

Accessibility System to Control Laptop Without Mouse

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ABSTRACT

Today's world is a high technological world imagining life without computer is impossible. Now computer is an essential part of human's day-to-day life. Vision and gesture are the important approach for communication between human beings just in the way as keyboard and mouse play a role for interacting with computer. Numbers of effective techniques are available for interaction with computer and one of them is hand gesture technique. In that technique hand gesture is used as an input which replaces functionality of mouse and keyboard shortcut keys. Hand gesture is an attractive and faster technique.

Keywords : Convolutional Neural Network (CNN), Keras, TensorFlow

I. INTRODUCTION

This project is a system for the "Accessibility System to Control Laptop Without Mouse". Using this project we can easily operate laptop by using hands without mouse. lot of effective techniques are available for interaction with computer and one of them is hand gesture technique. Hand gesture is an attractive and faster technique. With the development technologies in the areas of augmented reality and devices that we use in our daily life, these devices are becoming compact in the form of Bluetooth or wireless technologies. This paper proposes an AI virtual mouse system that makes use of the hand gestures and hand tip detection for performing mouse functions in the computer using computer vision. The main objective of the proposed system is to perform computer mouse

cursor functions and scroll function using a web camera or a built-in camera in the computer instead of using a traditional mouse device. Hand gesture and hand tip detection by using computer vision is used as a HCI with the computer.

II. II.OBJECTIVES

objectives for a project focused on developing an accessibility system to control a laptop without a mouse:

- 1.To develop an input system that allows individuals with disabilities to control a laptop effectively and efficiently without relying on a traditional mouse-based interface.
2. To design a customized input device that is tailored to the needs of the target user group, taking into

consideration factors such as motor control, visual acuity, and cognitive ability.

3. To evaluate the effectiveness of the developed system in terms of user experience, usability, and accessibility, using both qualitative and quantitative methods.

4. To compare the developed system with existing accessibility systems, identifying potential advantages and limitations.

III. LITERATURE SURVEY

In previous projects we used special hardware like mouse, keyboard, joystick, scroll wheels to operate the system and it works on counting of the pests on the leaves is the main purpose of their project.

Their main purpose is to detect the number of pests on the particular area of the leaf.

In the proposed project we are using a different CNN algorithm for image processing and for detection of pest.

The accuracy of previous projects algorithms is like 85%, 90% whereas our proposed algorithm accuracy is 96%

The aim of previous works is to detect only pest but our proposed project aim is to detect the pest and to give respective pesticide as an output so that the farmers can save their crop from pests from using the suitable pesticide. To get pesticide as an output we are using python3.7 software tool.

The classifiers used in the previous projects are K-Nearest neighbor algorithm, Support vector machine algorithm, artificial neural network algorithm. Convolutional neural network gives better results and it is much suitable for image recognition as compared to other classifiers

IV. PROPOSED SYSTEM

Our Proposed System is an add on to the conventional System and conventional way of operating computers. With the help of current modern technologies and use of Computer Vision with Machine Learning, we will create a system which can be installed on a Computer Device and allow User to perform several operations just by using Hand Gestures.

V. REQUIREMENT SPECIFICATION

Functional Requirements of Graphical User interface with the User.

Software Requirements

For developing the application the following are the Software Requirements:

a. Python

Operating Systems supported

1. Windows 10

Technologies and Languages used to Develop

1. Python 3

Debugger and Emulator

Any Browser (Particularly Chrome)

Hardware Requirements

For developing the application the following are the Hardware Requirements:

1. Processor: Intel core i5 2.5GHz

2. RAM: 4 GB

3. Space on Hard Disk: minimum 256 GB

VI. STEPS TO DEVELOP PROPOSED PROJECT

Following are the steps to develop the proposed project

- Gathering the dataset
- Load the dataset
- Preprocessing the data
- Split the dataset
- Design the algorithm
- Compile the algorithm
- Train the algorithm with the data
- Predict the results

VII. PROPOSED PROJECT ALGORITHM

OVERVIEW

Overview of layers of CNN algorithm are as follows.

A. SEQUENTIAL

It input or output data sequences. It is used because each layer should have exactly one output and are connected together to form entire network. It allows us to build a model layer by layer.

B. CONVOLUTION 2D LAYER

Our required input image is given to the conv2D layer. In this layer our input image can be seen as 2D matrix. This layer extracts all the different features present in the input image. The activation function is used here. The type of activation function using in our project is ReLU (Rectified Linear Unit) Activation function.

Activation Function: It introduce Non-linearity in the network. It is used to decide whether a neuron can contribute to the next layer.

C. MAXIMUM POOLING LAYER

Pooling is done to reduce the number of neurons necessary in subsequent layers. This layers reduces the size of the features extracted by the convolution 2D layer.

D. FLATTEN LAYER

All the images of features extracted by the maximum pooling layer are mapped into a single vector in this layer.

E. DENSE LAYER

This layer is used to classify the image based on the output given by the flatten layer.

F. COMPILE

This layer gives the loss function, optimizer and accuracy of the algorithm

Loss Function: It is defined as the deviation of the predicted output by the neural network to the expected output.

The type of loss function here used: Multi class classification loss function

Optimizer: During training , we adjust the parameters to minimize the loss function and make our model as optimized as possible

Optimizer: adam

G. FIT In this layer we train the constructed model with the required dataset.

VIII. LIBRARIES USED

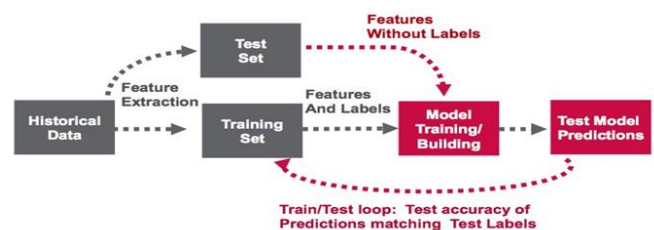
A. Tensorflow

Tensorflow is an open source library created for python. Tensorflow compiles many different algorithms and models together, enabling the user to implement deep neural networks for use in tasks like image recognition. Tensorflow is a powerful framework that functions by implementing a series of processing nodes. It includes a special feature of image recognition and these images are stored in a specific folder with relatively same images, it will be easy to implement this logic for security purposes.

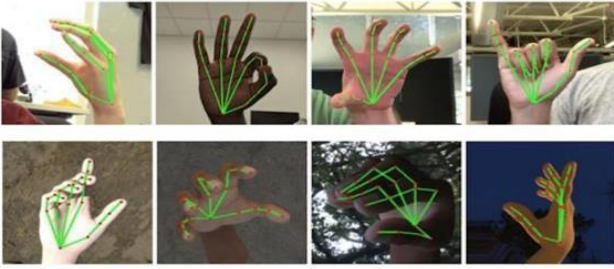
B. Media-Pipe

Media-Pipe is a framework which is used for applying in a machine learning pipeline, and it is an opensource framework of Google. The Media-Pipe framework is useful for cross platform development since the framework is built using the time series data. The Media-Pipe framework is multimodal, where this framework can be applied to various audios and videos. The Media-Pipe framework is used by the developer for building and analysing the systems through graphs, and it also been used for developing the systems for the application purpose. The steps involved in the system that uses Media-Pipe are carried out in the pipeline configuration. The pipeline created can run in various platforms allowing scalability in mobile and desktops.

IX. CNN ARCHITECTURE



DATASET



CLASS DIAGRAM

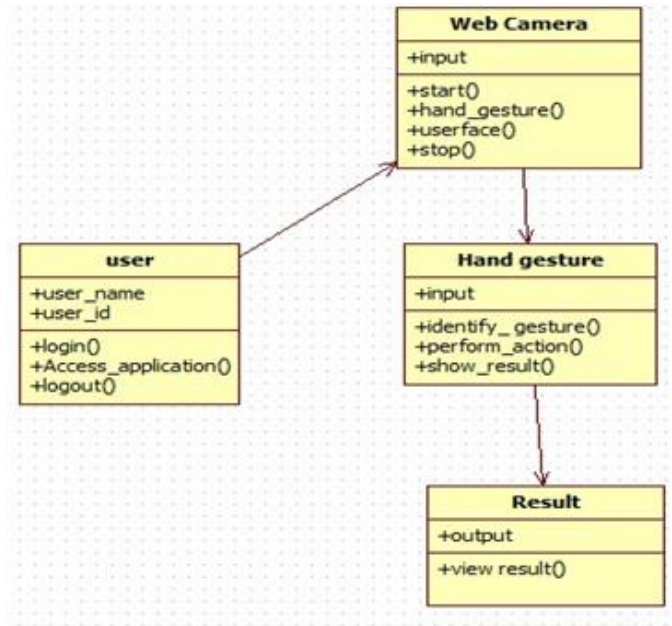


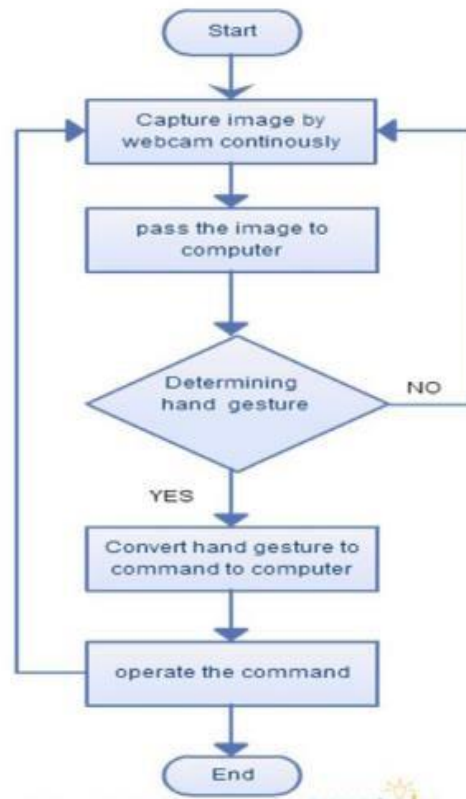
TABLE 1. COMPARISON OF CNN , ANN AND RNN ALGORITHMS

S.NO	Neural Network	Computations	Accuracy
1	Convolutional Neural Network	Low	95%
2	Artificial Neural Network	High	90%
3	Recurrent Neural Network	High	88%

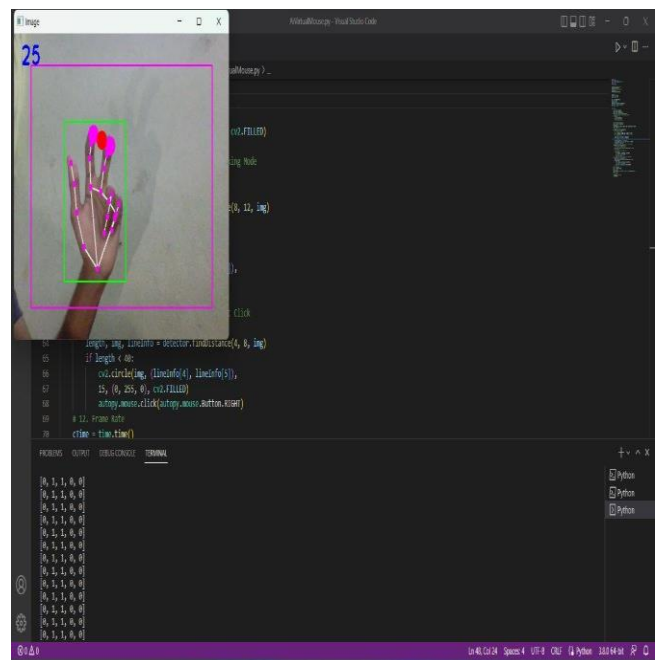
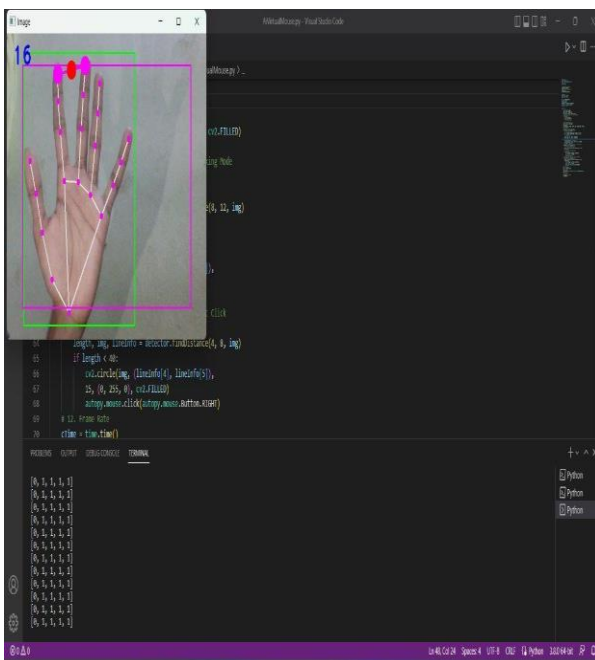
TABLE 2. COMPARISON OF SVM ALGORITHM AND PROPOSED CNN ALGORITHM

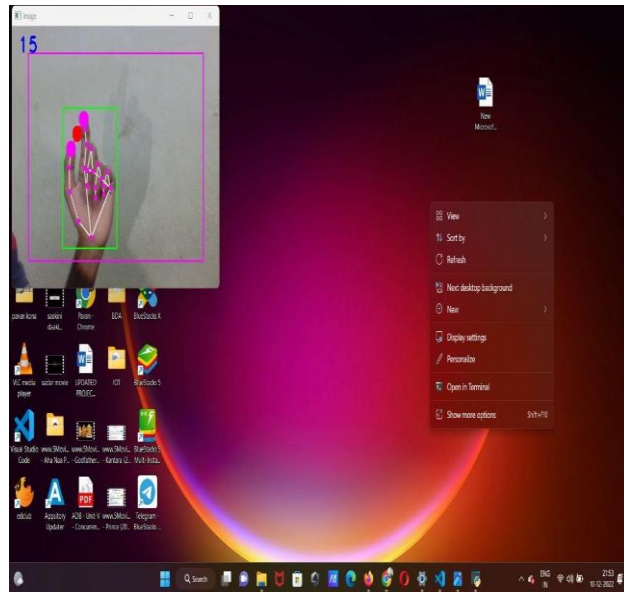
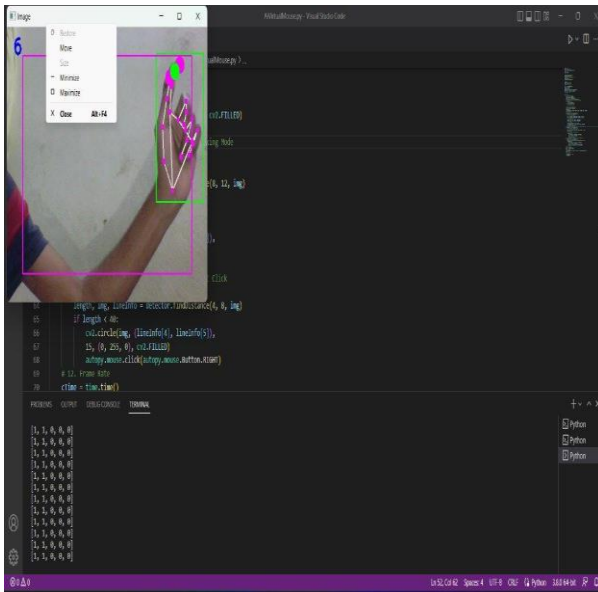
CNN	SVM
1.It is used for feature extraction and classification. 2.It is suitable for larger datasets . 3.It's structure is based on multiple layers of nodes including one or more convolutional layers. 4.It's accuracy in recognizing image is 95%	1.It is used only for classification. 2.It is not suitable for larger datasets. 3.It does not consists of hidden layers 4.It's accuracy is 90%

X. DATA FLOW DIAGRAM



XI. EXPECTED OUTCOME





XII. REFERENCES

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