed system aims at translating hand gestures made using sign language into words with the help of 5DT gloves fitted with position sensors and different machine learning

techniques. Australian Sign Language signs (High Quality) Data Set obtained from the UCI Repository of Machine Learning Databases has been used to implement the proposed system. The dataset contains data captured from two Fifth Dimension Technologies(5DT) gloves, one on the right and the other on the left hand. Each of the 5DT gloves contains 6 position sensors that provide 6 degrees of freedom - roll, pitch and yaw, x, y and z coordinate relative to the chin and 5 more position sensors, one on each finger, provide the finger bend measure. Thus, each record contains 22 attributes. In the dataset used, there are a total of 96 words or classes into which these records are classified into. 80% of this dataset has been used for training and 20% has been used for testing. Different machine learning techniques (k-Nearest Neighbour, Decision Tree Classifier, and Neural Network) have been used on the dataset to perform multiclass classification and thus classify the record into its corresponding word.

Objectives:-

- Sign language recognition using hand gestures.

- Eyes and face Detection

- Eye end points extraction

- Develop an algorithm to calculate the point gaze based on eye features extracted

- Using openCV eyeball movement recognition.

- Converting eyeball movement into mouse movement using tensor flow and CNN

Methdology:-

This document gives the design of the overall project. Software development is the phase which is very important for the supernova of the software, which is called as design phase. The design phase should satisfy the functional and non-functional requirements for the effectiveness for satisfying all the constraints and objectives of the project. It mainly concentrates on the modules that needed for system. The design phase depends mainly on the specification of feasibility survey.

Data Flow Diagram

The information stream outline demonstrates the graphical portrayal, similar to game plans it is utilized to speak to the information through the sources of info, different sorts of information examination will be completed and the coveted yield will be produced.

These parts will be utilized to demonstrate the framework and it will be displayed by to contemplate quickly regarding the info. In the framework outline the DFD will demonstrate the stream of whole parts. The stream of data will in arrangement of change utilizing this framework.
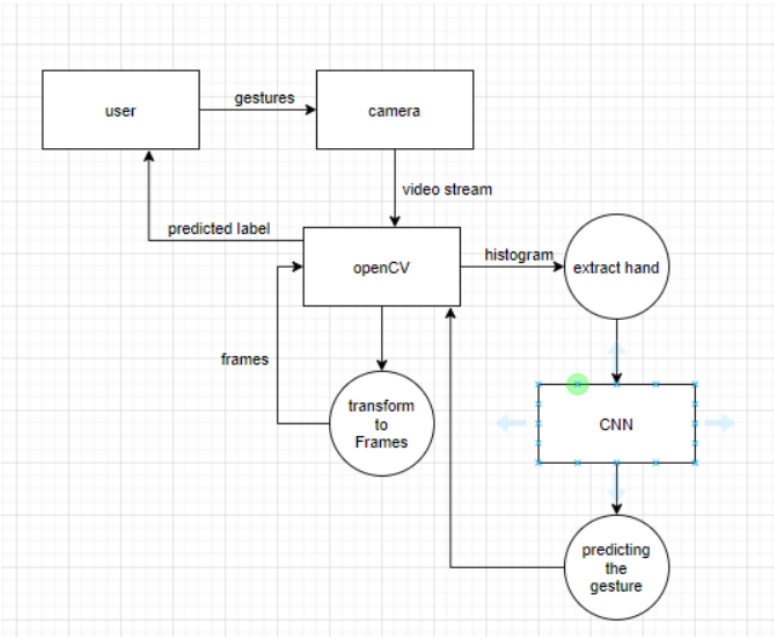
Fig 1.Data Flow Diagram: sign recognition

SEQUENCE DIAGRAM

A **sequence diagram** in Unified Modelling Language (UML) is a sort of cooperation chart that shows how forms work with each other and in what arrange. It is a develop of a Message Sequence Chart. Succession outlines are some of the time called Event-follow graphs, occasion situations, and timing charts.

A succession graph appears, as parallel vertical lines ("helps"), distinctive procedures or items that live at the same time, and, as even bolts, the messages traded between them, in the request in which they happen. This permits the particular of basic runtime situations in a graphical way.
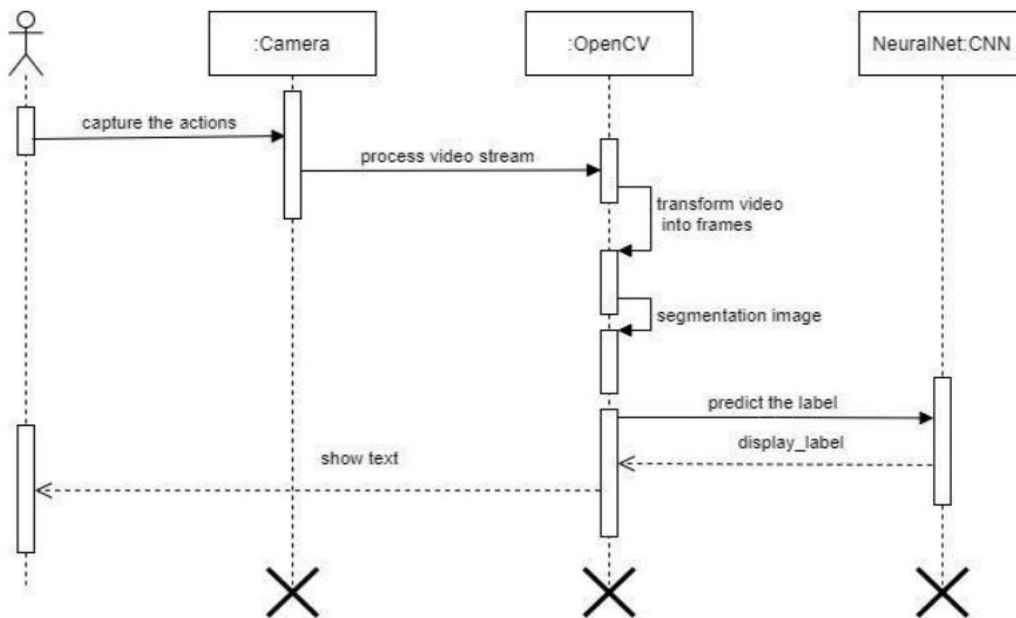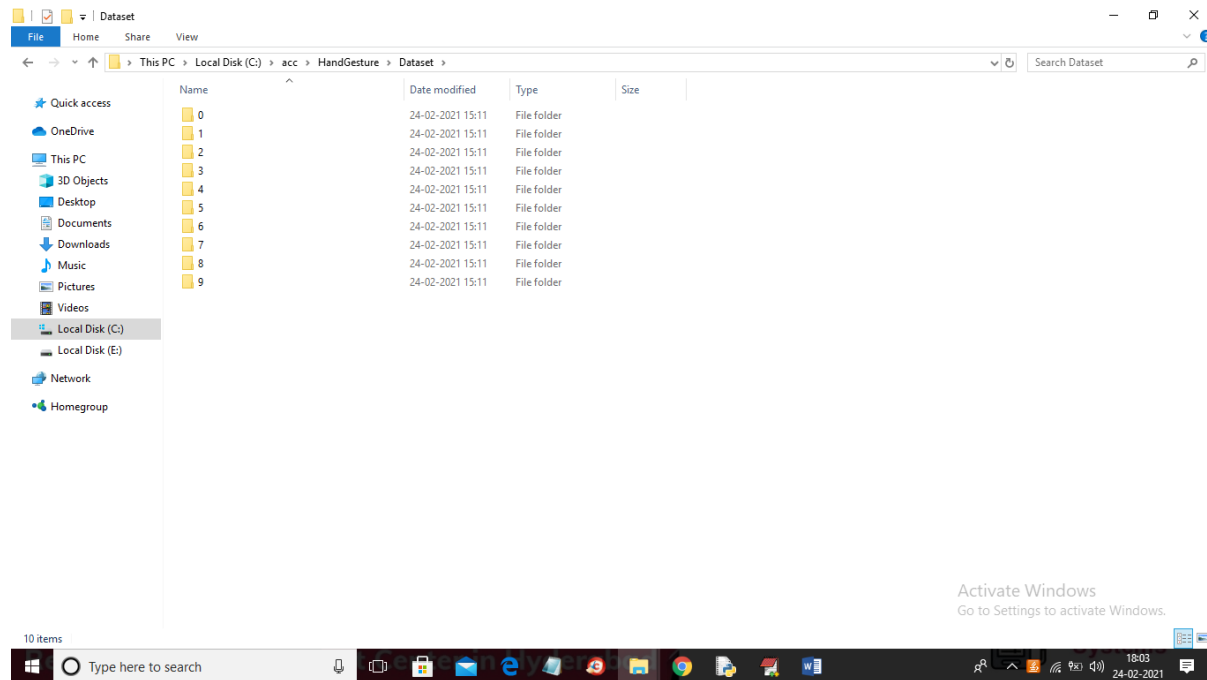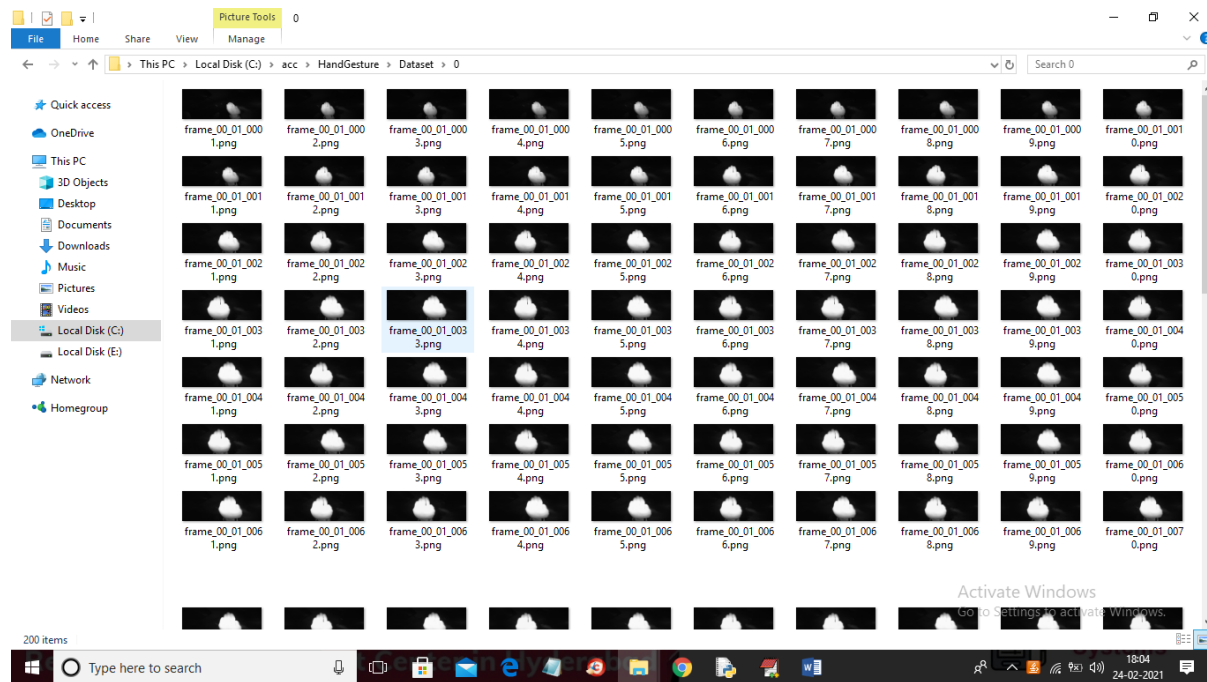

Figure 2. Sequence Diagram: Eye Ball Mouse

Results :-

In this project using CNN we are recognizing hand gesture movement and to train CNN we are using following images shown in below screen shots
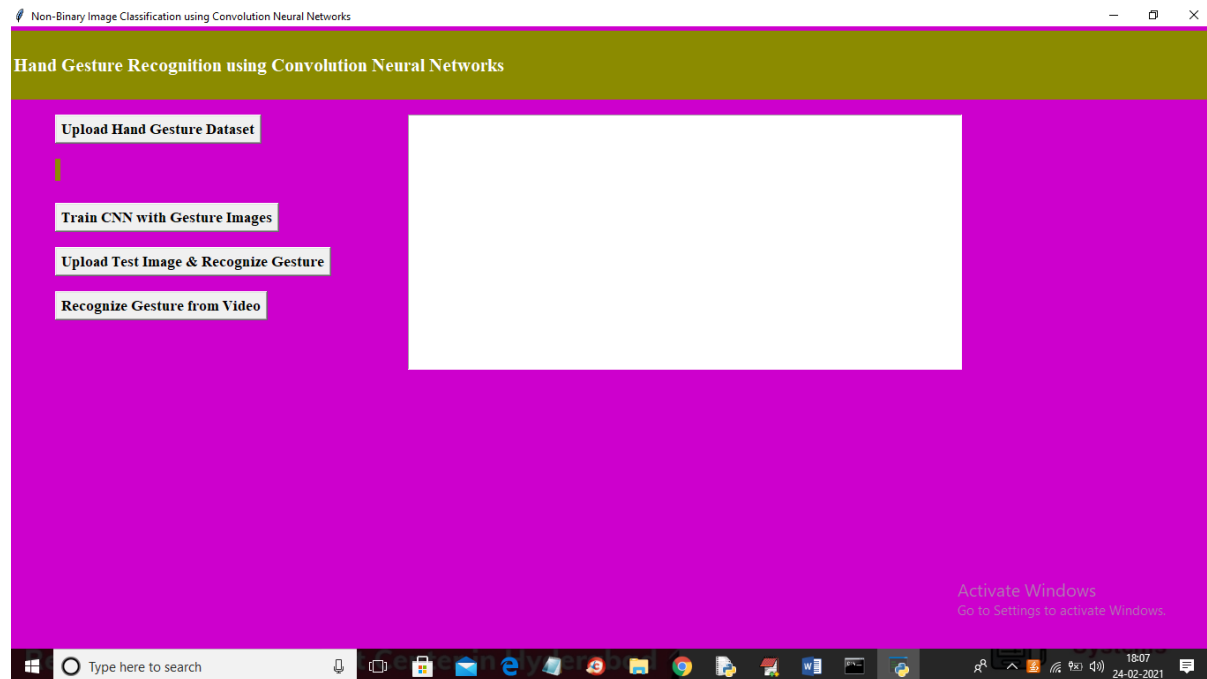

In above screen we can see we have 10 different types of hand gesture images and to see those images just go inside any folder
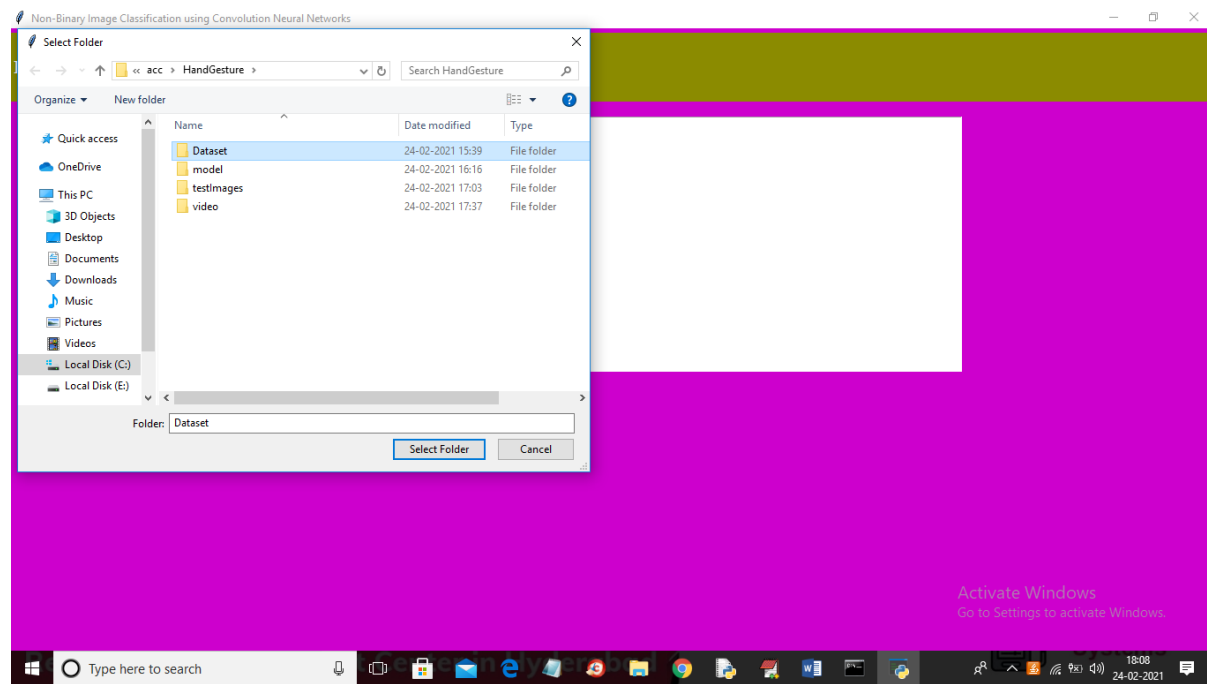

In above screen showing images from 0 folder and similarly you can see different images in different folders.
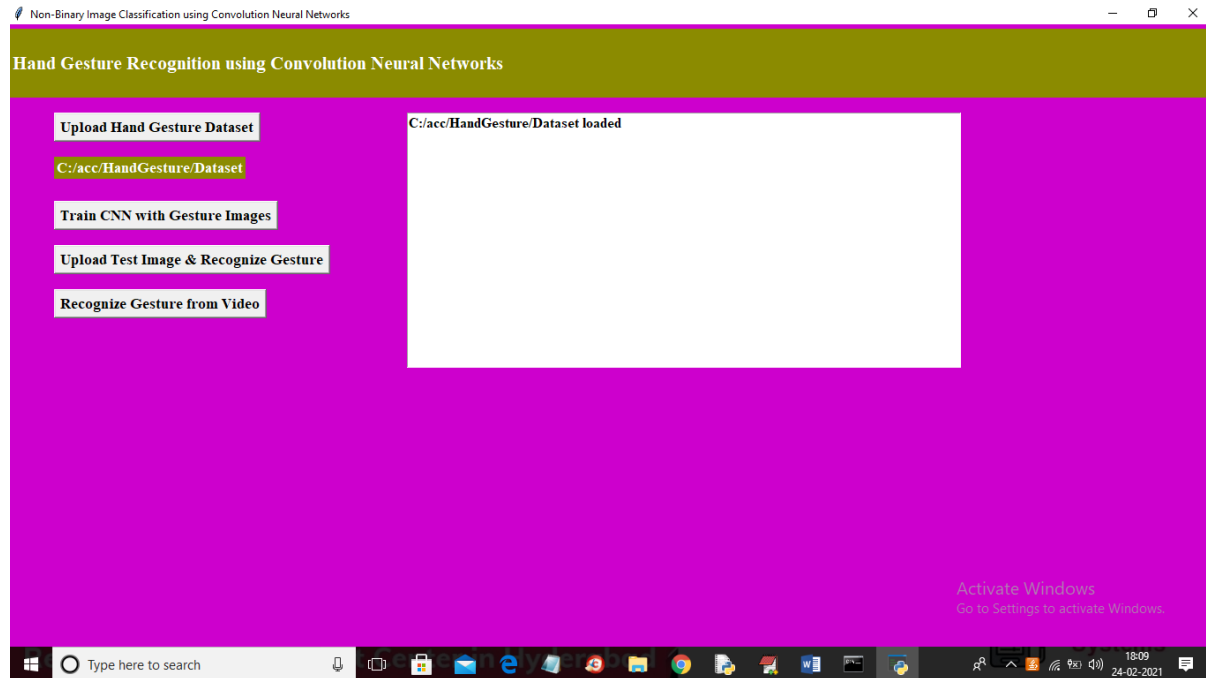
SCREEN SHOTS

To run project double click on run.bat file to get below screen
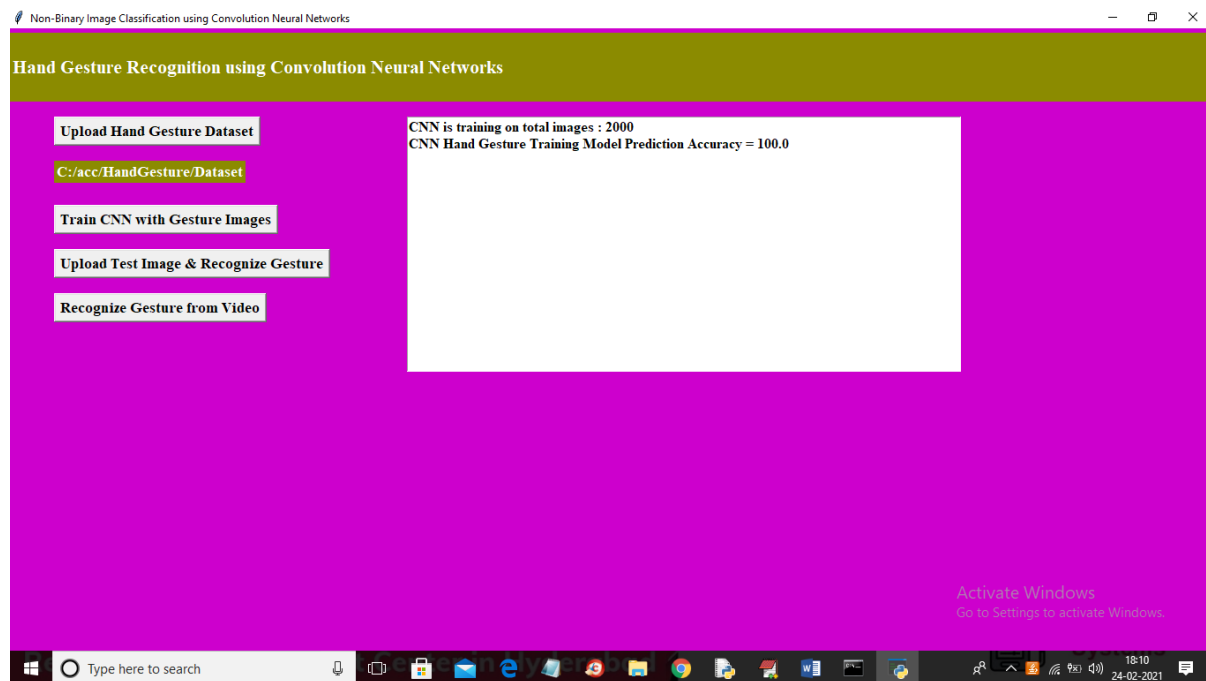

In above screen click on 'Upload Hand Gesture Dataset' button to upload dataset and to get below screen
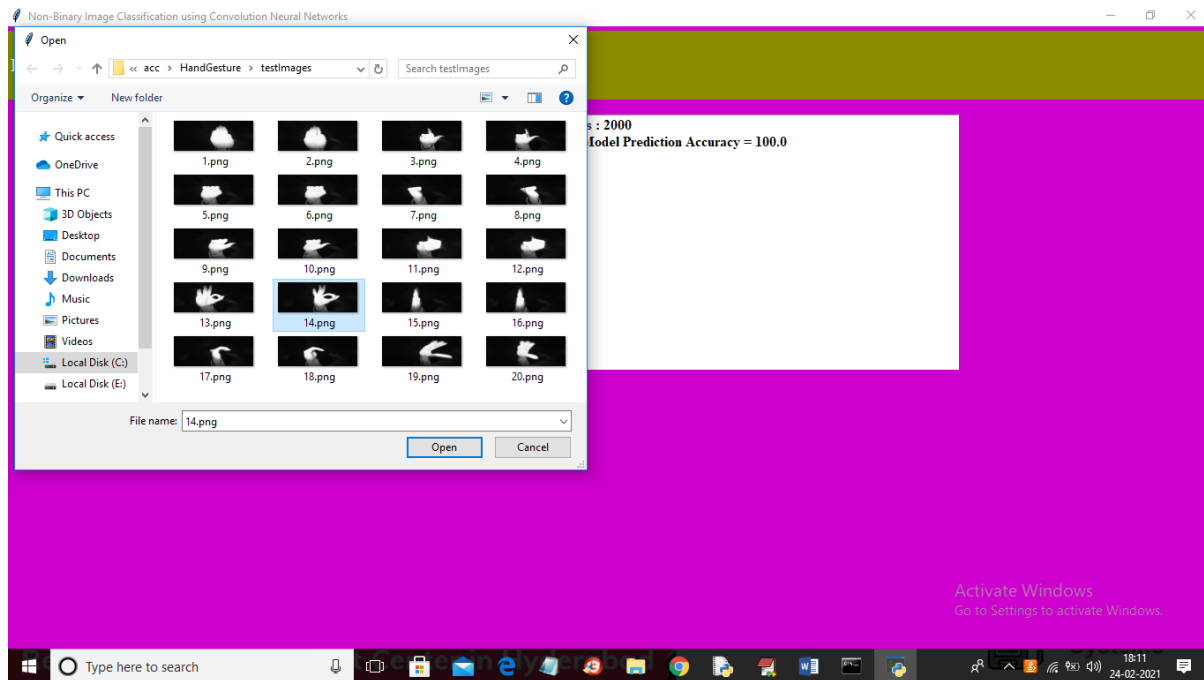

In above screen selecting and uploading 'Dataset' folder and then click on 'Select Folder' button to load dataset and to get below screen

In above screen dataset loaded and now click on 'Train CNN with Gesture Images' button to trained CNN model and to get below screen

In above screen CNN model trained on 2000 images and its prediction accuracy we got as 100% and now model is ready and now click on 'Upload Test Image & Recognize Gesture' button to upload image and to gesture recognition

In above screen selecting and uploading '14.png' file and then click Open button to get below result
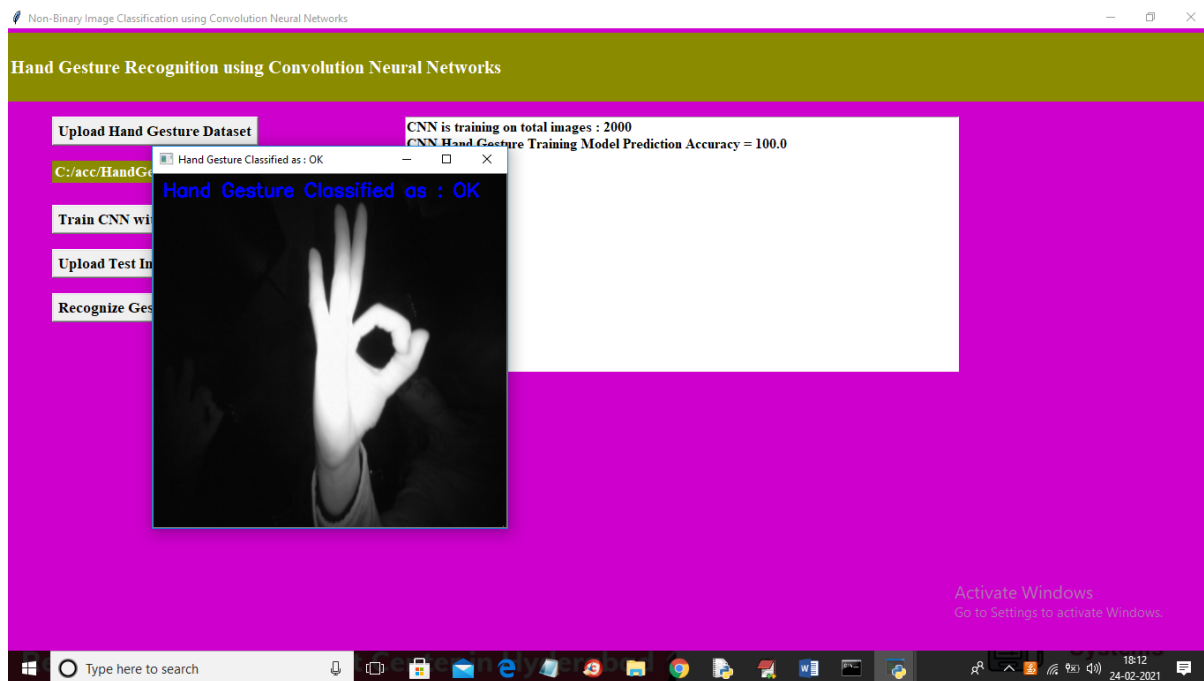
In above screen gesture recognize as OK and similarly you can upload any image and get result and now click on 'Recognize Gesture from Video' button to upload video and get result.

Conclusion:-

From the process implemented it is cleared that the cursor can be controlled by the eyeball movement i.e., without using hands on the computers. This will be helpful for the people having disability in using the physical parts of the computers to control the cursor points.

Because the cursor points can be operated by moving the eyeballs. Without the help of others disabled people can use the computers. The proposed system also aims to translate hand signals into words. Different machine learning techniques like neural networks, decision tree classifier, and k-nearest neighbors have been used to classify the data into words.

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Scope for future work:-

In the future, we will perform the next steps to increase the frame rate per second, to improve accuracy by increasing the resolution of the input image or using methods, and to combine neural networks with other networks to increase the efficiency of calculations and performance with any object.