CHALLENGE TASKS PROJECT REPORT

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CHALLENGE TASK LECTURE 6:

To write a C# program to sort the number of elements in an Array using a one-dimensional array.

- First declare the single dimensional array of 5 elements as numbers using the line

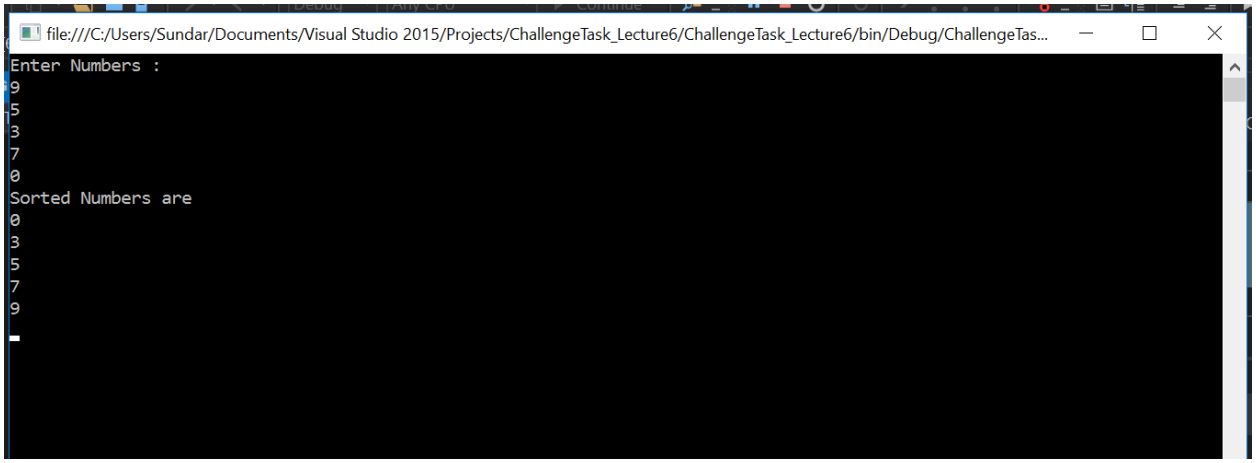
```
int[] number = new int[5];
```

- Now declare the numbers as string and take 5 inputs of different random numbers.
- Use a for loop condition to sort the elements in an ascending order such that the lowest number comes first and print using the console.writeline command.

```
for (a = 0; a < number.Length; a++)
```

- And using the below for condition check the length of each number individually and print the lowest number.

```
for (b = a + 1; b < number.Length; b++)
```



CHALLENGE TASK LECTURE 7:

To change the Depth Cam app such that the Gray scale colors are changed for different depth ranges.

- First add the depth image frame to the code using depth frame ready event.
- Now copy pixel data to depth pixels

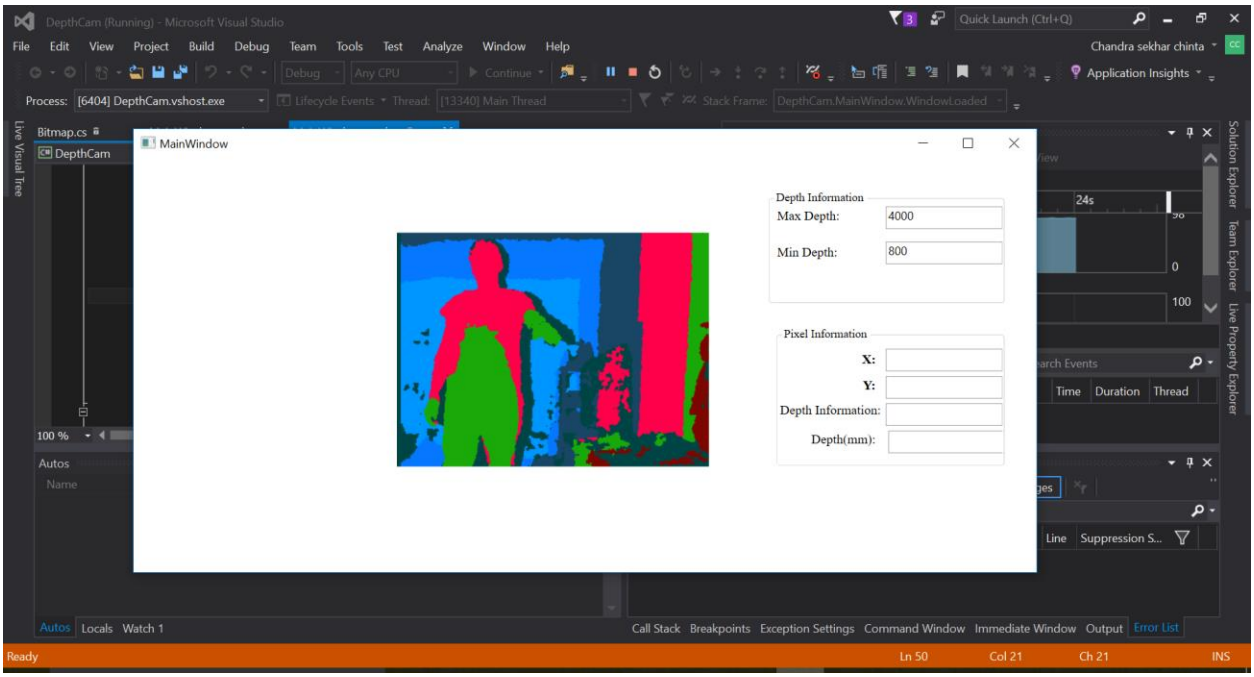
```
imageFrame.CopyPixelDataTo(depthPixels);
```

- Change the image format to Rbg32 and declare red, blue and green index.
- Copy the raw depth data to the image frame.
- Declare the variable Depth as depth index of raw depth data greater than bitmask width.

- Now generate color bytes in the image frame by using GenerateColorBytes event.

```
private byte[] GenerateColoredBytes(DepthImageFrame imageFrame)
```

-
- Now write if statements for different depth ranges like <500 , 500 – 1000 , 1500 – 2000 till 4000.
- For every depth range change the pixel values of red, blue and green index such that you get five different colors for the ranges specified.



CHALLENGE TASK LECTURE 8:

To change the tracking hand program into a painting app and use left hand to select the color of the brush.

- Track the skeleton by SkeletoFrameReady event. When the skeleton is in tracked state then map the joints with UI element.
- As the right hand is being tracked by the scale position of the skeleton add the traces of the hand using canvas.children.add(drawobject) and don't clear the canvas.
- Now add another canvas to the UI exactly overlapping the first canvas and keep the background as transparent. Add different buttons with colors red, blue , green, yellow and a clear to the second canvas. And declare the points of the positon of every button.
- In the MapJointsWithUIElements event first declare the position of the right hand joint and the left hand joint as mappedpoint and mappedpointL.

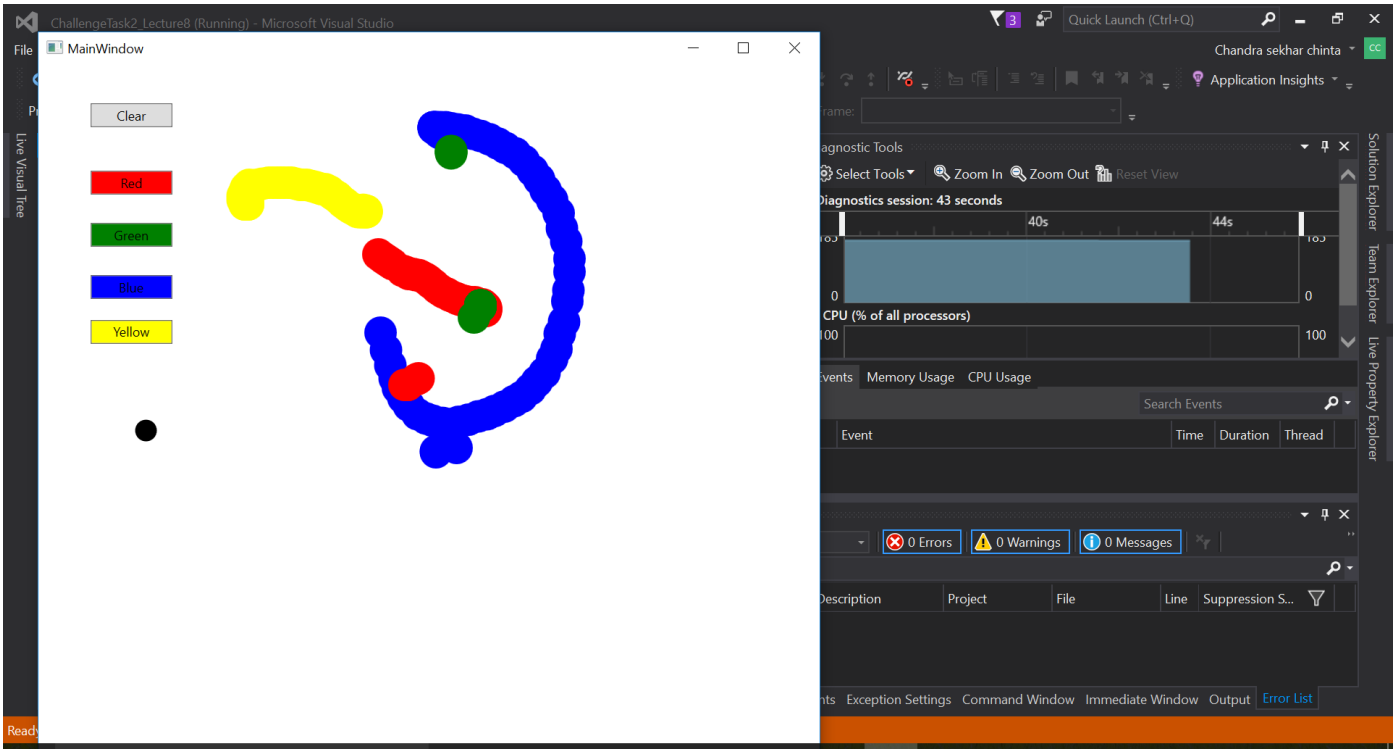
```
Point mappedPoint = ScalePosition(skeleton.Joints[JointType.HandRight].Position);
Point mappedPointL = ScalePosition(skeleton.Joints[JointType.HandLeft].Position);
```

- Track the left hand with scale position of the joint Handleft and draw an ellipse at that position. Now the ellipse also moves as the left hand moves.
- Now write the condition such that if the left hand position is same as the position of the color button then the color of the Right hand ellipse should be changed.

```
•   if (mappedPointL.X <= redresult.X && mappedPointL.X >= redresultsub.X)
•    {
•      if (mappedPointL.Y <= redresult.Y && mappedPointL.Y >= redresultsub.Y)
```

- Write four conditions for every button. Now when the left hand position is as the points as the clear button clear the first canvas using command canvas.children.clear().

```
•  if (mappedPointL.X <= eraseresult.X && mappedPointL.X >= eraseresultsub.X)
•    {
•  if (mappedPointL.Y <= eraseresult.Y && mappedPointL.Y >= eraseresultsub.Y)
•      {
•          canvas1.Children.Clear();
•
```



CHALLENGE TASK LECTURE 9:

Measure the angle between the right hand and torso and draw an arc between the arm and torso.

- To draw an arc, select two points.

```
Point spinePt = ScalePosition(skeleton.Joints[JointType.Spine].Position);
Point handPt = ScalePosition(skeleton.Joints[JointType.WristRight].Position)
```

-
- One is the spine joint and the other is Wrist right joint. AddCircularArcGraph function to draw the arc.
-
- Now add a textblock to the canvas and attach it to the start and end points of the arc such that it is shown on the top of the arc.

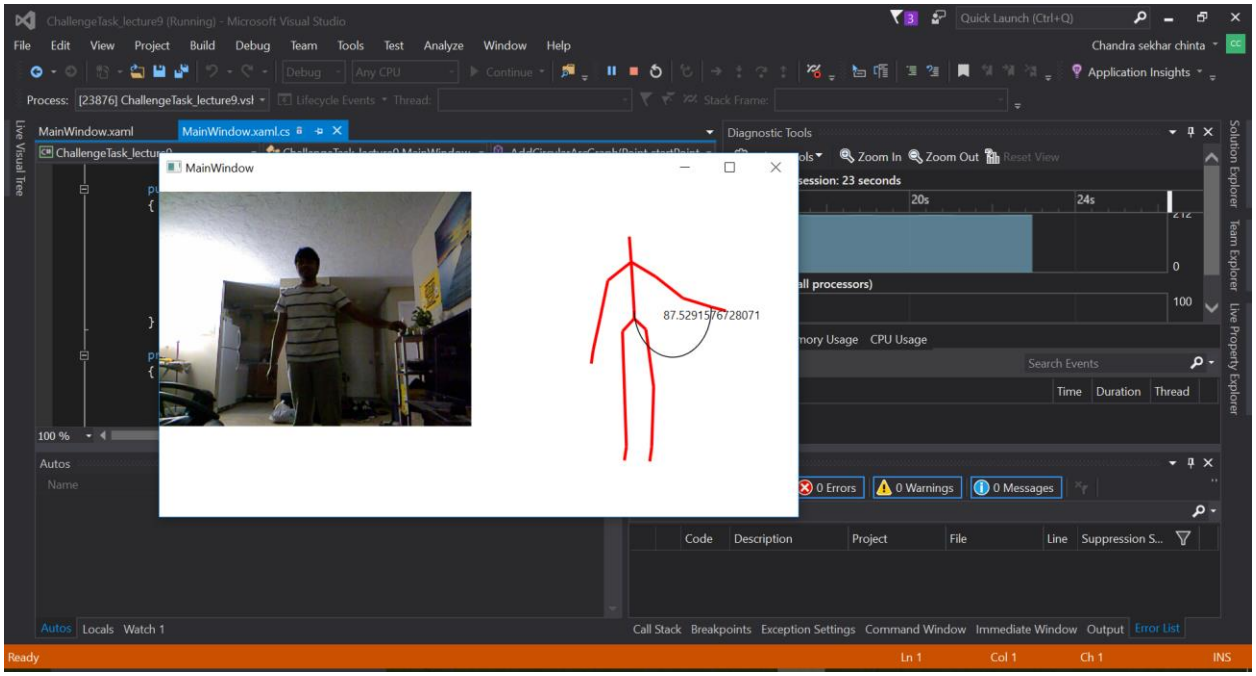
```
Canvas.SetLeft(textblock, startPoint.X + 30);
Canvas.SetTop(textblock, endPoint.Y - 10);
```

- Now to measure the angle take three points right hand joint, hip center and wrist right.

```
dotProduct = Vector3.DotProduct(vectorA, vectorB);
    return (double)Math.Acos(dotProduct) / Math.PI * 180;
```

- Take the vector points of the three joints and find the angle between using the vector formula to find the angle. Now show the angle in the textblock.

```
this.textblock.Text = "" + angle;
```



CHALLENGE TASK LECTURE 12:

To enable the color image and Modify the grammar such that you can add a particular shape to a particular joint location.

- First add an image control and enable the color image using color frame ready event.
- Now keep both the image control and the canvas at same margin and same in same resolution so the canvas is imposed on the image control.
- Now super impose one more canvas in same margin and resolution on the image control and add the skeleton frame ready event in this canvas.
- Add the grammarBuilder.Append and add choices for the joint location like right hand, left hand, head and hip.

```
grammarBuilder.Append(new Choices("righthand", "lefthand" , "head" , "hip"));
```

- Now when the speech recognizer is ready, it will go to the speech recognized event, or else it will give message that “Could not find the speech recognizer.”
- Once when the speech recognizer is ready, it will take the words by the audio source and check for the confidence level.
- If confidence level is greater than the given threshold value then it will go the command parser event.

```
 if (e.Result.Confidence > confidenceThreshold)
            {
                CommandsParser(e);
            }
```

- In command parser it will execute the conditions according to the words recognized and changes the result for different words using the switch cases.

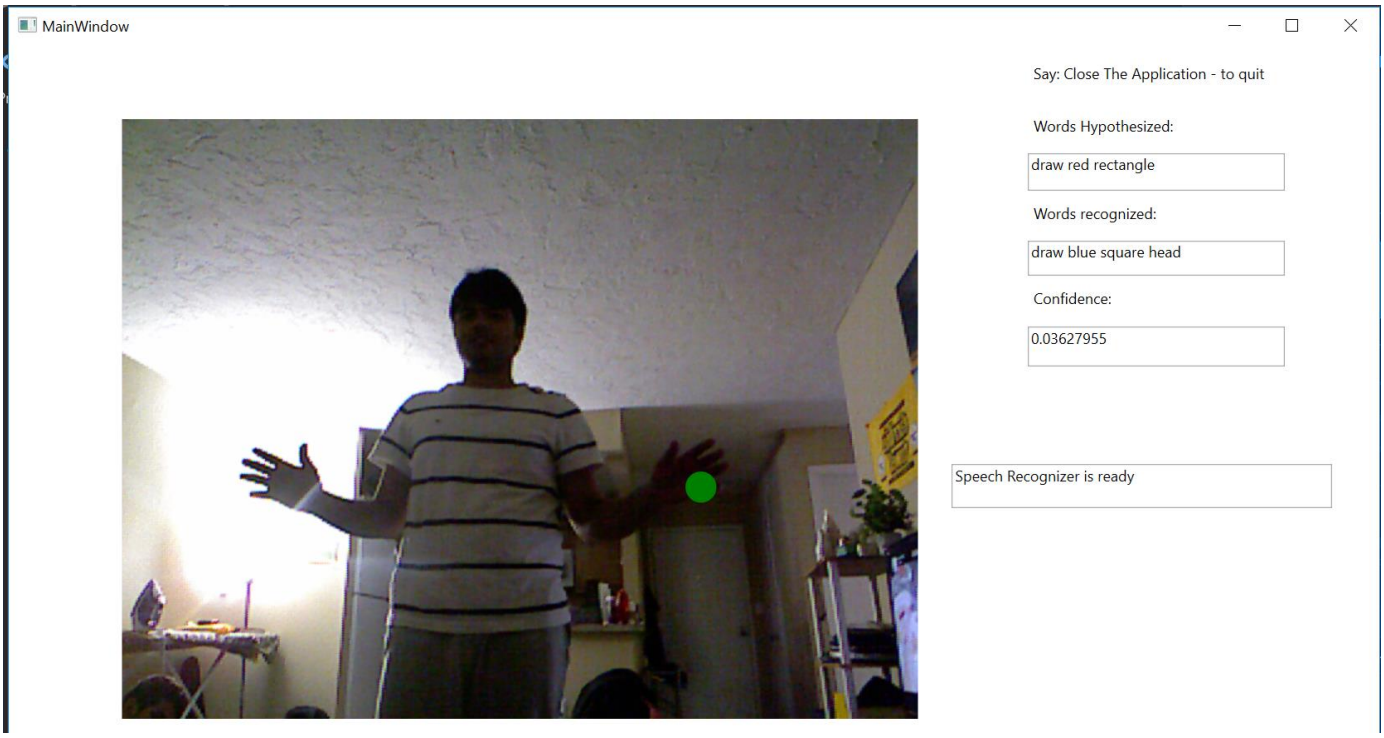
```
if (words[0].Text == "draw")
            {
                string colorObject = words[1].Text;
                switch (colorObject)
                   {     case "green":
                         objectColor = Colors.Green;
                         break; }

              var shapeString = words[2].Text;
                switch (shapeString)
                {
                    case "circle":
```

- In the command parser event add the code for the 4th word recognized in the grammar for the joints.

```
string drawposition1 = words[3].Text;
             if (drawposition1 == "righthand")
```

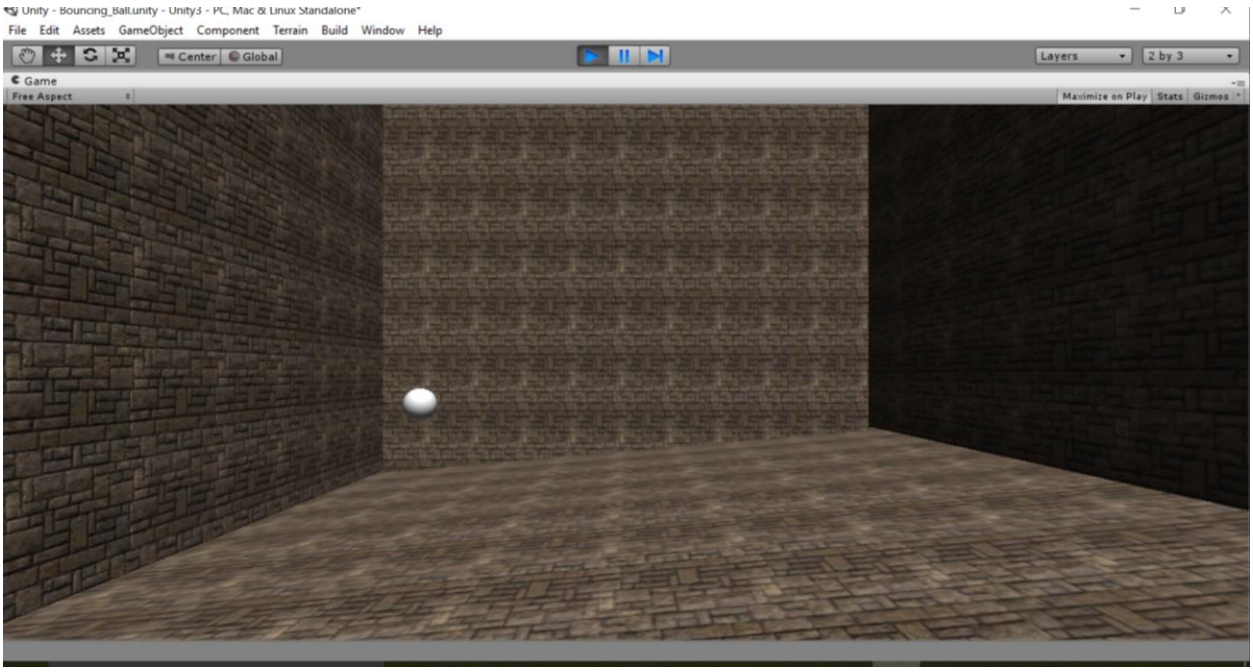
- Now attach the drawObject to the scale position of the joint that is recognized in the speech and shown on the color image.



CHALLENGE TASK LECTURE 13:

Create boundaries to the cube and make the ball bounce and change the direction by programing.

- Add six cubes and change their scale and position so that form a hallow room and the main cube is in the center.
- Change the shape of the cube to a sphere so that it looks like a ball.
- Now click add component and add a C# script. Open the script write the code in void update. Write the if statement for the transform.position.x hits the wall then the transform.rotation and transform.translate changes.



CHALLENGE TASK LECTURE 15:

Modify the gesture recognition app to recognize the left hand raised and right hand raised gestures.

- Enable both the color frame ready and skeleton frame ready.
- Display the color image and the skeleton by drawing the skeleton. Then go to the gesture recognition engine.
-

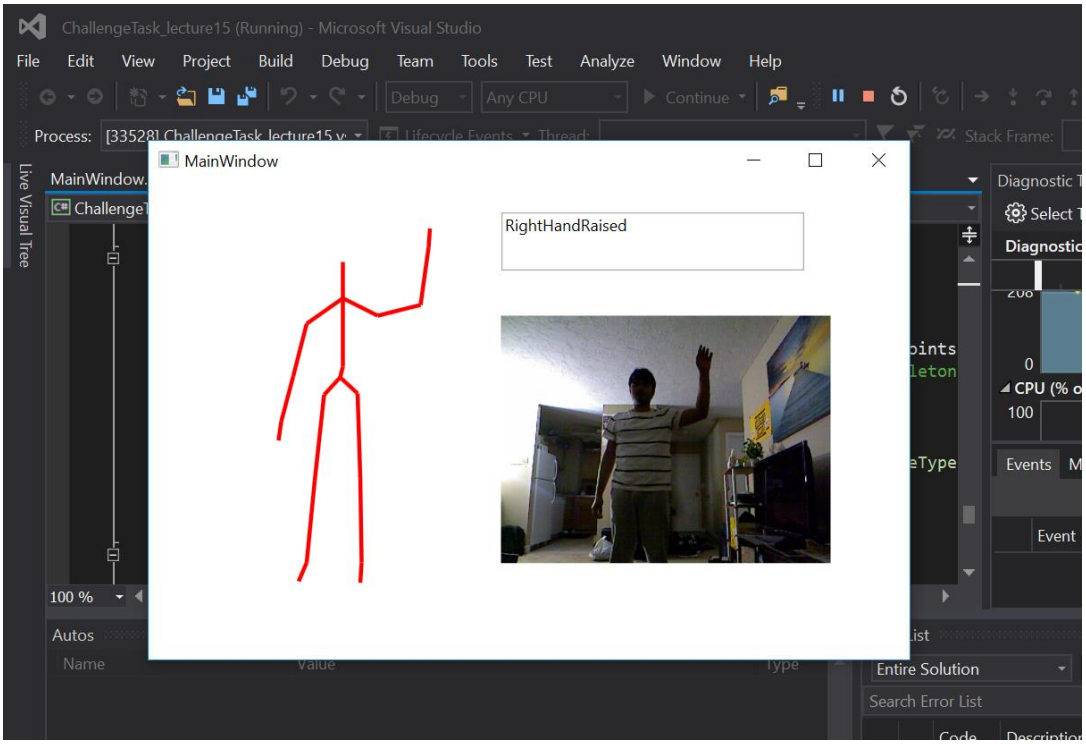
```
        GestureRecognitionEngine recognitionEngine;
```

- Now in window loaded also declare the recognition engine.
-

```
recognitionEngine = new GestureRecognitionEngine();

 recognitionEngine.GestureRecognized += gestureRecognized;
```

- In the gesture recognition engine create the event for the right hand raised gesture by the if statement that if the mapped point of right hand joint > mapped point of head joint.
- Create the event for the left hand raised gesture by the if statement that if the mapped point of left hand joint > mapped point of head joint.
- Now it will show the gesture type left hand raised or right hand raised in the textbox.


ChallengeTask_lecture15 (Running) - Microsoft Visual Studio
File Edit View Project Build Debug Team Tools Test Analyze Window Help
Debug
Any CPU
Continue
Process:
Stack Frame:
MainWindow
RightHandRaised
Live Visual Tree
100 %
Autos
Name
Value
Type
Entire Solution
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Diagnostic
CPU (%
Events
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