**VISHWAKARMA INSTITUTE OF INFORMATION TECHNOLOGY, PUNE**

**COMPUTER ENGINEERING DEPARTMENT**

**APRIL-MAY 2019**

**Synopsis**

****

**Group number:**

Group Members :

1. Prathamesh Patil

2. Vivek Kashid

3. Vishwesh Chaudhari

4. Vrushal Walzade

Email-ID : [vrushalw97@gmail.com](mailto:vrushalw97@gmail.com)

Mobile no : 7775955864

**Title : HAND GESTURE BASED DEVICE CONTROL USING NEURAL NETWORKS**

**Objective : To control some mouse functionalities in laptops/computers using hand gesture based system.**

**Abstract :**

**Briefs about Contents:**

**Introduction :**

Almost everyone uses a desktop or laptop these days. A serious problem is that we insist on using mouse, which are not viable in a long run. And in the VR / AR era, we can't use the mouse. Our goal is to replace the mouse with gestures. We designed a system which understands hand movements and made the ML recognize our gestures so that we could remotely control our computer. We need to make standard gestures that make people as easy to use as standard mouse. The use of such system can be done to reduce operational distance between humans and the devices facilitating operations from distance.

Machine learning will solve this problem for humans. We use Deep Learning as Machine learning technique in this project. ML( Machine Learning ) can recognise our gesture and control the computer as we intended by gesture remotely. We will feel like a magician. And by moving our body to control the computer, we can avoid sitting still and getting a health problem. Moreover we can play a game with much more immersive experience by moving our hands, head and body.

To replace a mouse, we have to devise many subtle gestures and these gestures have to be easy one for people to learn easily. And these gestures should be a standard like a standard mouse. It may be annoying if we have to learn different gestures to control different devices in future.

In the era of VR / AR, interactions with the computer being constrained to the physical and wired devices for performing the desired functionalities in not efficient. Suppose while delivering a presentation every time for changing the slide, going to the mouse and clicking it, doesn’t sound efficient, or while playing a video, every time for volume control, mouse is needed, this isn’t a solution in this era.

So making use of the gestures based controls to perform functionalities like changing the slides of a presentation or volume control, it can reduce human efforts significantly and could be used in as base for the future automation world.

**Technical Details :**

1. Defining as many hand gestures as possible to cover almost all the mouse actions.
2. Coding for tools to create as many data sets as possible in short time.
3. Coding to use a deep learning model which can recognise these hand gestures at real time
4. Coding for tracking and capturing hand.
5. Coding to assign gestures to mouse controls

**Working :**

The outcomes for this project would be:

* Different actions triggered for respective gesture (It would be according to the association of the action and the gesture).
* Examples:

1. Swipe our hand in front of the Webcam will scroll down or up files.
2. Play/Pause actions according to the gesture.

**Applications:**

Using the gesture based device control, we can make actions do in a quick and using lesser efforts by just using the hardware which is already present (in this case the Webcam for gesture capturing/detection). So we will get more efficiency with no added costs. This could be used as the starting step towards the more futuristic approach towards the VR and the AR.

**References/Bibliography:**

1. Code project – www.codeproject.com/Articles/498193/Mouse-Control-via-Webcam
2. Microsoft Research Paper- <http://research.microsoft.com/enus/um/people/awf/bmvc02/project.pdf>
3. Saha, H. N., Tapadar, S., Ray, S., Chatterjee, S. K., & Saha, S. (2018). A Machine Learning Based Approach for Hand Gesture Recognition using Distinctive Feature Extraction. 2018 IEEE 8th Annual Computing and Communication Workshop and Conference (CCWC).
4. Hand Gesture Recognition and Cursor Control. Available from: <https://www.researchgate.net/publication/280112512_Hand_Gesture_Recognition_and_Cursor_Control>