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Virtual Mouse Using Hand Gesture

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Abstract: ***The hand gesture is the most effortless and natural way of communication. The output of the camera will be displayed on the monitor. Shape and position information about the gesture will be gathered using detection of color. The file transferring scheme is implemented by using the python server programming. Hand gestures can be used to play an important role for establishing Human-Computer Interaction interface (HCI) in modern techniques. Direct use of hand as input device is an attractive method for providing natural HCI. Human gestures can substitute the use of mouse and keyboard as inputs to computer. Gesture commands can be used to control computers and other intelligent machines.***

I. INTRODUCTION

Predictive analytics tools are powered by several different models and algorithms that can be applied to wide range of use cases. Determining what predictive modeling techniques are best for your company is key to getting the most out of a predictive analytics solution and leveraging data to make insightful decisions in the statistical context, Machine Learning is defined as an application of artificial intelligence where available information is used through algorithms to process or assist the processing of statistical data. While Machine Learning involves concepts of automation, it requires human guidance. Machine Learning involves a high level of generalization in order to get a system that performs well on yet unseen data instances

II. SOFTWARE ANALYSIS

Python Technology:

Python is an interpreter, high-level, general-purpose programming language. It supports multiple programming paradigms, including procedural, object-oriented, and functional programming. **Python** is often described as a "batteries included" language due to its comprehensive standard library.

Python Programing Language:

Python is a multi-paradigm programming language. Object-oriented programming and structured programming are fully supported, and many of its features support functional programming and aspect-oriented programming (including by Meta programming and met objects (magic methods)). Many other paradigms are supported via extensions, including design by contract and logic programming.

Python packages with a wide range of functionality, including:

- Easy to Learn and Use
- Expressive Language
- Interpreted Language
- Cross-platform Language
- Free and Open Source
- Object-Oriented Language
- Extensible
- Large Standard Library
- GUI Programming Support
- Integrated

Python uses dynamic typing and a combination of reference counting and a cycle-detecting garbage collector for memory management. It also features dynamic name resolution (late binding), which binds method and variable names during program execution.

Rather than having all of its functionality built into its core, Python was designed to be highly extensible. This compact modularity has made it particularly popular as a means of adding programmable interfaces to existing applications. Van

Rossum's vision of a small core language with a large standard library and easily extensible interpreter stemmed from his frustrations with ABC, which espoused the opposite approach.

Python is meant to be an easily readable language. Its formatting is visually uncluttered, and it often uses English keywords where other languages use punctuation. Unlike many other languages, it does not use curly brackets to delimit blocks, and semicolons after statements are optional. It has fewer syntactic exceptions and special cases than C or Pascal.

III EXISTING SYSTEM

The existing system consists of the generic mouse and track pad system of monitor controlling and the non-availability of a hand gesture system. The remote accessing monitor screen using the hand gesture is unavailable. Even-though it is largely trying to implement the scope is simply restricted in the field of virtual mouse. The existing virtual mouse control system consists of the simple mouse operations using the hand recognition system, where we could perform the basic mouse operation like mouse pointer control, left click, right click, drag etc. The further use of the hand recognition is not been made use of. Even-though there are a number of systems which are used for hand recognition, the system they made used is the static hand recognition which is simply recognition of the shape made by hand and by defining an action for each shape made, which is limited to a number of defined actions and a large amount of confusion.

IV PROPOSED SYSTEM

This Virtual Mouse Hand Recognition application uses a simple color cap on the finger without the additional requirement of the hardware for the controlling of the cursor using simple gestures and hand control. This is done using vision based hand gesture recognition with inputs from a webcam. Using the current system even-though there are a number of quick access methods available for the hand and mouse gesture for the laptops, using our project we could make use of the laptop or web-cam and by recognizing the hand gesture we could control mouse and perform basic operations like mouse pointer controlling, select and deselect using left click, and a quick access feature for file transfer between the systems connected via network LAN cable. The project done is a “Zero Cost” hand recognition system for laptops, which uses simple algorithms to determine the hand, hand movements and by assigning an action for each movement. But we have mainly concentrated on the mouse pointing and clicking actions along with an action for the file transfer between connected systems by hand action and the movements. The system we are implementing which is been written in python code be much more responsive and is easily implemented since python is a simple language and is platform independent with a flexibility and is portable which is desirable in creating a program which is focused in such an aim for creating a Virtual Mouse and Hand Recognition system. The system be much more extendable by defining actions for the hand movement for doing a specific action. It could be further modified to any further extent by implementing such actions for the set of hand gestures, the scope is restricted by your imagination.

V. MODULES

MODULE DESCRIPTION

Data collection

- In this process to collect a data from Kaggle. This Kaggle data collection has an only numerical value and in this data using multiple purpose.
- Kaggle supports a variety of dataset publication formats, but we strongly encourage dataset publishers to share their data in an accessible, non-proprietary format if possible. Not only are open, accessible data formats better supported on the platform, they are also easier to work with for more people regardless of their tools.

5.2.1 Data preprocessing

- Data pre-processing is a process of preparing the raw data and making it suitable for a deep learning model. It is the first and crucial step while creating a deep learning model.
- When creating a machine learning project, it is not always a case that we come across the clean and formatted data.
- And while doing any operation with data, it is mandatory to clean it and put in a formatted way. So for this, we use data pre-processing task.

5.2.2 Model development

- The use of Machine Leaning (ML) has increased substantially in enterprise data analytics scenarios to extract valuable insights from the business data.
- Hence, it is very important to have an ecosystem to build, test, deploy, and maintain the enterprise grade machine learning models in production environments.

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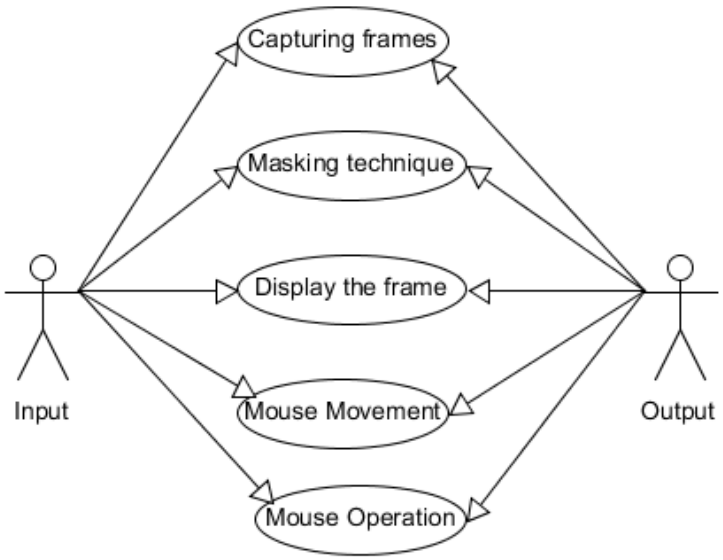
- The ML model development involves data acquisition from multiple trusted sources, data processing to make suitable for building the model, choose algorithm to build the model, build model, compute performance metrics and choose best performing model.

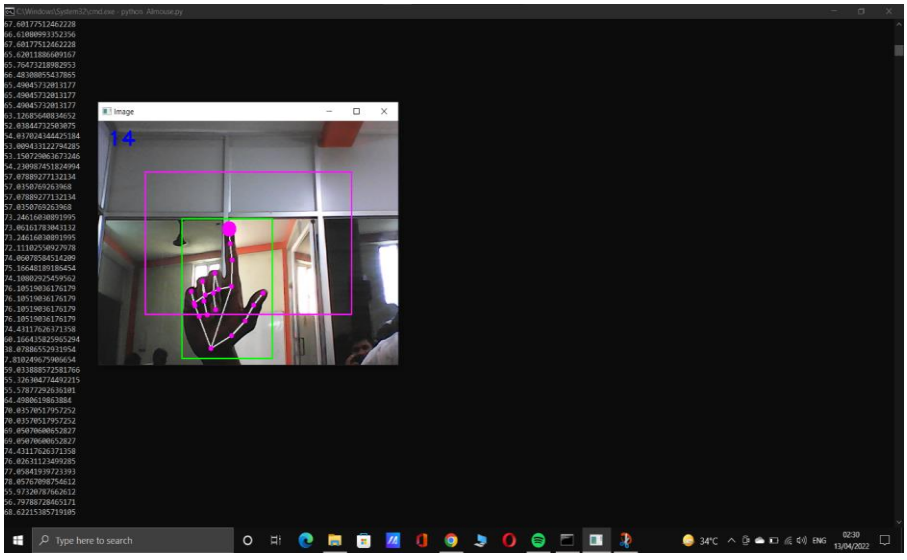
5.2.4 Model Selection

- Model selection is the process of selecting one final machine learning model from among a collection of candidate machine learning models for a training dataset.
- Model selection is a process that can be applied both across different types of models (e.g. logistic regression, SVM, KNN, etc.) and across models of the same type configured with different model hyper parameters (e.g. different kernels in an SVM).

ARCHITECTURE DIAGRAM



V. RESULT



VI. CONCLUSION

Gesture recognition gives the best interaction between human and machine. Gesture recognition is also important for developing alternative human computer interaction modalities. It enables human to interface with machine in a more natural way. Gesture recognition can be used for many applications like sign language recognition for deaf and dumb people, robot control etc. Digital Canvas is an extension of our system which is gaining popularity among artists, by which the artist could create 2D or 3D images using the Virtual Mouse technology using the hand as brush and a Virtual Reality kit or a monitor as display set. this project show the different gesture operations that could be done by the users but it also demonstrated the potential in simplifying user interactions with personal computers and hardware systems.

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