

## AI Concentration - “Computer Vision”

In this project, faces were tracked in the video and facial expressions were identified using the Affectiva API's.

The various steps involved were:

### 1. Drawing the feature points:

```
149 // Draw the detected facial feature points on the image
150 function drawFeaturePoints(canvas, img, face) {
151   // Obtain a 2D context object to draw on the canvas
152   var ctx = canvas.getContext('2d');
153
154   // TODO: Set the stroke and/or fill style you want for each feature point marker
155   // See: https://developer.mozilla.org/en-US/docs/Web/API/CanvasRenderingContext2D#Fill\_and\_stroke\_styles
156   ctx.strokeStyle = 'rgba(255,255,255,0.9)';
157   ctx.lineWidth = 1;
158   ctx.font = '15px serif';
159
160   // Looping over each feature point in the face
161   for (var id in face.featurePoints) {
162     var featurePoint = face.featurePoints[id];
163
164     // TODO: Draw feature point, e.g. as a circle using ctx.arc()
165     // See: https://developer.mozilla.org/en-US/docs/Web/API/CanvasRenderingContext2D/arc
166     ctx.beginPath();
167     ctx.arc(featurePoint.x, featurePoint.y, 2, 0, 2 * Math.PI);
168     ctx.stroke();
169   }
170 }
171
172 }
```

### 2. Display the mapping Emoji based on the user expression:

Calculate the distance between two diagonally opposite feature points and display emoji whose size varies on the distance.

```
174 // Draw the dominant emoji on the image
175 function drawEmoji(canvas, img, face) {
176   // Obtain a 2D context object to draw on the canvas
177   var ctx = canvas.getContext('2d');
178
179   // TODO: Set the font and style you want for the emoji
180   // Varying font size with face size
181   var dist = ((face.featurePoints[10].x - face.featurePoints[5].x)**2 + (face.featurePoints[10].y - face.featurePoints[5].y)**5) ** 0.5;
182   if (dist > 130) {
183     ctx.font = '55px serif';
184   } else if (dist > 100) {
185     ctx.font = '45px serif';
186   } else {
187     ctx.font = '35px serif';
188   }
189
190 }
```

### 3. Feature Points are captured:

```
165   // TODO: Draw feature point, e.g. as a circle using ctx.arc()
166   // See: https://developer.mozilla.org/en-US/docs/Web/API/CanvasRenderingContext2D/arc
167   ctx.beginPath();
168   ctx.arc(featurePoint.x, featurePoint.y, 2, 0, 2 * Math.PI);
169   ctx.stroke();
170 }
171
172 }
```

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### 4. Emoji set is reduced for better recognition:

```
25 // Reduced set of emojis
26 var reducedEmojis = [ 128528, 9786, 128515, 128527, 128521, 128535, 128545, 128561 ];
27
```

### 5. Next starting and resetting the game and further compare user face with dominant emoji using the API's



#### EMOTION TRACKING RESULTS

Timestamp: 25.46  
Number of faces found: 1  
Appearance: {"gender": "Male", "glasses": "Yes", "age": "55 - 64", "ethnicity": "Caucasian"}  
Emotions: {"joy": 0, "sadness": 0, "disgust": 1, "contempt": 0, "anger": 0, "fear": 0, "surprise": 1, "valence": -10, "engagement": 37}  
Expressions:  
{"smile": 0, "innerBrowRaise": 0, "browRaise": 0, "browFurrow": 0, "noseWrinkle": 0, "upperLipRaise": 0, "lipCornerDepressor": 2, "chinRaise": 65, "lipPucker": 92, "lipPress": 0, "lipSuck": 0, "mouthOpen": 26, "smirk": 0, "eyeClosure": 0, "attention": 69, "lidTighten": 0, "jawDrop": 37, "dimpler": 3, "eyeWiden": 55, "cheekRaise": 0, "lipStretch": 0}  
Emoji: 😊

#### Mimic Me!

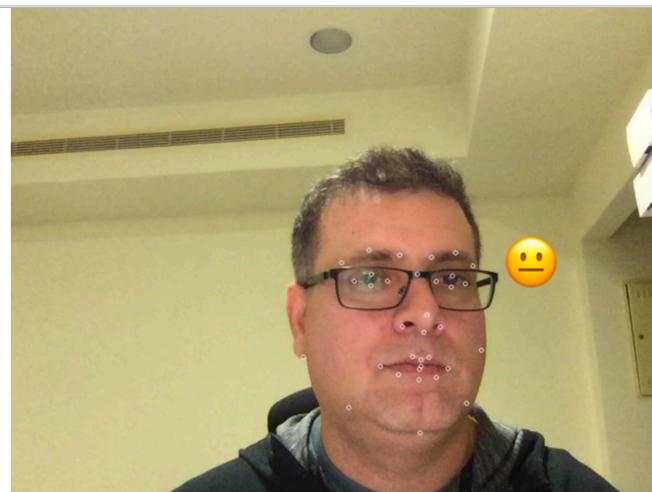


Score: 2 / 5

Start  Stop  Reset

#### INSTRUCTIONS

- Press **Start** to initialize the detector.
- Your current emoji will be shown next to your head.
- Mimic each emoji being displayed to score a point!
- Press **Stop** to end the detector.
- Watch the tracking results and log messages for more information.



#### EMOTION TRACKING RESULTS

Timestamp: 71.26  
Number of faces found: 1  
Appearance: {"gender": "Male", "glasses": "Yes", "age": "55 - 64", "ethnicity": "Caucasian"}  
Emotions: {"joy": 0, "sadness": 0, "disgust": 0, "contempt": 0, "anger": 0, "fear": 2, "surprise": 0, "valence": 0, "engagement": 0}  
Expressions:  
{"smile": 0, "innerBrowRaise": 0, "browRaise": 2, "browFurrow": 0, "noseWrinkle": 0, "upperLipRaise": 0, "lipCornerDepressor": 3, "chinRaise": 2, "lipPucker": 0, "lipPress": 0, "lipSuck": 0, "mouthOpen": 0, "smirk": 0, "eyeClosure": 0, "attention": 71, "lidTighten": 0, "jawDrop": 0, "dimpler": 4, "eyeWiden": 63, "cheekRaise": 0, "lipStretch": 0}  
Emoji: 😐

#### Mimic Me!



Score: 9 / 13

Start  Stop  Reset

#### INSTRUCTIONS

- Press **Start** to initialize the detector.
- Your current emoji will be shown next to your head.
- Mimic each emoji being displayed to score a point!
- Press **Stop** to end the detector.
- Watch the tracking results and log messages for more information.

#### DETECTOR LOG MSGS

Start button pressed  
Webcam access allowed  
The detector reports initialized

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Here are some of the screenshots of the results:



### EMOTION TRACKING RESULTS

Timestamp: 37.04  
Number of faces found: 1  
Appearance: {"gender": "Male", "glasses": "Yes", "age": "55 - 64", "ethnicity": "Caucasian"}  
Emotions: {"joy": 0, "sadness": 10, "disgust": 0, "contempt": 1, "anger": 1, "fear": 0, "surprise": 0, "valence": -39, "engagement": 61}  
Expressions:  
{"smile": 0, "innerBrowRaise": 0, "browRaise": 0, "browFurrow": 69, "noseWrinkle": 0, "upperLipRaise": 0, "lipCornerDepressor": 37, "chinRaise": 0, "lipPucker": 0, "lipPress": 0, "lipSuck": 0, "mouthOpen": 0, "smirk": 0, "eyeClosure": 0, "attention": 41, "lidTighten": 2, "jawDrop": 0, "dimpler": 0, "eyeWiden": 0, "cheekRaise": 0, "lipStretch": 0}

### Mimic Me!



Score: 3 / 7

### INSTRUCTIONS

- Press **Start** to initialize the detector.
- Your current emoji will be shown next to your head.
- Mimic each emoji being displayed to score a point!
- Press **Stop** to end the detector.
- Watch the tracking results and log messages for more information.



### EMOTION TRACKING RESULTS

Timestamp: 81.73  
Number of faces found: 1  
Appearance: {"gender": "Male", "glasses": "Yes", "age": "55 - 64", "ethnicity": "Caucasian"}  
Emotions: {"joy": 0, "sadness": 0, "disgust": 0, "contempt": 0, "anger": 0, "fear": 1, "surprise": 14, "valence": -30, "engagement": 99}  
Expressions:  
{"smile": 0, "innerBrowRaise": 0, "browRaise": 70, "browFurrow": 0, "noseWrinkle": 0, "upperLipRaise": 1, "lipCornerDepressor": 0, "chinRaise": 99, "lipPucker": 100, "lipPress": 30, "lipSuck": 0, "mouthOpen": 6, "smirk": 0, "eyeClosure": 0, "attention": 66, "lidTighten": 0, "jawDrop": 1, "dimpler": 3, "eyeWiden": 78, "cheekRaise": 0, "lipStretch": 0}

### DETECTOR LOG MSGS

Start button pressed  
Webcam access allowed  
The detector reports initialized

### Mimic Me!



Score: 13 / 17

### INSTRUCTIONS

- Press **Start** to initialize the detector.
- Your current emoji will be shown next to your head.
- Mimic each emoji being displayed to score a point!
- Press **Stop** to end the detector.
- Watch the tracking results and log messages for more information.

### DETECTOR LOG MSGS

Start button pressed  
Webcam access allowed  
The detector reports initialized