

Equivalence Class Testing

Table 1: Equivalence classes

| Test Functions | Variables Being Tested | Equivalence Classes |
|-------------------------|-------------------------------|--|
| calculate_eye_ratio() | Eye coordinates | Invalid format, Valid format |
| calculate_mouth_ratio() | Lips coordinates | Invalid format, Valid format |
| detect_yawn() | average_ratio_lips | Below threshold, At threshold, Above threshold |
| | yawn_start_time | None, Valid timestamp, Expired timestamp |
| | yawn_detected, yawn_alert | False, True |
| detect_eye_closure() | average_ratio_eyes | Below threshold, At threshold, Above threshold |
| | closed_start_time | None, Valid timestamp, Expired timestamp |
| | sleepy_detected, closed_alert | False, True |
| yawn_alert_func() | yawn_start_time | None, Valid timestamp, Expired timestamp |
| | yawn_detected, yawn_alert | False, True |
| | file2 | Valid file path, Invalid file path |
| closed_alert_func() | closed_start_time | None, Valid timestamp, Expired timestamp |
| | sleepy_detected, closed_alert | False, True |
| | file1 | Valid file path, Invalid file path |
| prepare_eye_for_model() | eye_img | Invalid format, Valid format |
| get_box() | ids | Invalid format, Valid format |
| | width, height | Positive/Negative values |

Table 2: Equivalence class tests:

| Test Method | Test Purpose | Expected Outcome | Actual Outcome | Test Pass |
|-------------------------|--|--|--|-----------|
| calculate_eye_ratio() | Test with valid input | The result should be the eye's ratio whether it is open or closed | The result was the eye's ratio whether it is open or closed | ✓ |
| calculate_eye_ratio() | Test with missing points | The result should be a default '100' if missing points | The result was a default '100' | ✓ |
| calculate_mouth_ratio() | Test with valid input | The result should be the mouth ratio whether it is open or closed | The result was the mouth ratio whether it is open or closed | ✓ |
| calculate_mouth_ratio() | Test with 0 horizontal distance | It should gives value error | Value error was raised | ✓ |
| detect_yawn() | Test open/close mouth at threshold (ratio and duration) | The yawn detection should be based on the ratio and duration | The yawn detection was based on the ratio and duration | ✓ |
| detect_yawn() | Test open/close mouth below threshold (ratio and duration) | The yawn detection should be based on the ratio and duration | The yawn detection was based on the ratio and duration | ✓ |
| detect_yawn() | Test open/close mouth above threshold (ratio and duration) | The yawn detection should be based on the ratio and duration | The yawn detection was based on the ratio and duration | ✓ |
| detect_eye_closure() | Test open/close eye at threshold (ratio and duration) | The closed eye detection should be based on the ratio and duration | The closed eye detection was based on the ratio and duration | ✓ |
| detect_eye_closure() | Test open/close eye below threshold (ratio and duration) | The closed eye detection should be based on the ratio and duration | The closed eye detection was based on the ratio and duration | ✓ |

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|---|--|--|--|---|
| detect_eye_closure() | Test open/close eye above threshold (ratio and duration) | The closed eye detection should be based on the ratio and duration | The closed eye detection was based on the ratio and duration | ✓ |
| yawn_alert_func(), closed_alert_func() | Test with the alert variables are set | Alert should be played | Alert was played | ✓ |
| yawn_alert_func(), closed_alert_func() | Test with the alert variables are not set | Alert should not be played | Alert was not played | ✓ |
| prepare_eye_for_model() | Test with valid image input | The image should be converted to the custom shape | The image was converted to the custom shape | ✓ |
| prepare_eye_for_model() | Test with invalid/empty image types | It should gives value error | Value error was raised | ✓ |
| get_box() | Test with valid image values | It should output the values of box around the eye | The output was the values of box around the eye | ✓ |
| get_box() | Test with invalid IDs | It should gives value error | Value error was raised | ✓ |
| get_box() | Test height/width with negative values | It should gives value error | Value error was raised | ✓ |