



## MINI PROJECT

# Playing snake game using Hand Gestures

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## 1. ABSTRACT

The main objective of this project is to demonstrate the an emerging field of Human Computer Interaction i.e. Gesture Recognition. Gesture recognition has found its way into many applications ranging all across from basic gaming to Advanced gaming. Normally players used to play using keyboard or keypad for movement of the snake ,later by using touchscreens.But with gestures I never seen so I have explored the capabilities of gesture recognition by demonstrating the classic Snake game as a gesture controlled snake game . We use Computer vision techniques and the OpenCV library to achieve our results, which are similar rather then the original mode that makes no use of the arrow keys..Keywords—Gesturerecognition,computer vision,OpenCV,pygame,pyautogui..

## 2. INTRODUCTION

The main purpose of this idea i.e, In vision-based interfaces for video games, gestures are used as commands for the games instead of pressing buttons on a keyboard or moving a mouse. In these interfaces, unintentional movements and continuous gestures must be supported to provide the user with a more natural interface. The paper I decided to work on is the classic snake game. This is a game in which, the user uses a red coloured object and moves it around in front of a webcam so that a trail follows the object on its image and represents the direction of a snake. This project has been coded in Python . The libraries used are NumPy ,imutils,pygame,pyautogui and OpenCV . This project is considered to be under the

field of gesture recognition which is a field which is gaining widespread popularity as it makes it very easy for the user get some particular tasks done. Gesture recognition has slowly but surely created a stronghold in the gaming industry and now moving beyond it in every aspect. Together with computer vision it is enabling for a much better user experience and dynamic and user-friendly interfaces. In our paper, we used techniques like colour detection contour detection drawing, pyautogui.

## BACKGROUND

The background of the implementation lies in the idea to develop an interesting gaming application for the children in which they can get immersed and have a fabulous experience. The aim was to deliver the following features to the user :Error free calculation of score, Prompts to follow next instructions, Accurate object recognition to prevent false results., Easy to exit application. The game should be addictive and provide a strong will to succeed and stay in the game. Every object class has its own special features that help in classifying the object. object recognition is that sub-domain of computer vision which helps in identifying objects in an image or video sequence. With more efficient algorithms, objects can even be recognized even when they are partially obstructed from the direct view. Various approaches to this task have been implemented in the past years.

## 3. LITERATURE SURVEY

**Title:** A Survey on Recent Vision-Based Gesture Recognition

1. **Author** Haitham Badi

College of Business Informatics, University of Information Technology and Communications, Baghdad, Iraq

**Description:**

1. A novel approach to gesture representation and classification is proposed.
2. A feature selection algorithm which captures a variable-size set of local image regions ensuring maximum dissimilarity between each individual sign and all other signs.

**Title:** A Survey on Human-Computer Interaction Technologies and Techniques

**Author:** Mohammed Fadhel

**Description:** A quantitative comparison of several segmentation methods are presented.

## RELATED WORK

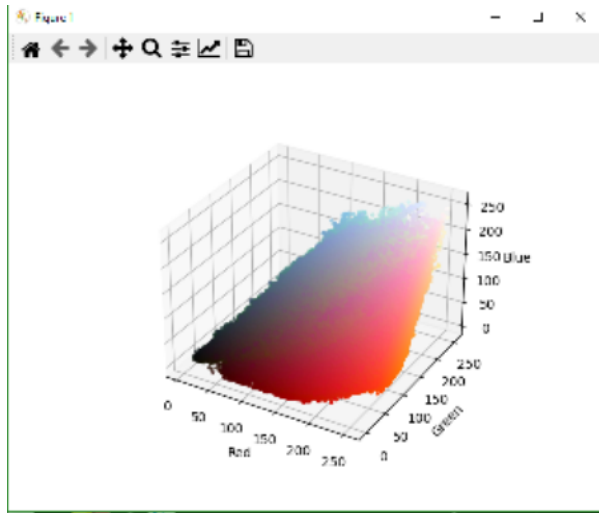
In this section, a study on various existing hand gestures algorithms are introduced.

## 4. PROPOSED METHODOLOGY

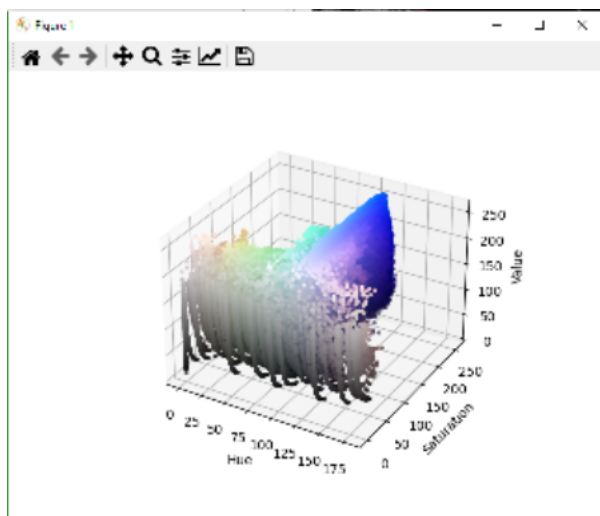
**We are using an algorithm named as "ObjectTracking"**

- Object tracking algorithm is by representing the object using outline contour information and tracking, thus retrieving both its position and its shape. Such a modeling method is more complicated than modeling entire regions, for example using color. . **How it works?**

- **Step 1:** Detect the presence of a colored object using computer vision techniques.
- For color isolation we have to implement the best color model.
- For checking the best model first we have to apply both RGB and HSV model on an image.
- Visualize in RGB model:



- From this plot, we can notice that the orange parts of the image span across almost the entire range of red, green, and blue values.
- Visualize in HSV model:



- In HSV space, picture's orange color are much more localized and visually separable. The saturation and value of the oranges do vary, but they are mostly located within a small range along the hue axis. **This is the key point that can be leveraged for segmentation.**
- We want to convert the image to HSV model in color extraction algorithm because working with HSV values is much easier to isolate colors. In the HSV representation of color, hue determines the color you want, saturation determines how intense the color is and value determines the lightness of the image.

- To isolate the colors, we have to apply multiple masks. A low threshold and high threshold mask for hue, saturation and value. Anything pixel within these thresholds will be set to 1 and the remaining pixels will be zero.
- This method of color isolation may not work so well if the image is noisy. This is quite common because a camera uses an ADC which can create noise in an image. One potential solution would be to apply a Gaussian blur before running this algorithm.
- **Step 2:** Track the object as it moves around in the video frames, drawing its previous positions as it moves.
- When successfully detected object .We'll be using ,deque, for storing the (x,y) coordinates and initialize center(x,y) to none .By using Centroid Algorithmwith super fast appends and pops to maintain a list of the past  $N(x, y)$  locations of the ball in our video stream. Maintaining such a queue allows us to draw the "contrail" of the ball as its being tracked.

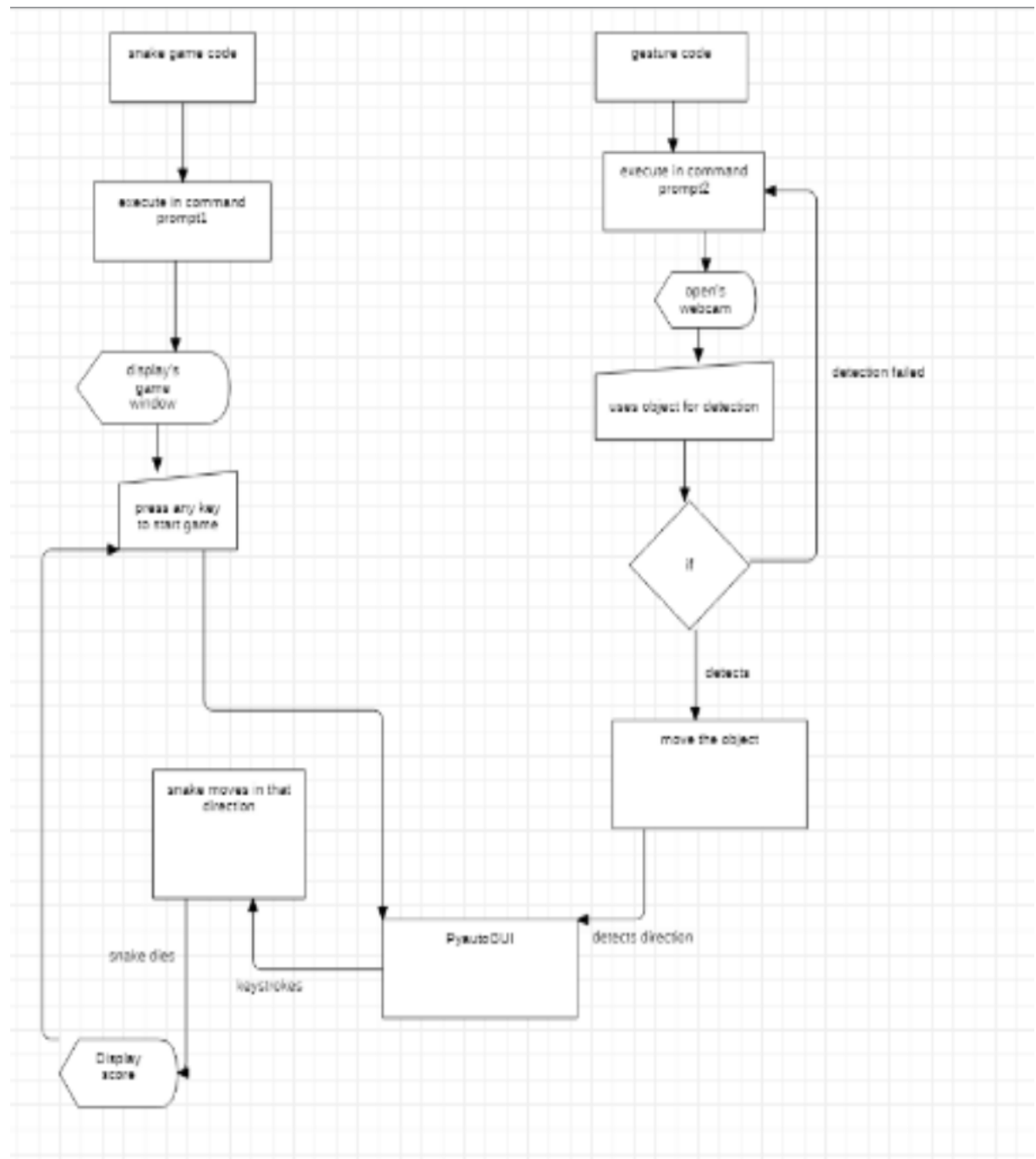
Step1:open gesture window  
 Step2: detects green color.  
 Step3: starts game window  
 Step4: detects direction .  
 Step5: moves in the tracked direction

### Pygame:

Pygame is a cross-platform set of Python modules designed for writing video games. It includes computer graphics and sound libraries designed to be used with the Python programming language.

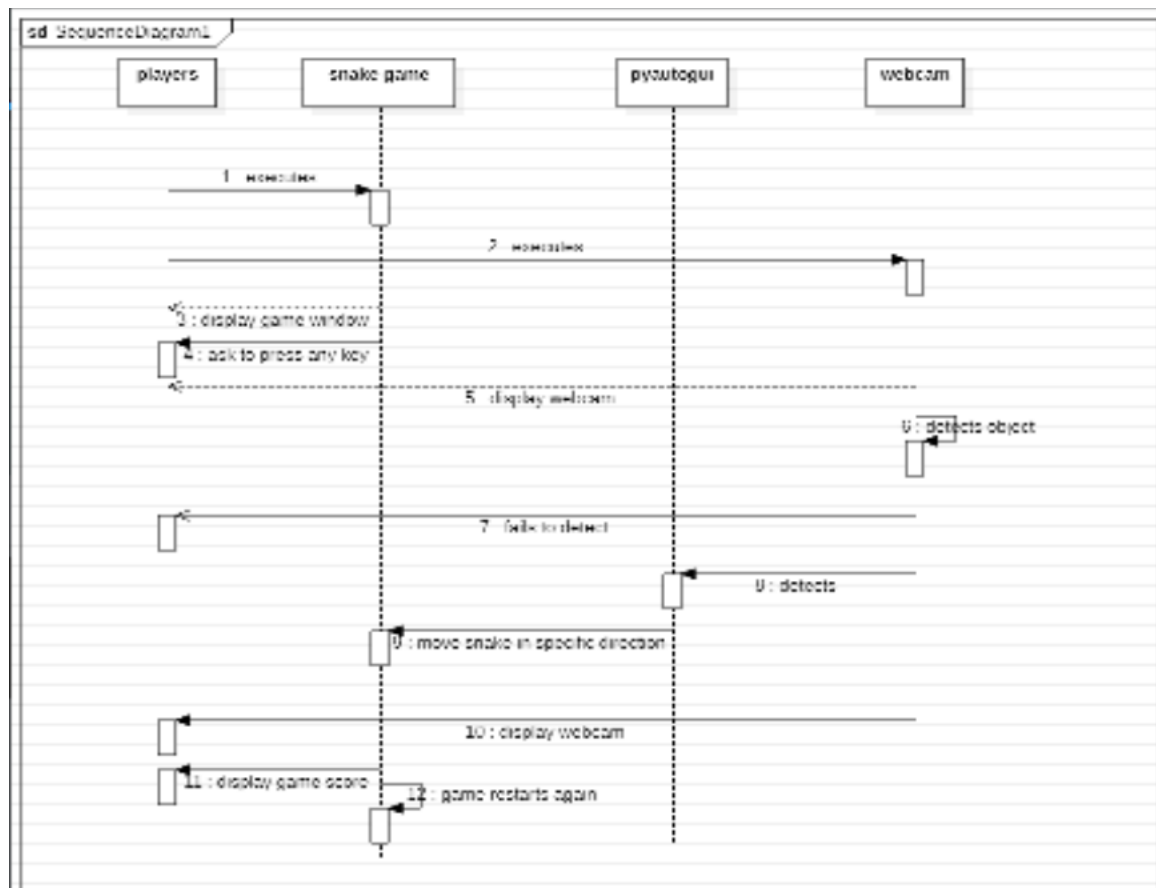
## 5.RESULTS

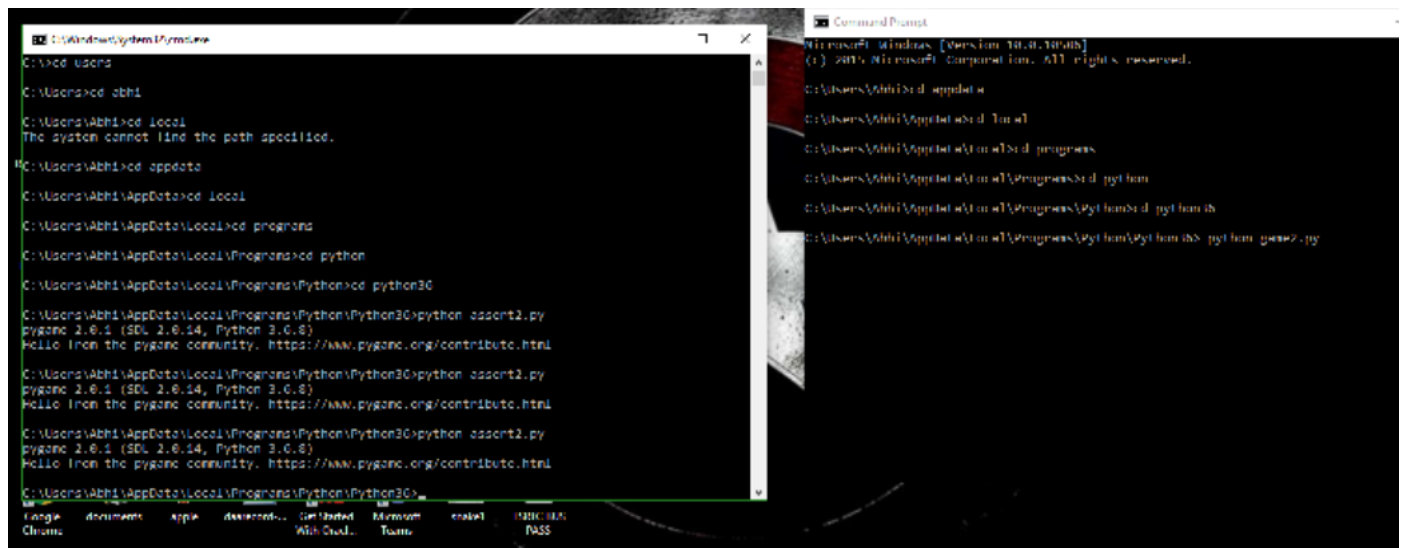
In the existing system we manually use keyboard to play the snake game. It makes a routine feeling and shows less interest while playing .Applying advanced technology to the existed one makes some special interest while playing the game.



## PROPOSED SYSTEM

- Our proposed system hand gestures with OpenCV will give the real time environment of the game in an synchronized way the user can play the game using hand gestures.
- Players get the interest and excitement to play the game in a new way rather than sensing and using phone pad directions .

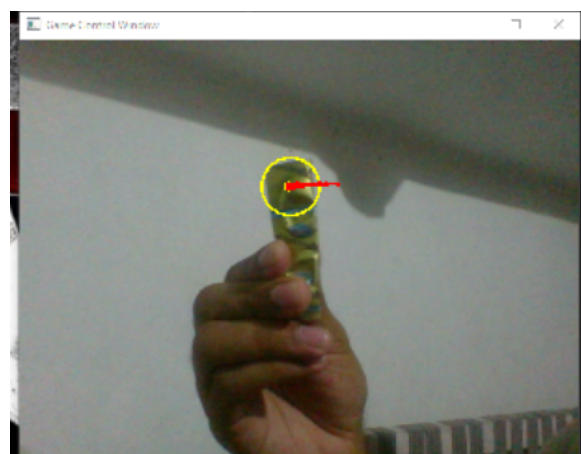




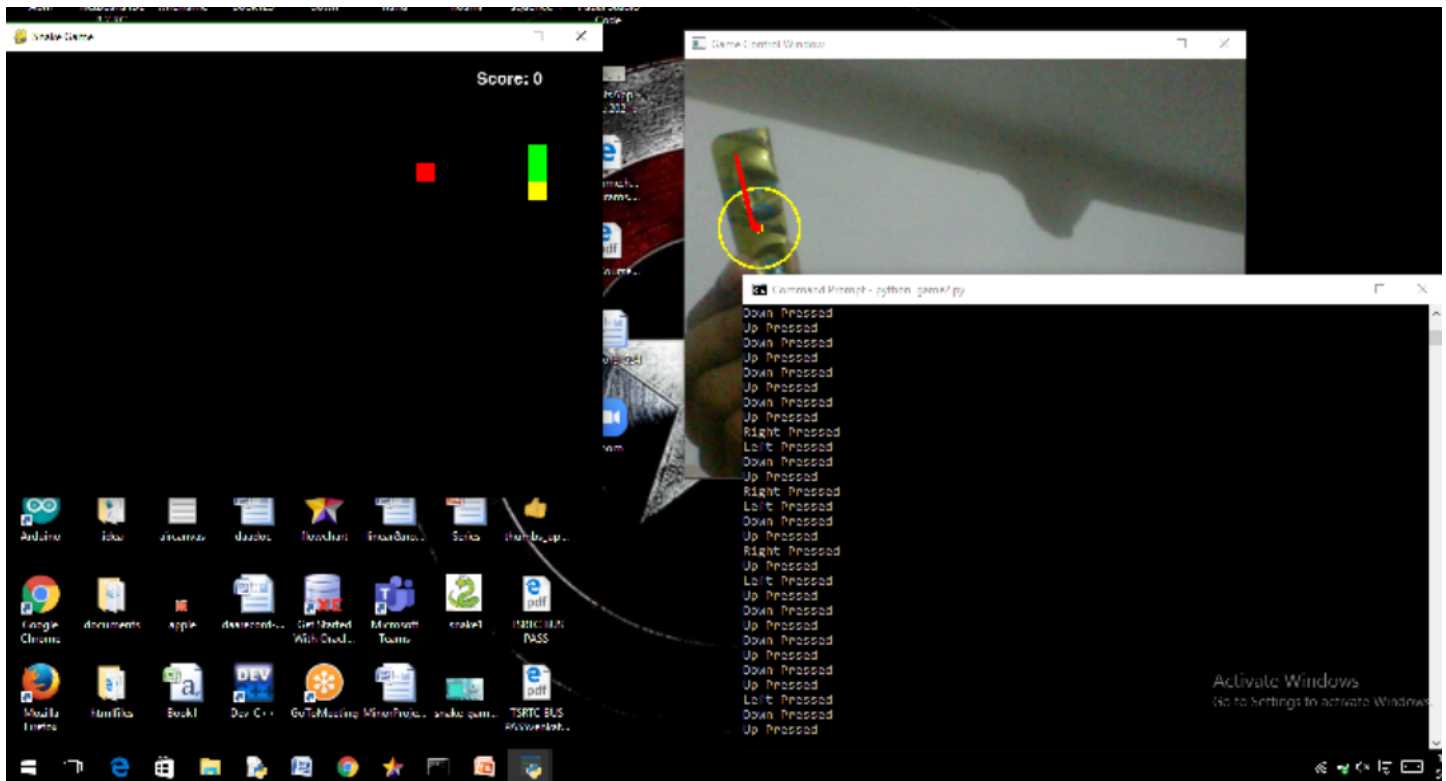
5.1Figure



5.2figure



5.3figure



5.4figure

## 6.CONCLUSION

Our project runs on python .Many modules/libraries are installed for executing this project.Considering the relative infancy of research related to hand gesture recognition according to that movement of snake , remarkable progress has been made. To continue this momentum, it is clear that further research in the areas of feature extraction, classification methods and gesture representation are required, to realize the ultimate goal of humans interfacing with machines on their own natural terms. In this paper the recent development on the research of hand gesture recognition with focus on various recognition techniques here we used opencv open source library for object tracking. Overall, gesture recognition is still in its infancy. It involves the cooperation of many disciplines. In order to understand hand gestures, not only for machines, but also for humans, substantial research efforts in computer vision, machine learning and psycholinguistics will be needed.

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