

COLOR DETECTION DRIVEN DRAWING

USER GUIDE

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Introduction

We wanted to create a project that was fun and interactive where the user would have to move around in order to use the application. Thus, we turned to a computer vision application. Our application can draw on a digital canvas when a user is standing in front of a camera and holding a colored object. The application is meant to be a drawing app, but more like a VR experience where the user is engaging with the brush and the canvas.

Getting started

System requirement

Windows 7 and up

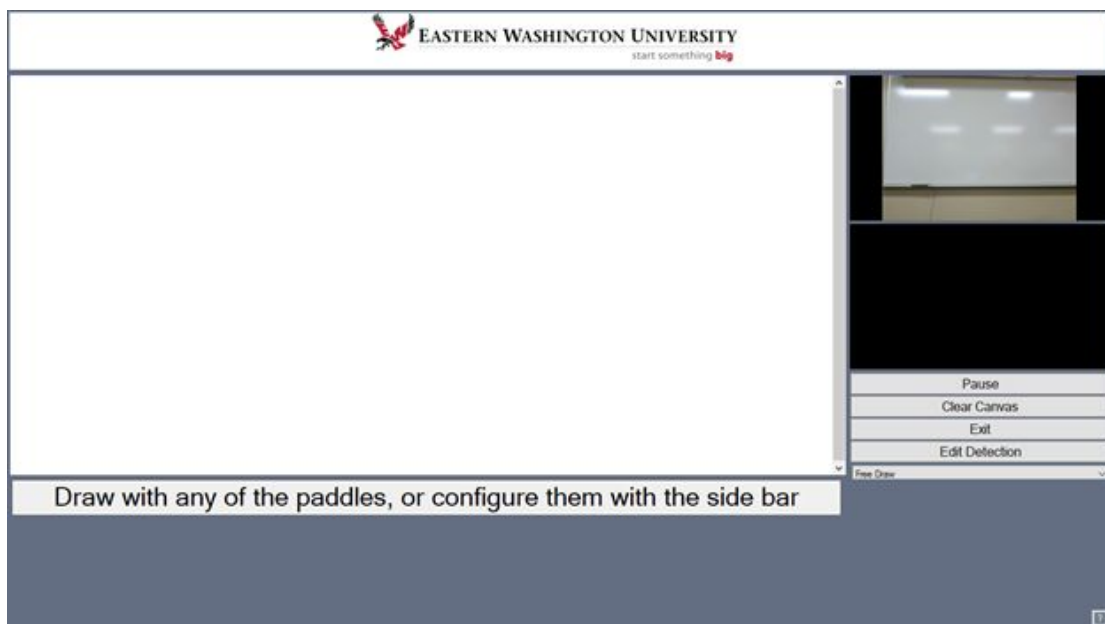
4GB RAM

Quick start

Free Draw

Single Object

Step 1: Run the application

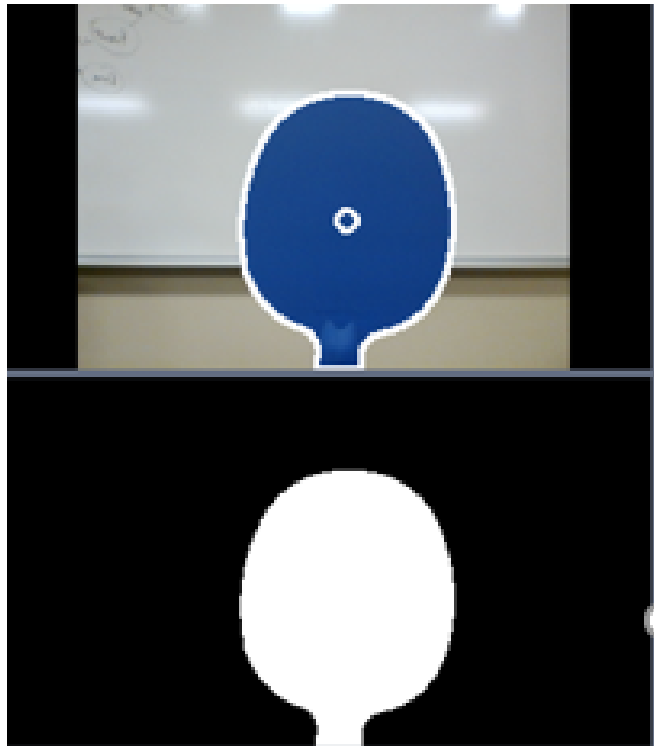


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Step 2 :Picking the colored paddle

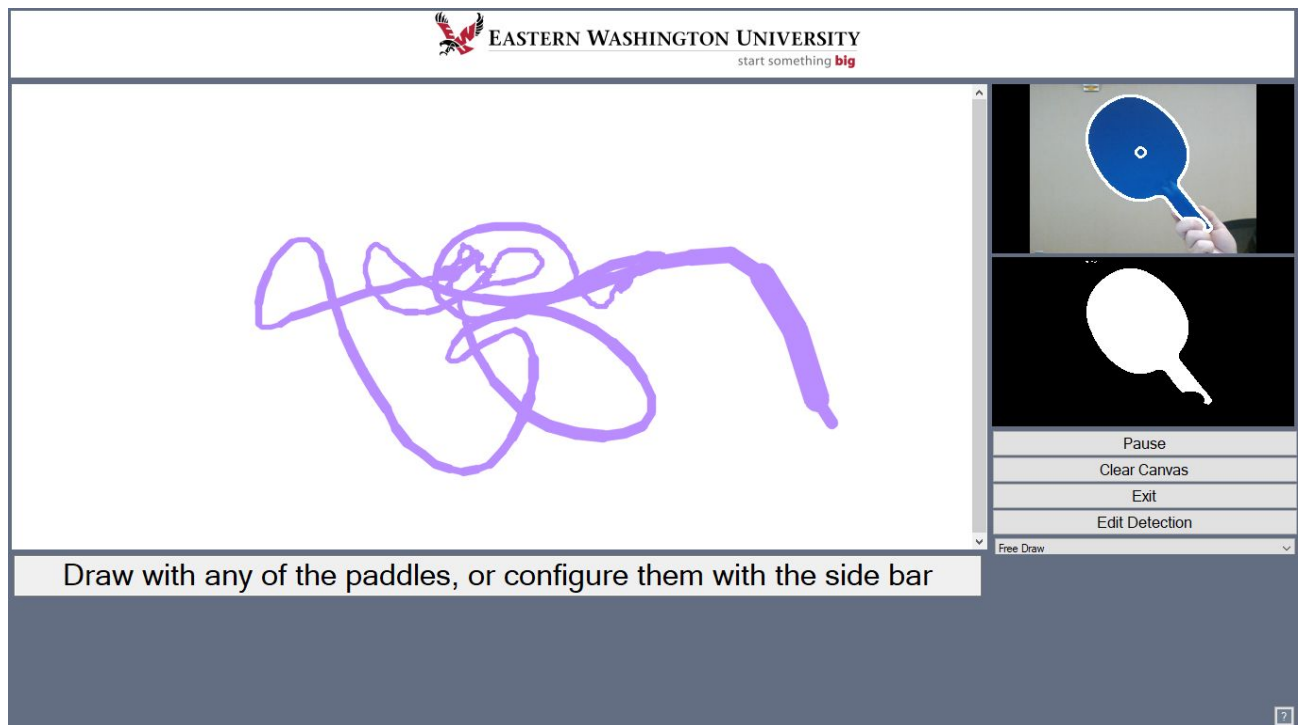


Step 3: Holding the paddle in the front of the camera



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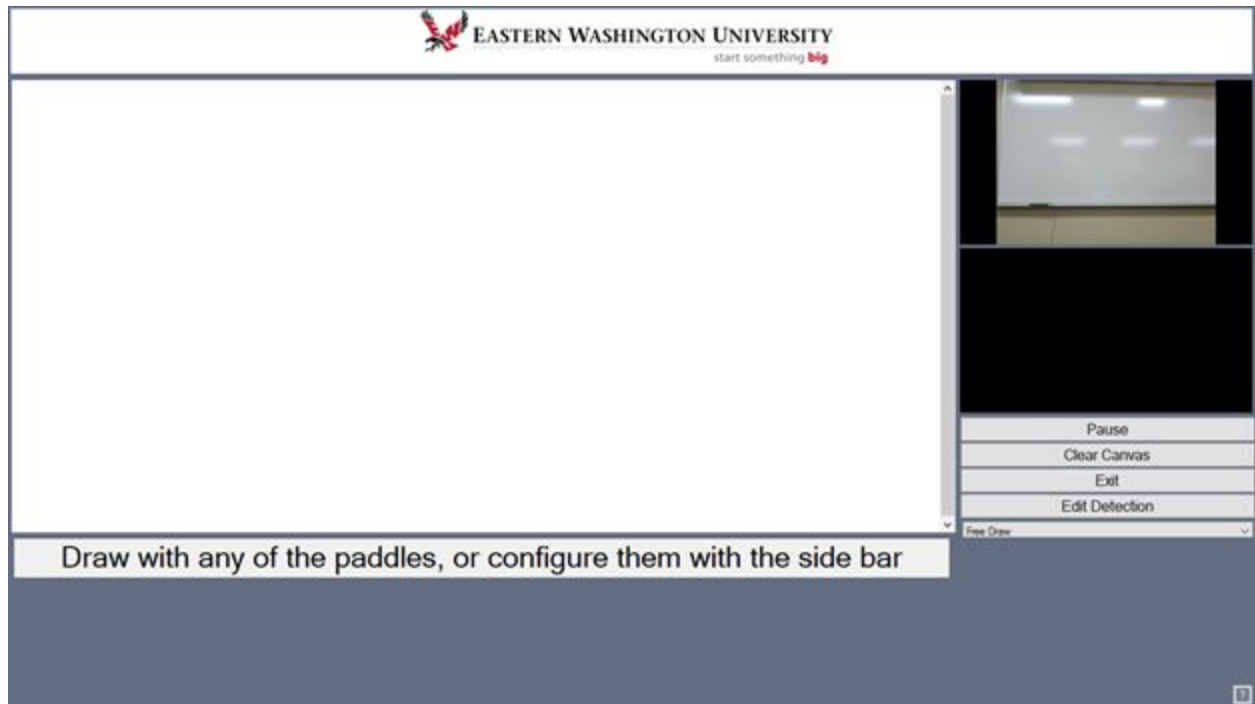
Step 4: Moving paddle around to start drawing



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Multiple Object

Step 1: Run the application

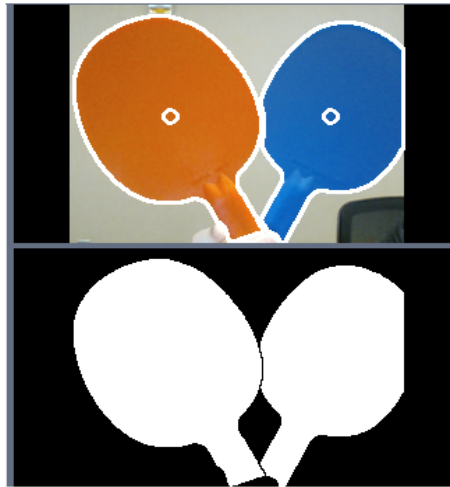


Step 2: Picking the two colored paddle you want to play.

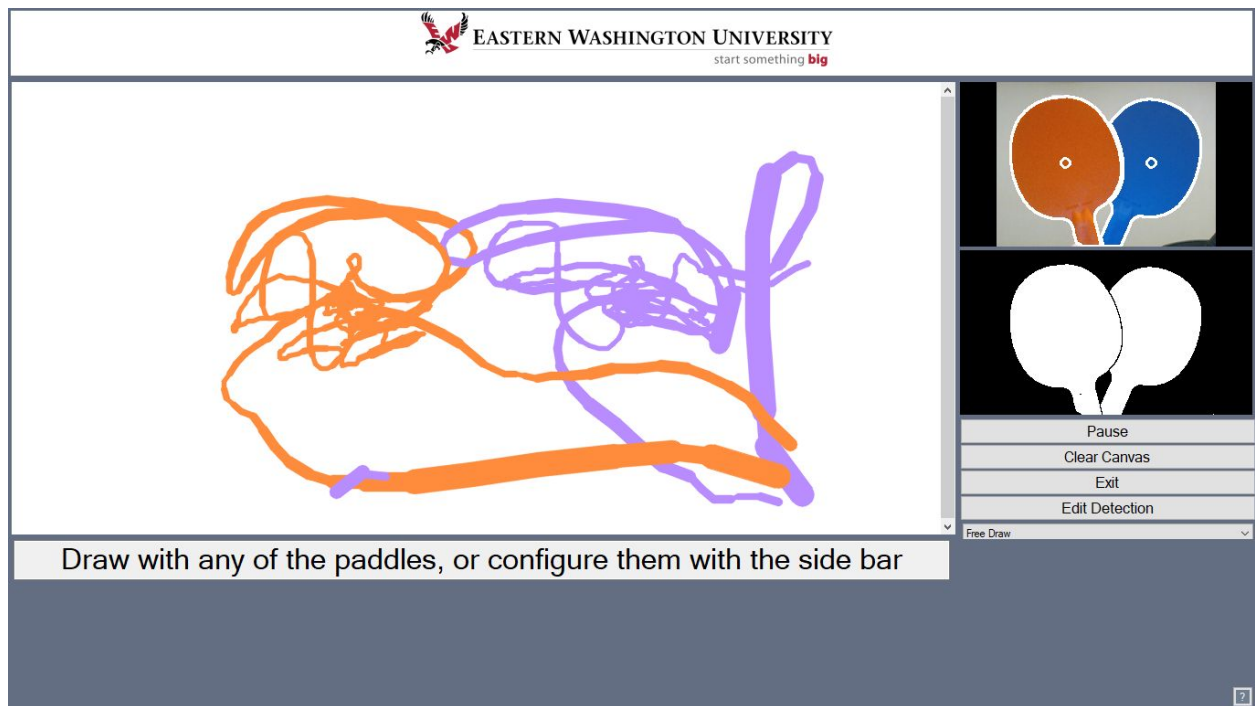


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Step 3: Holding these paddles in the front of the camera

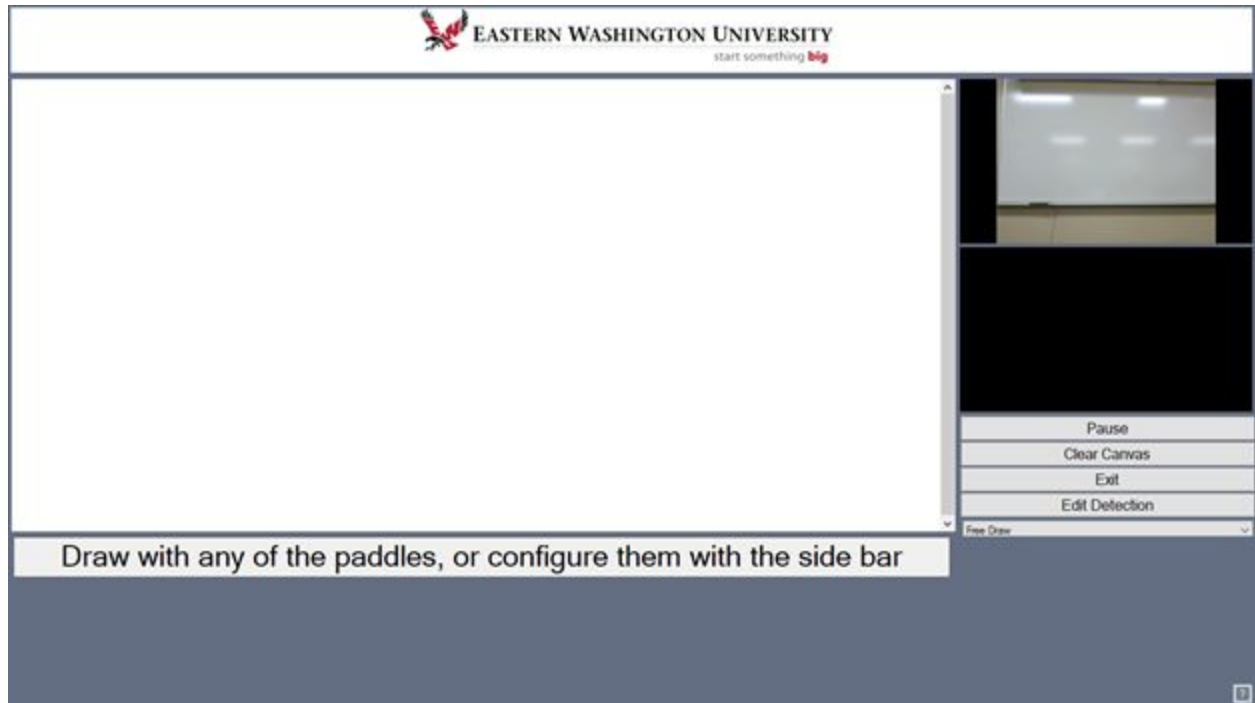


Step 4: Moving paddle around to start drawing

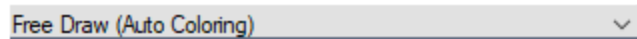


Free Draw(Auto coloring)

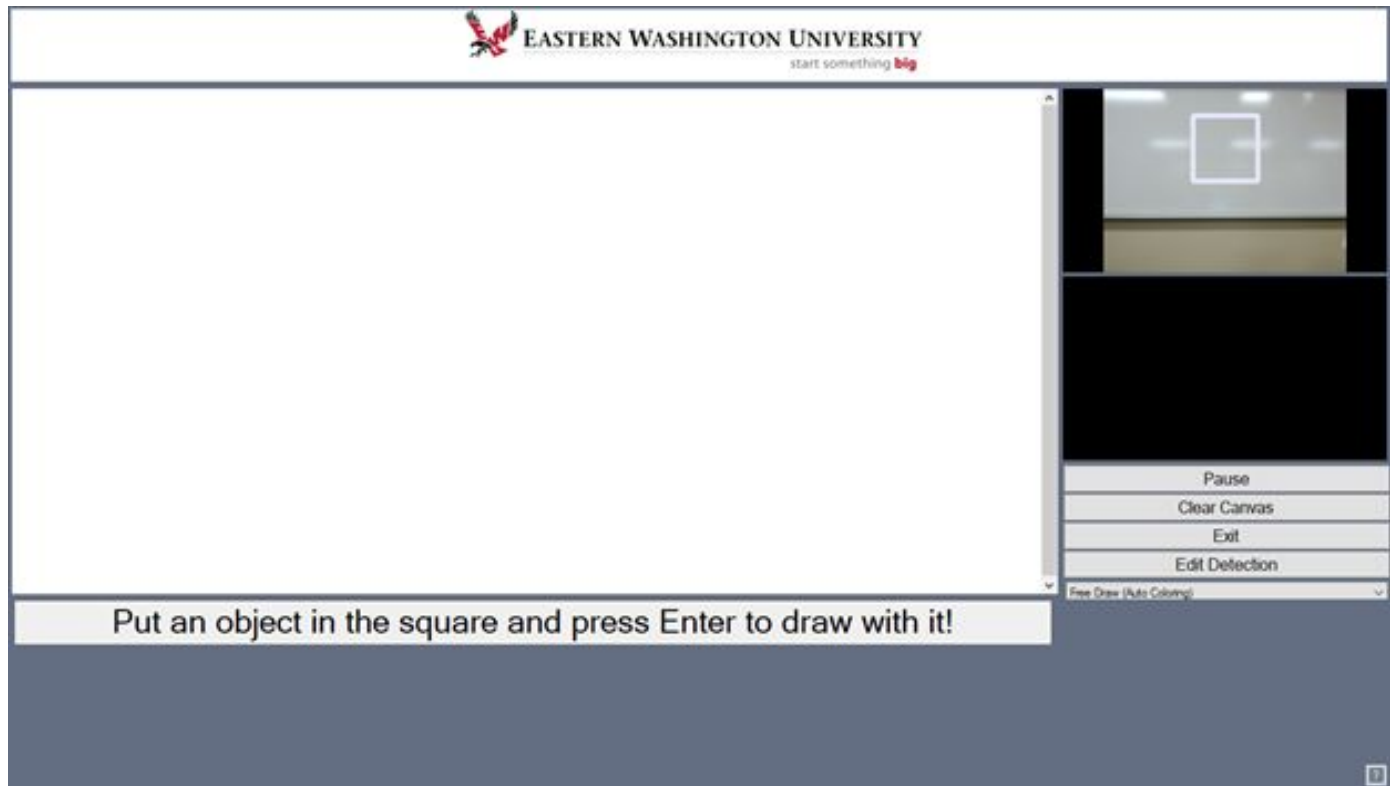
Step 1: Run the application



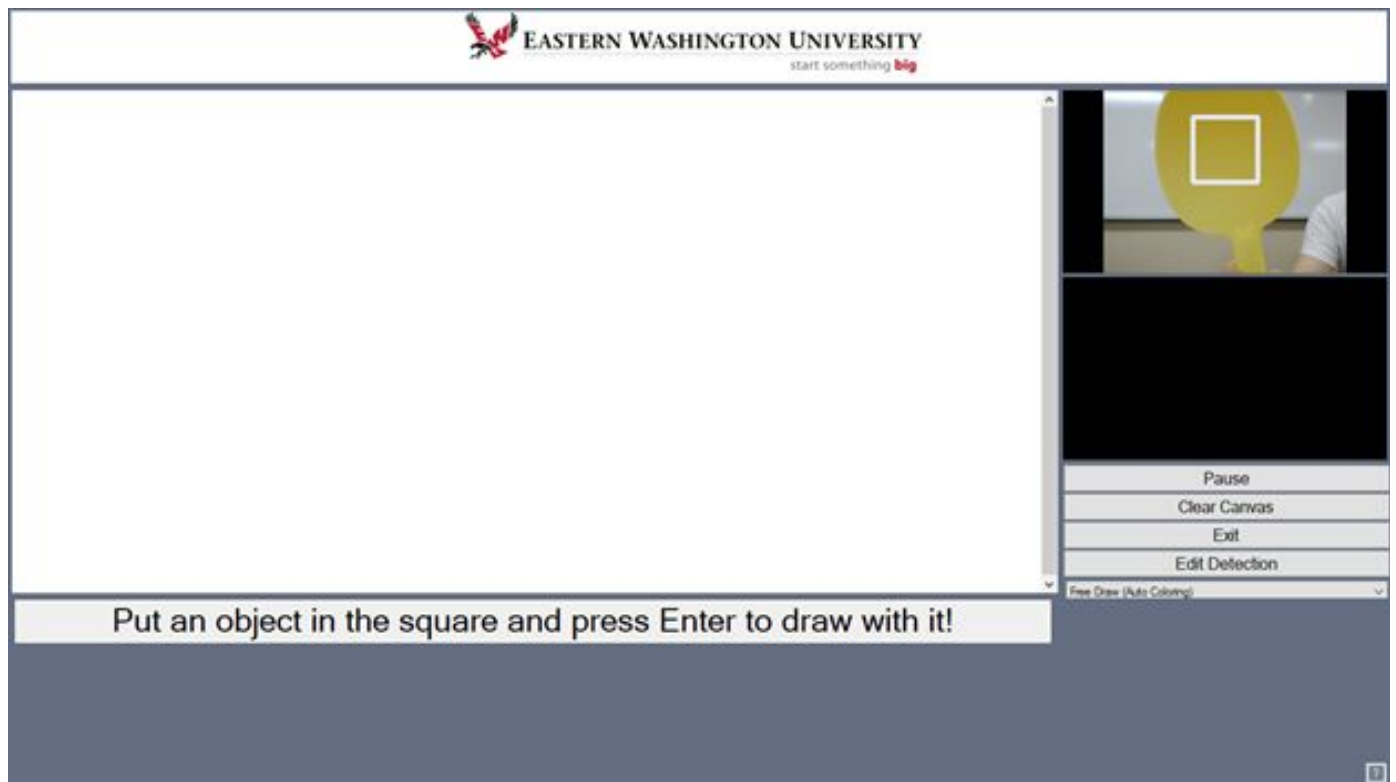
Step 2: Choose the Free Draw(Auto coloring) from the combobox



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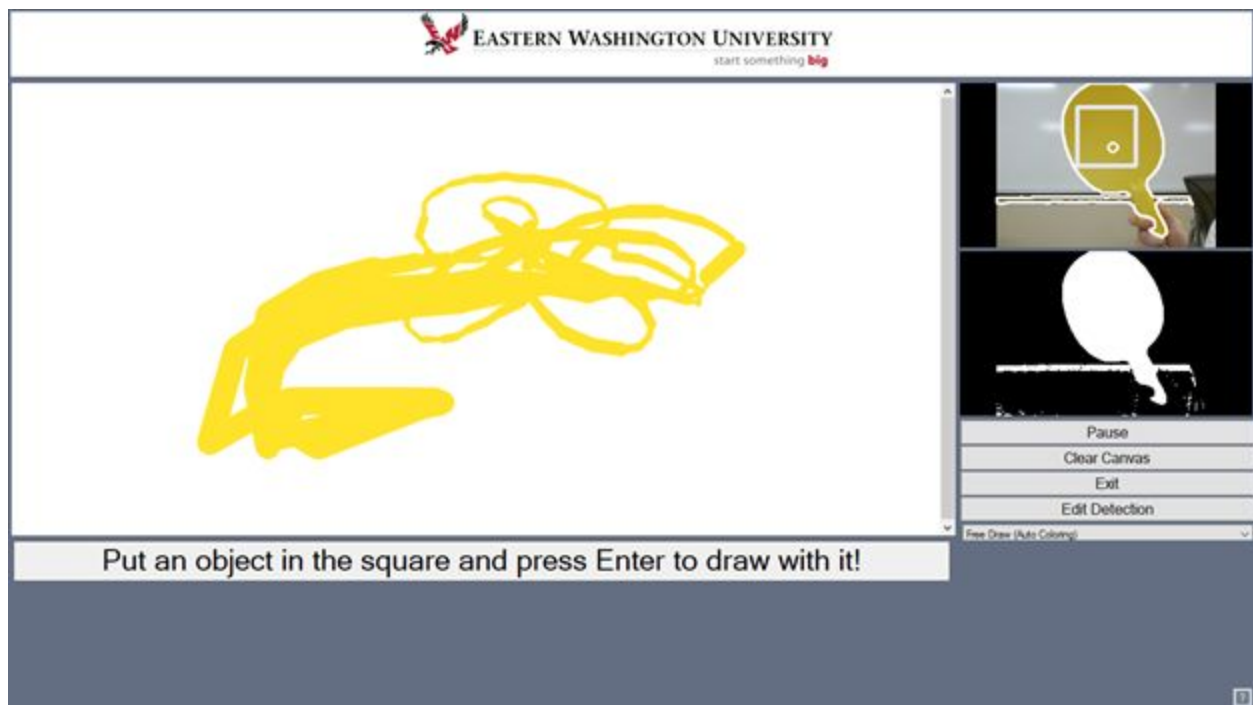


Step 3: Put the paddle in the square



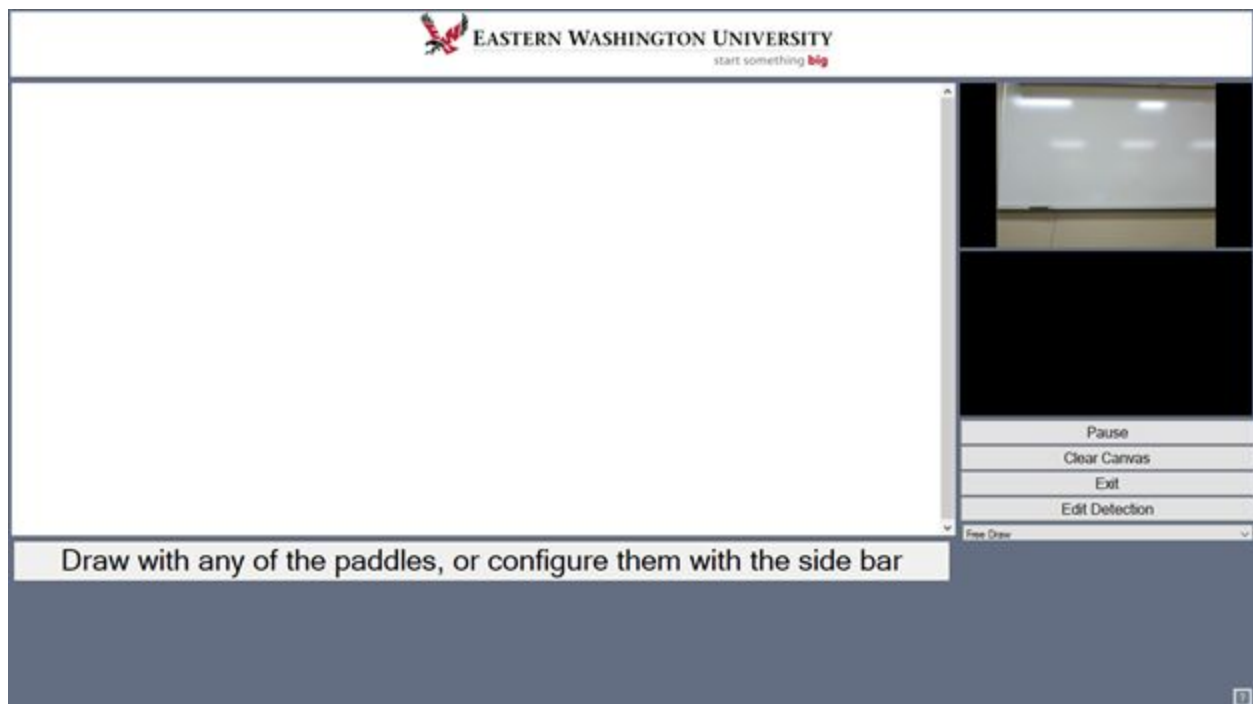
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Step 4: Press Enter to start drawing



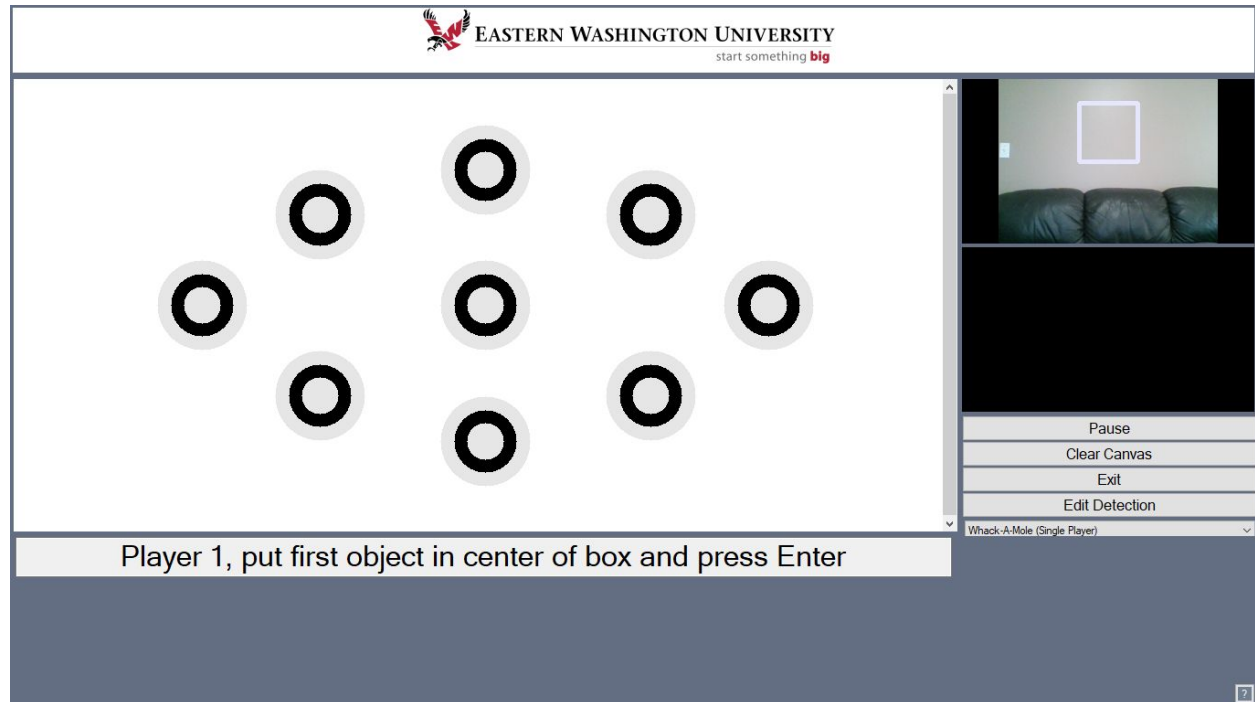
Whack A Mole (Single player)

Step 1: Run the application

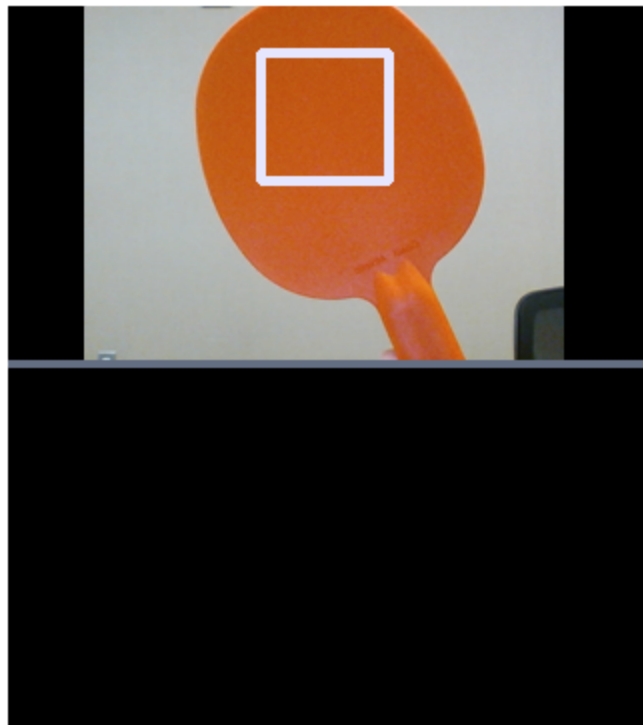


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Step 2: Choose **Whack-A-Mole (Single Player)** from the dropdownlist

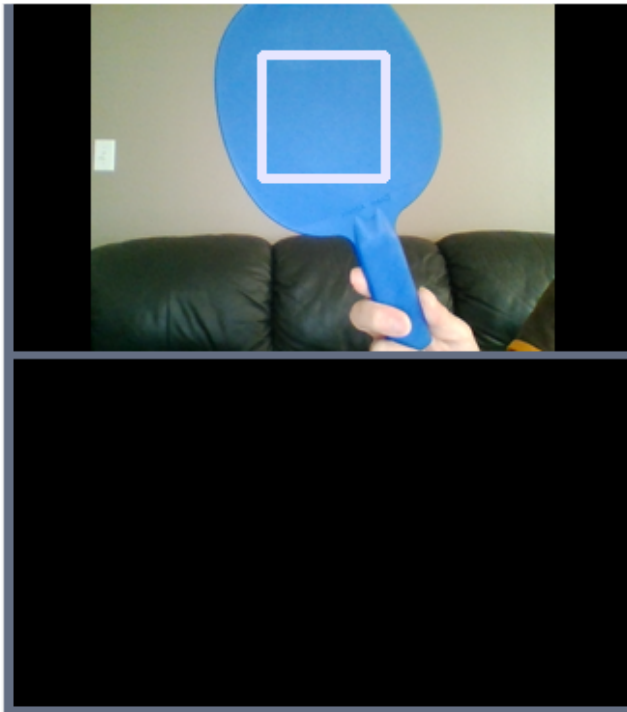


Step 3: Player 1, put the first object in the center box and press Enter key

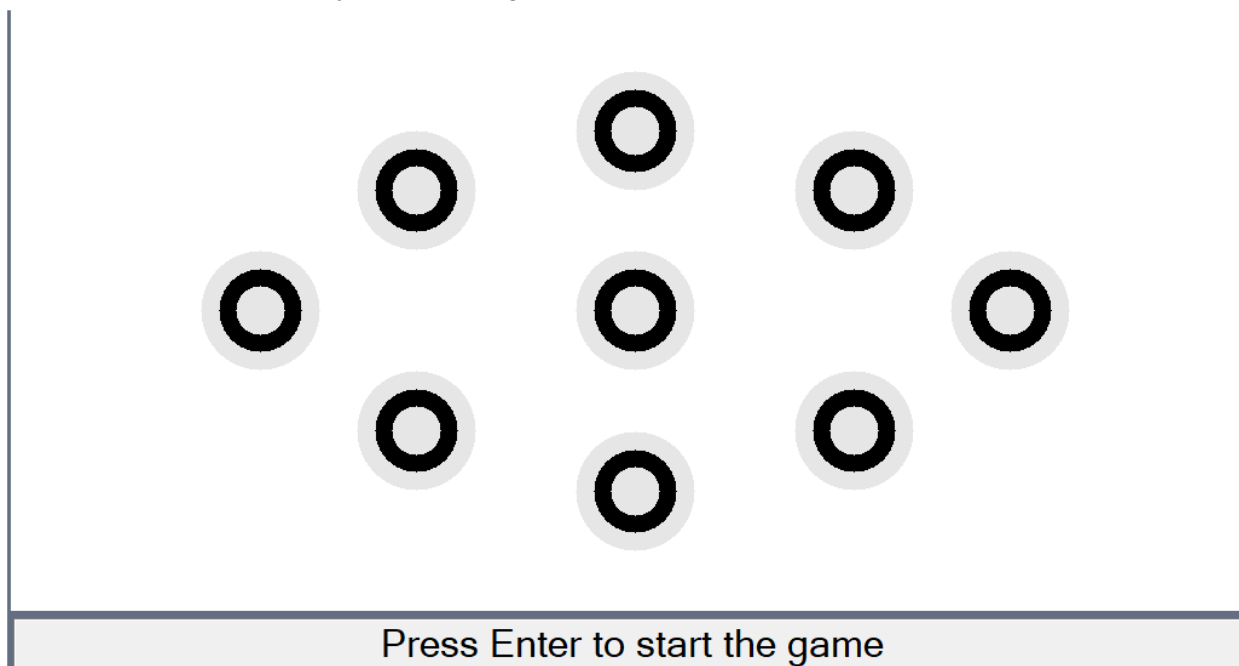


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Step 4: Put the second object in the center of square box and press the Enter key

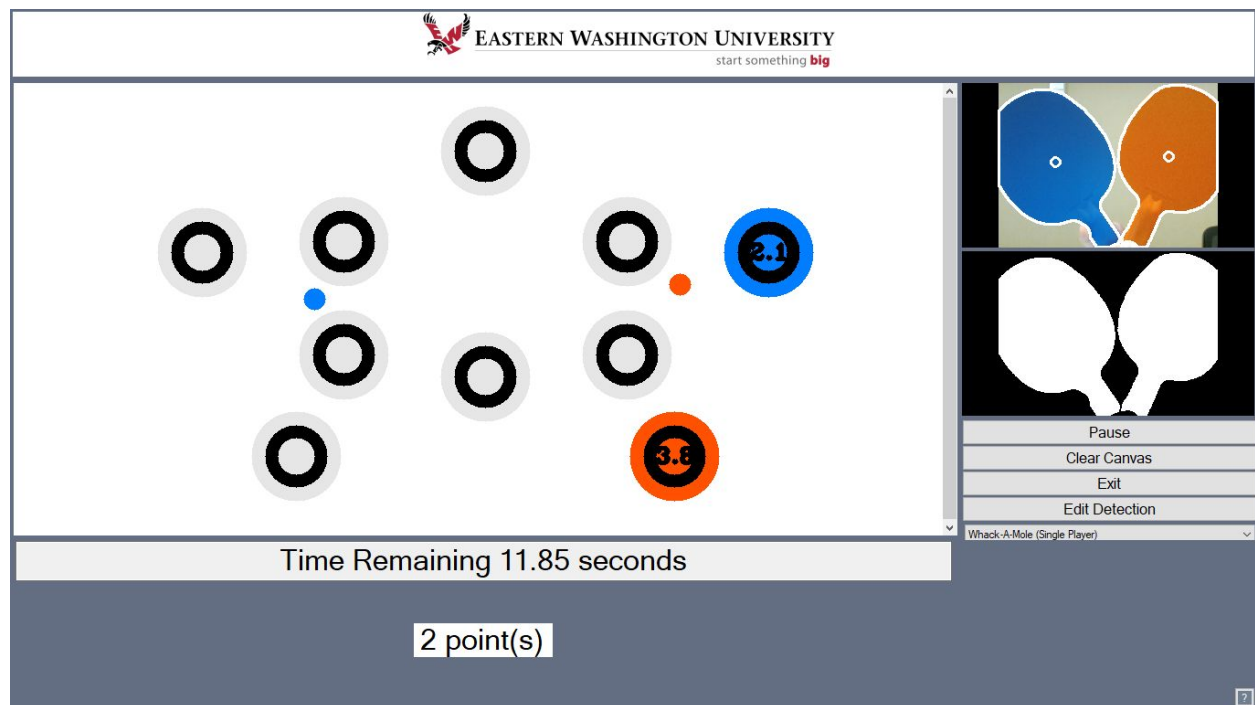


Step5: Press the Enter key to start the game



Step 6: After you press Enter key, the canvas will be displayed like bellow

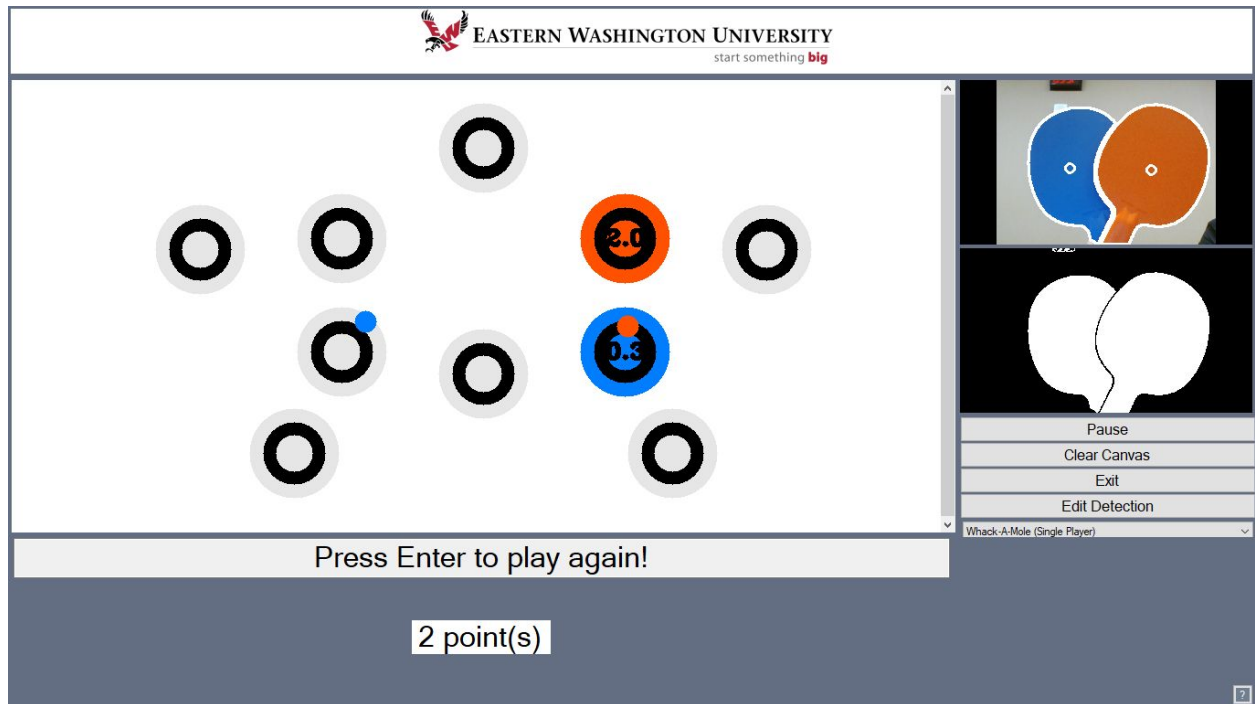
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- There are total of 10 circles. The two colors corresponding to the two colored paddles will appear randomly around the two circles. Each colored circle will shown up within 5 seconds.
- The objective of the game is to hit these colored circles to get points. The more quickly this is done, the higher the final score will be.
- The time for the game is 20 seconds.

When the time remaining is over, you will see the total of points you just hit these moles.

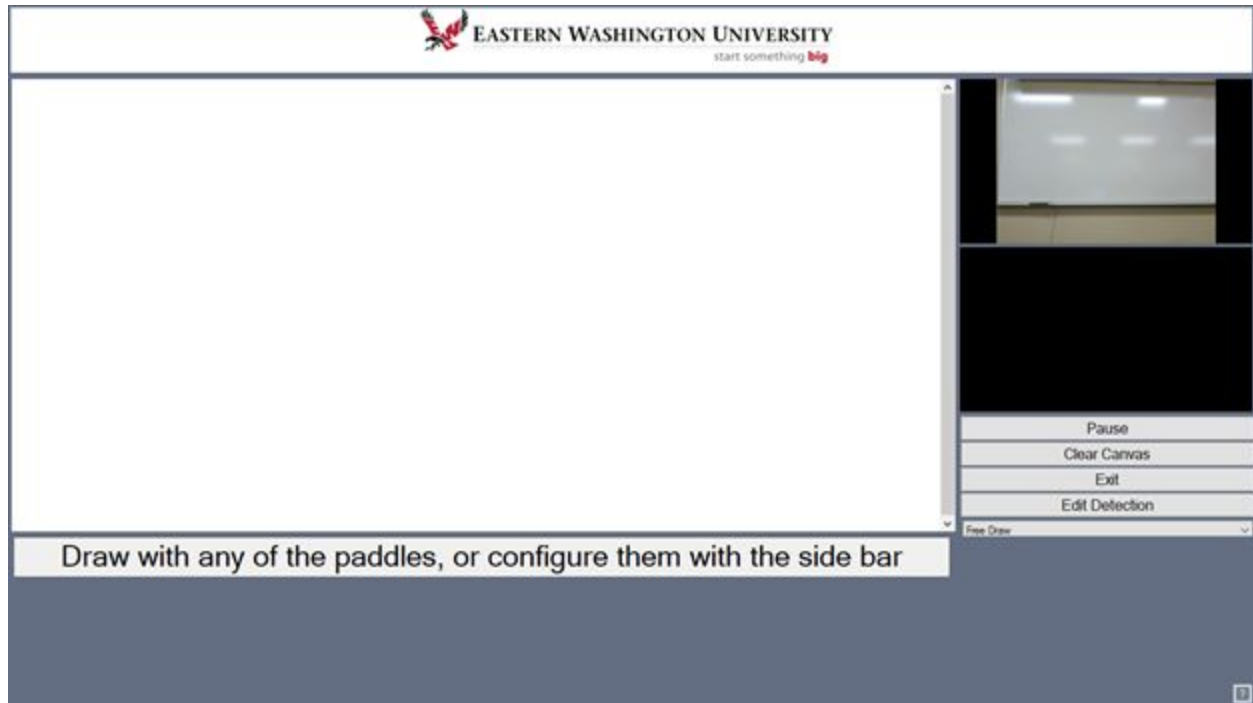
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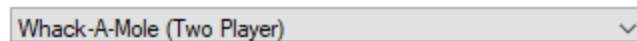
Step 8: You could press Enter to play again.

Whack a Mole(Two players)

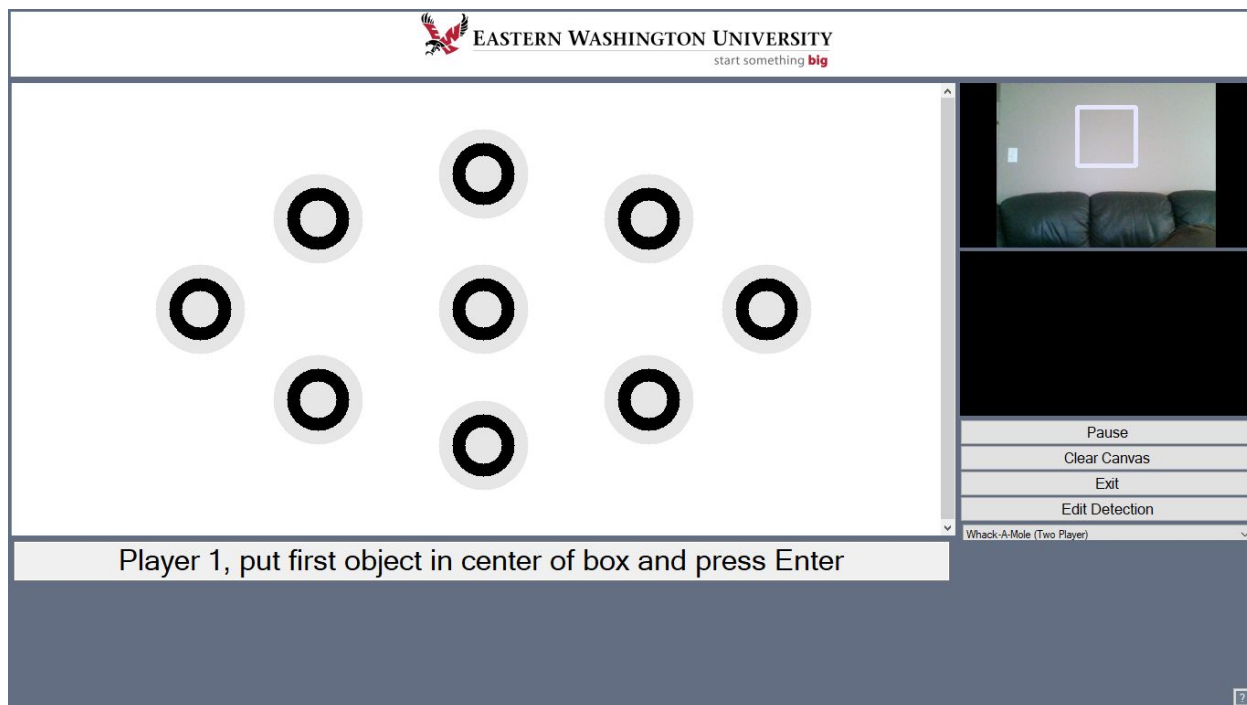
Step 1: Run the application



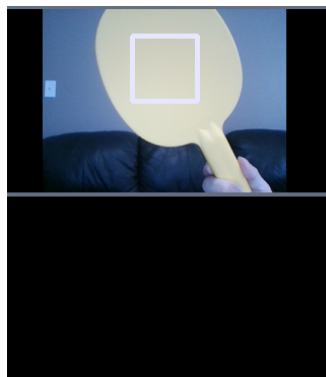
Step 2: Choose Whack a Mole(2 players) from the dropdownlist



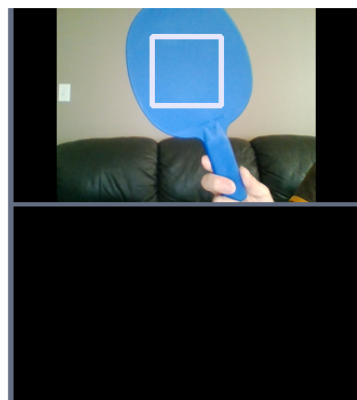
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Step 3: Player 1, put the first object in the center of box and press Enter

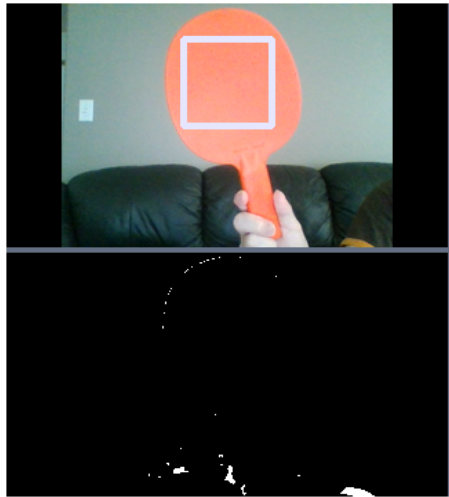


Step 4: Player 1: Put the second object in the center of box and press Enter

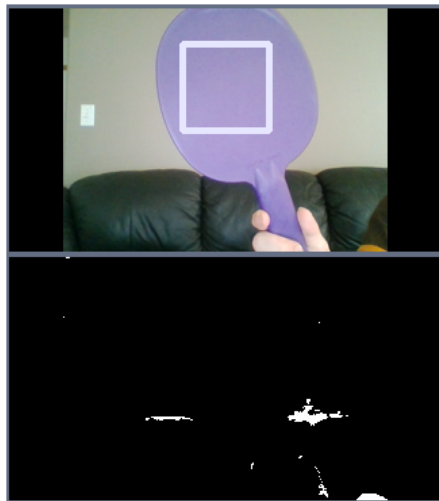


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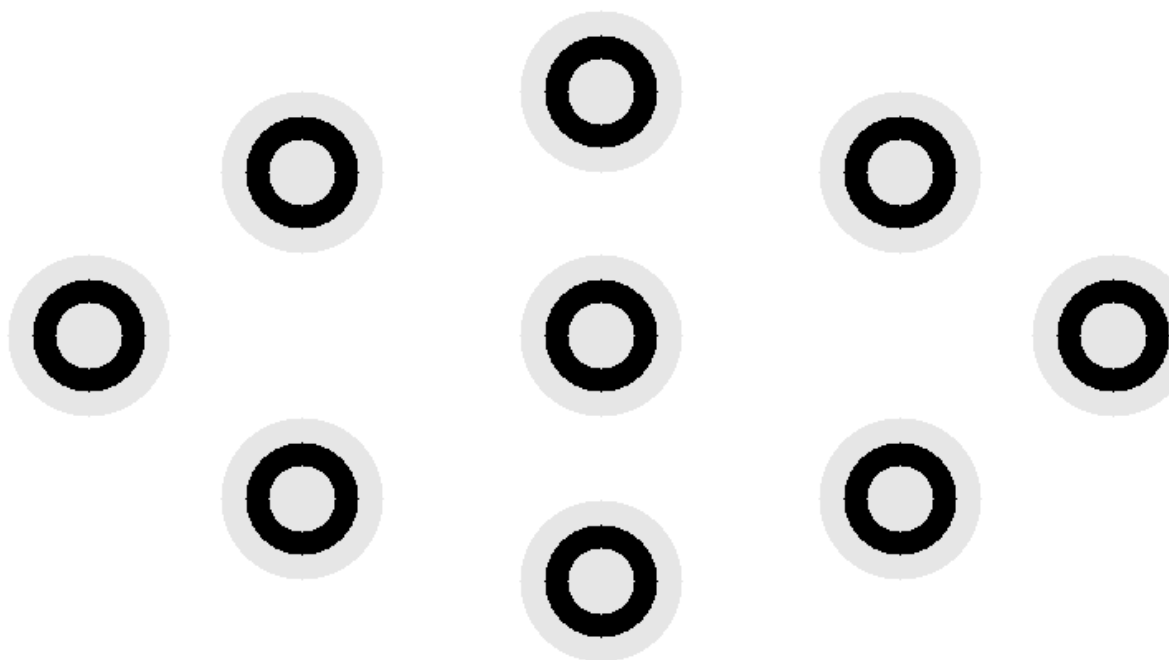
Step 5: Player 2, put the first object in the center of box and press Enter



Step 6: Player 2: Put the second object in the center of box and press Enter

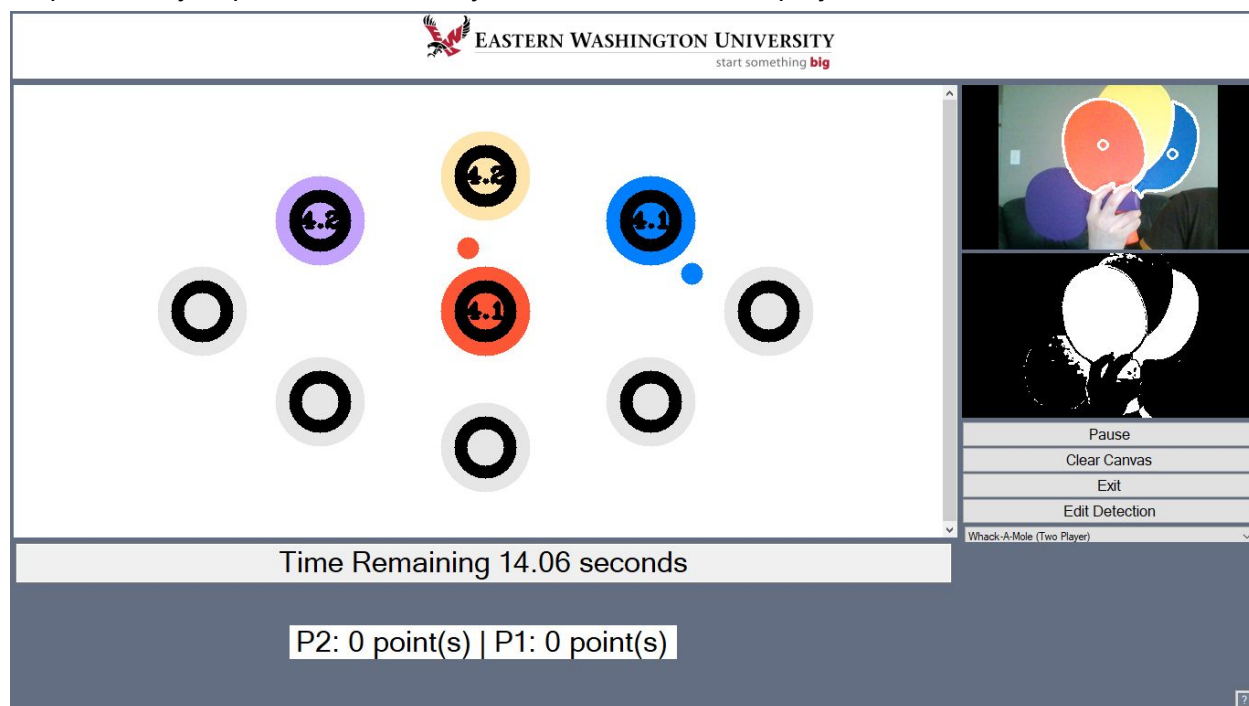


Step 7: Press Enter key to start the game



Press Enter to start the game

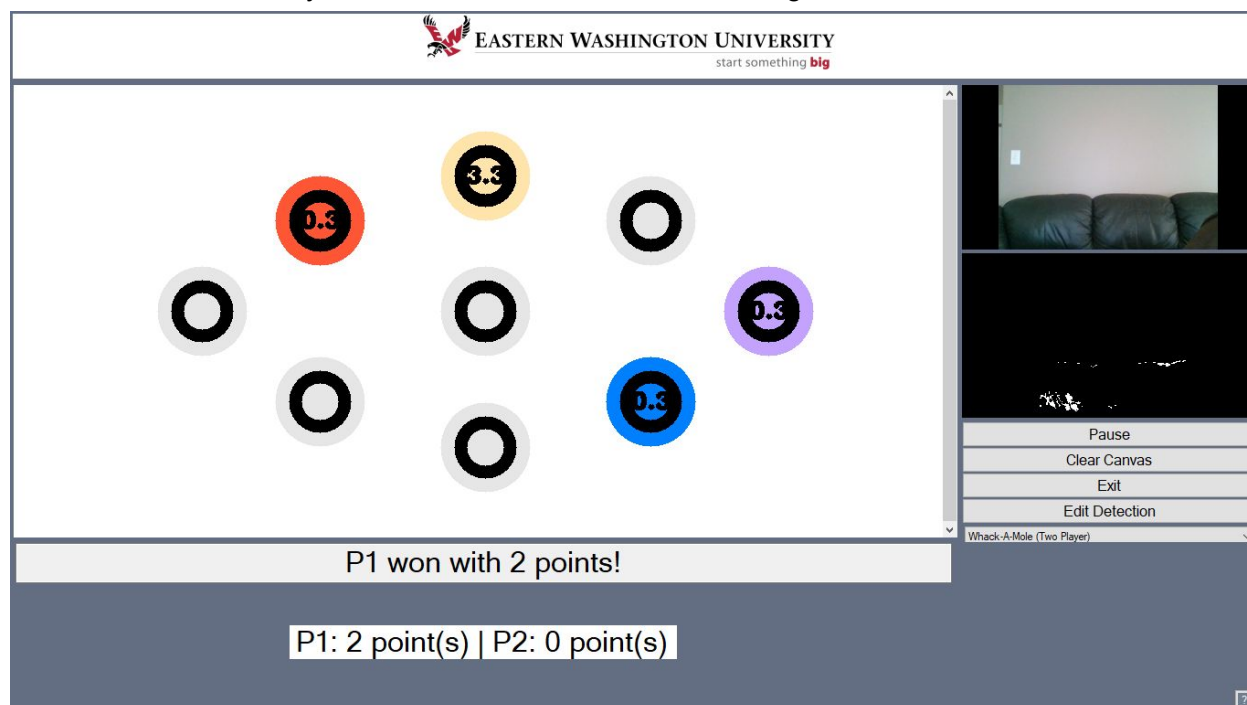
Step 8: After you press the Enter key, the canvas will be displayed like bellow



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- There are total of 9 circles. The two colors corresponding to the two colored paddles will appear randomly around the two circles. Each colored circle will shown up within 5 seconds.
- The objective of the game is to hit these colored circles to get points. The more quickly this is done, the higher the final score will be.
- The time for the game is 20 seconds.

When the time is over, you will see who is the winner of this game



Pause the game

Pause the game means stop the game for a short time.

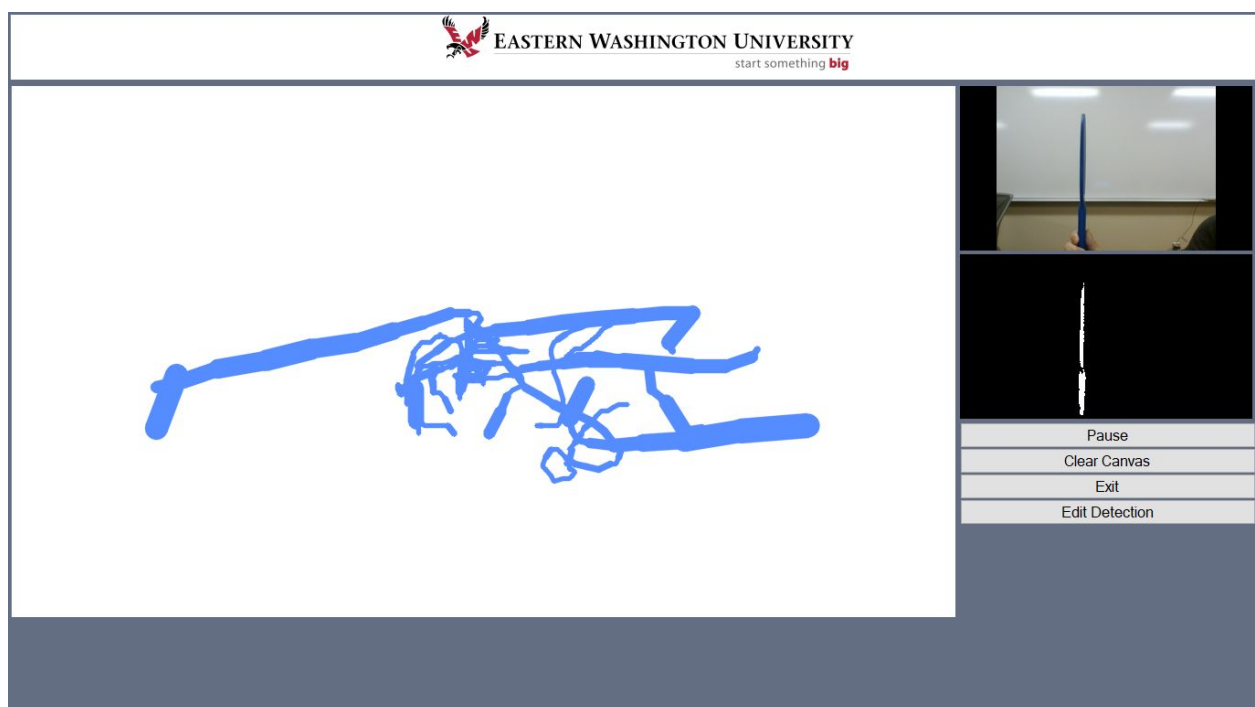
If you want to stop drawing you can either click to the **Pause** button or turn your handling paddle to 90 degree.

Option 1: Click the **Pause** button.

The Pause button will be replaced to **Play** button.



Option 2: You can turn the paddle to 90 degree to stop drawing



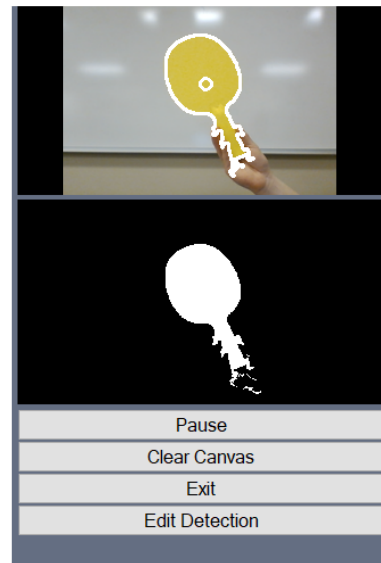
Play the game

The application will be continued by clicking Play button or turn your paddles back to 0 degree.

Option 1: Click the **Pause** button.

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After that, the play button will be replaced by the **Pause** button

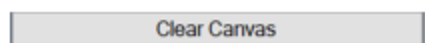


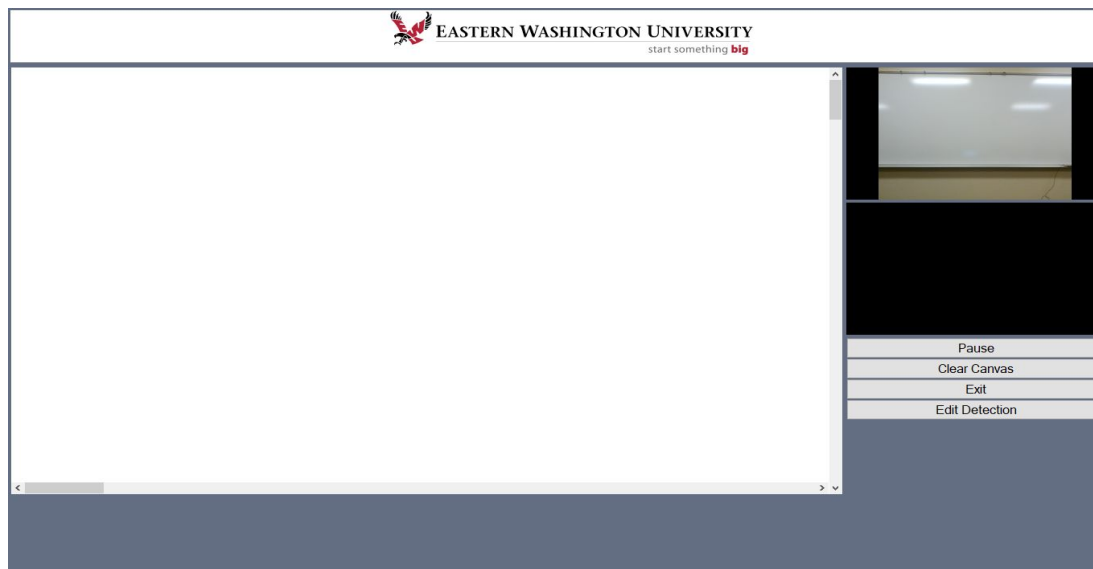
Option 2: Turn the paddle back to 0 degree



Clear canvas

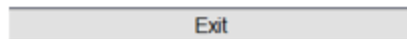
If you want to clear what you have drawn, you could click on the button



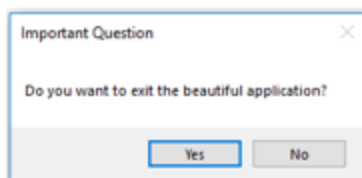


Exit the game

The game ends when the user click on the button



The message box will be displayed



If the user choose Yes, the game will be ended. Otherwise, the game will be continued.

Lighting condition

You can either turn on/off the color or edit the range of HSV color by clicking



- **Turn on/off color object**

For example, I want to ignore the yellow color, so I can uncheck checkbox on

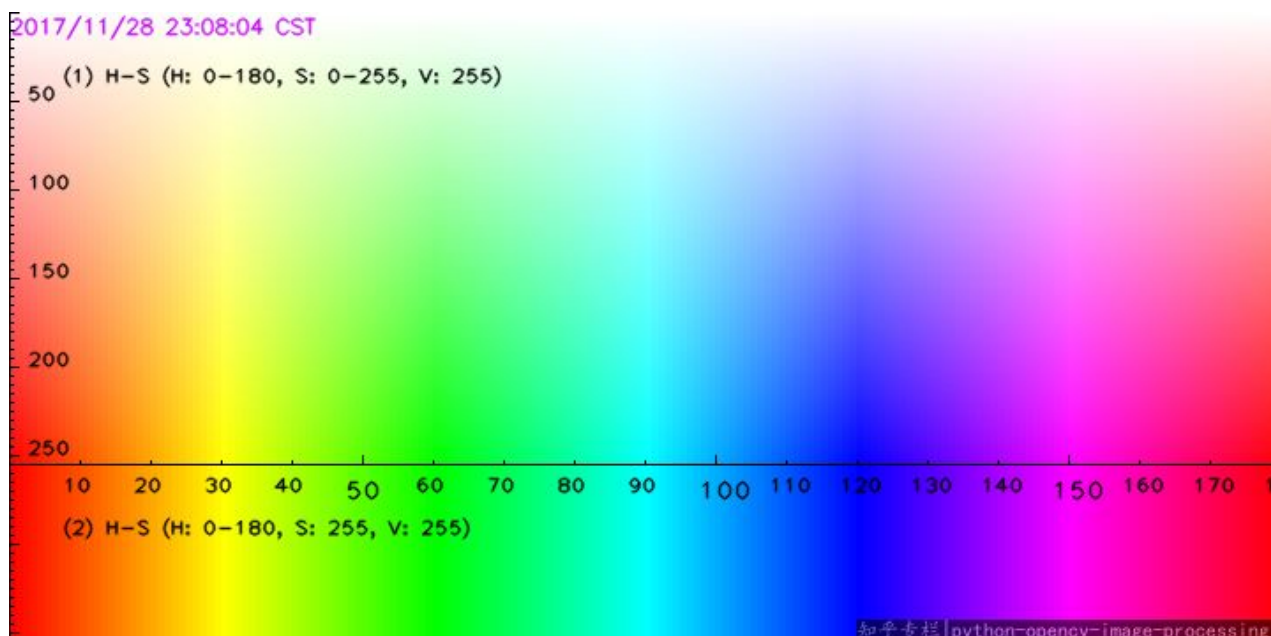


After that, you will see on the threshold image, the yellow color will disappear.



- **Edit the range of colored object**

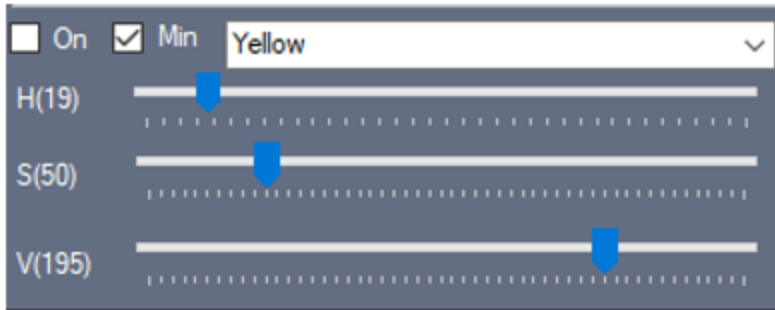
You can edit the range of colored object by dragging the three sliders H, S, V. These ranges determine how well the detection will perform and how much noise it will include or ignore. Fine tuning these ranges will greatly enhance the performance of the application. Use this image as a guide, where Hue is the x-axis and Saturation is the y-axis. For any color, the maximum value for S and V should be 255 and the minimum value for V should be greater than 80, but is dependant upon lighting conditions.



Step 1: Choose the name of color you want to edit on combobox

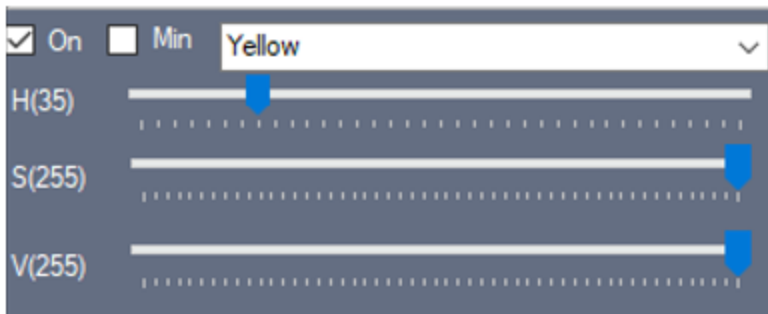


Step 2: Edit the minimum range of colored object by dragging these sliders below:



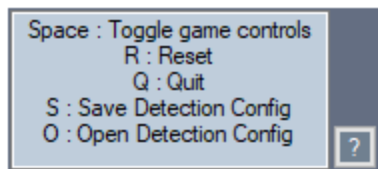
While setting the minimum range it is best to hold the object directly facing the camera, then roughly set H to where it is just below the point where it detects the object and nothing else. When you set the sliders for their minimum range, you want to move the slider to the right until it stops detecting the object. Once you reach that point then move it back slowly until the object is detected again. This is where you should set that slider. Now, turn the object so that it has some glare on its surface such that the object is the brightest it will be in the current lighting; set S. Now turn the object away from the light source so as to cast shadow on the object so that the object is the darkest it will be in the current lighting; set V.

Step 3: Edit the maximum range of colored object by unchecking the min checkbox



Similar to setting the minimum sliders, for setting the maximum values you want to move the slider, starting from the right, towards the left until the object is not detected then slide it back to the right until it's just right. You typically want to leave V at 255 as well as S.

Key shortcut



Step 1: Press space keys from the keyboard

Step 2: Choose options you want

- Press R key  if you want to reset the game

- Press Q key  if you want to exit the game

- Press S key  if you want to save the detection config

- Press O key  if you want to open the detection config