



## Project Proposal Format

**Note: Please provide proper information. Do not add unused and wrong information. Do not make it too lengthy.**

### Part A: General Information

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2.					
3.					

### Fill By the Project Coordinator

Name of Guide Approved for the Project:

Name of Coordinator:

Signature of Coordinator:

## Part B: Project Synopsis

### 1. Title of the Project :

**HOVER** games – A gesture controlled game playing website

### 2. Abstract :

The communication between the user and the computer can be done through various input devices such as the keyboard, mouse etc. However, a more natural and intuitive form of communication i.e. via hand gestures can also be used. The gesture performed by the user is recognized and the action specific to it is performed, thus eliminating the use of any of the hardware input devices completely. This method makes use of image processing to recognize the gestures and has built in functions for every gesture provided. It is coded in Python and uses the computer vision. Experiments show that the implementation is reliable enough for practical use.

**Keywords:** Deep Learning, Neural Networks, Image Processing, Pose Detection, Gesture Recognition, NumPY

### 3. Introduction :

Hover games is a platform where user can play indie games with the gesture moments of their palms. Gesture is a form of nonverbal communication which involves movement of a part of the body, especially the hand usually to express an idea. In a human interaction, we make use of speech, gestures and body movements to convey information. The human-computer interaction which makes use of input devices such as keyboard or mouse for communication lacks natural communication between humans and machines. For this purpose, it is important to develop applications or devices that support intuitive communication. With simple palm moments like swipe, finger-tap, peace sign user will be able to interact with the platform.

### 4. Review of Existing Literature :

#### Source:

Athiya Mariam, Deepthi Rao, Divina Riya Crasta, Kavya Acharya, Rio D'Souza, Hand Gesture Recognition using Webcam, *American Journal of Intelligent Systems*, Vol. 7 No. 3, 2017, pp. 90-94. doi: 10.5923/j.ajis.20170703.11.

As computer technology continues to grow, the need for natural communication between humans and machines also increases. Although our mobile devices make use of the touch screen technology, it is not cheap enough to be implemented in desktop systems.

Although the mouse is very useful for device control, it could be inconvenient to use for physically handicapped people and people who are not accustomed to use the mouse for interaction. The method proposed in this paper makes use of a webcam through which gestures provided by the user are captured, processed and the function related to that gesture is carried out. For example, a gesture “V” i.e. two fingers, could be predefined in the system to perform a click operation.

The cursor movement by hand gestures is done using OpenCV library, uses Python programming language, which provides an ease to understand code through its simplicity. Python modules and packages used here are PyAutoGUI and NumPy.

The captured video is broken down into continuous image frames using functions defined in OpenCV. The image frames are processed in order to detect any valid gestures being performed by the user.

### **Primitive Algorithm of the paper:**

The following algorithm shows the basic steps performed by the system when gestures are detected.

START: Start the webcam

STEP 1: Detect the user's hand

STEP 2: Capture the image

STEP 3: Identify the specific hand gesture

STEP 4: If the gesture for cursor movement is detected, go to STEP 10

STEP 5: If the gesture for single click is detected, go to STEP 11

STEP 6: If the gesture for double click is detected, go to STEP 12

STEP 7: If the gesture for drag is detected, go to STEP 13

STEP 8: If the gesture for left wave is detected, go to STEP 14

STEP 9: If the gesture for right wave is detected, go to STEP 15

STEP 10: Detect the coordinates of the mouse and perform cursor movement

STEP 11: Using coordinates from the mouse perform the selection, go to STEP 3

STEP 12: Perform selection or opening actions, go to STEP 3

STEP 13: Perform dragging action, go to STEP 3

STEP 14: Decrease the speed of the cursor

STEP 15: Increase the speed of the cursor

STEP 16: Stop

This paper describes a system that controls computer applications with the help of palm gestures. The method proposed here successfully created a hand gesture recognition system, that is able to recognise which gesture is performed by the user and accurately perform the functionality associated with it. Presently, the webcam, microphone and mouse are an integral part of the computer system. Our product which uses only webcam would completely eliminate the mouse. Also this would lead to a new era of Human Computer Interaction (HCI) where no physical contact with the device is required.

The current system gives best results in a plain background and hence puts certain constraints on the user for successful working. The future work will include implementation of additional gestures which will enable the user to perform more functions with ease. Background subtraction algorithm can be used for a more effective performance. The proposed system uses only the right hand to perform gestures. Hence, enhancement of the technique proposed, is possible using both hands for performing different computer operations. Experiments need to be done on a larger scale so that results can be more accurate.

## 5. Objective :

The main objective is to enhance the way games have been played so far and give user a pseudo virtual realistic feel.

## 6. Methodology :

With the advancement in the fields like Artificial Intelligence, Machine Learning understanding an image has become quite intuitive. Images can be easily processed in the forms of matrix and information can be extracted from them. Frames are nothing but images, which have been captured through the webcam and extracted from the video we get, which are then used to deduce position of our palms and their direction of motion. This helps us determine which type of gesture is registered and we can invoke a connected event to it.

## 7. Expected Outcomes :

Upon the deployment of the web application:

- a. Users / Gamers will get satisfaction of playing games using a more intuitive and interactive manner as opposed to pressing keys on a hardware device.
- b. Enthusiasm about advancement in technologies.

## 8. Targeted Audience :

Gamers who are bored of the traditional joystick and keyboard-mouse gaming

## 9. References:

- a. Athiya Mariam, Deepthi Rao, Divina Riya Crasta, Kavya Acharya, Rio D'Souza, Hand Gesture Recognition using Webcam, *American Journal of Intelligent Systems*, Vol. 7 No. 3, 2017, pp. 90-94. doi: 10.5923/j.ajis.20170703.11.
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- g. Aniket Tatipamula's Blog - <http://anikettatipamula.blogspot.in/2012/02/hand-gesture-using-opencv.html>
- h. Microsoft Research Paper- <http://research.microsoft.com/en-us/um/people/awf/bmvc02/project.pdf>



## Part C: Details of Technologies (Use Number Format)

### 1. Programming Languages

- HTML5
- CSS3
- JavaScript (ES8)
- Python 3.7.2

### 2. Front-End Libraries

- React.JS (16.8)

### 3. Back-End Framework

- Flask (1.0.2)

### 4. Database Management System

- MongoDB (4.0)