Vision Vanguards Test Plan

The overall test plan outlines a comprehensive testing strategy for the Vision Vanguards project, which consists of three main components: Vision, Audio, and Web. Each component has specific test cases aimed at ensuring the functionality, accuracy, and integration of various features.
For the Vision component, tests focus on the accuracy of pose estimation lines, pose placement, pose accuracy, and integration with the web interface. These tests cover both functional and integration aspects, ensuring that the vision system accurately recognizes and processes user poses within the web application.
The Audio component's testing plan addresses the verification of lyrical transcription, pitch detection, octave detection, timing, accuracy score, and pitch score. These tests evaluate the correctness of audio processing, ensuring that the system accurately transcribes lyrics, detects pitch, and evaluates user performance based on different criteria.
The Web component's test plan emphasizes user authentication, responsive design, cross-browser compatibility, form validation, and search functionality. These tests are designed to ensure the security and usability of the web application, covering aspects such as user registration, responsive design on various devices, input validation, and efficient search and filtering capabilities.
The Test Case Matrix provides a structured overview of each test case, indicating whether it is a normal or abnormal case, whether it involves black box or whitebox testing, and whether it is focused on functional or performance aspects, as well as unit or integration testing.
Overall, the testing strategy aims to systematically validate the individual components and their integration, ensuring a robust and user-friendly experience for the Vision Vanguards project.

Vision Component:

1. Pose estimation line accuracy:
Part I. Description of Overall Test Plan:
The test aims to see if the pose estimation lines drawn on video input are accurate to where the person is standing.
Part II. Test Case Descriptions:

Test Case Identifier: VC1

- Purpose: Pose estimation line accuracy
- Description: See if a live video input of a person has correctly drawn lines between each big joint.

- Inputs: Inputs used for the test include a live video feed.
- Expected Outputs/Results: The expected output should be a person with lines drawn along each limb and points connecting each line to another at joints correctly.
- Actual Outputs/Results: Lines were correctly and properly drawn on human skeletal structure.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

2. Pose estimation pose placement:
Part I. Description of Overall Test Plan:
The test aims to see if the pose coded into the program is successfully set up and completed by the user.
Part II. Test Case Descriptions:

Test Case Identifier: VC2

- Purpose: Pose estimation pose placement
- Description: Determine if the coded poses show up during the song and, when the user copies the given pose, it registers that the pose was matched.
- Inputs: Inputs used for the test include a live video feed and the pre-coded poses.
- Expected Outputs/Results: The expected output should be a pose showing up on the app and then the user matching the pose.
- Actual Outputs/Results: Hardcoded poses were properly created and successfully displayed on the app.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

3. Pose estimation pose accuracy:
Part I. Description of Overall Test Plan:
The test aims to see how much of the given pose is accurately completed by the user.
Part II. Test Case Descriptions:

Test Case Identifier: VC3

- Purpose: Pose estimation pose accuracy
- Description: Calculate how much of the user pose is within the bounds of the given pose resulting in an accuracy score.

- Inputs: Inputs used for the test include a live video feed the user will use and the pre-programmed poses.
- Expected Outputs/Results: The expected output should be an accuracy score of how much the user matched the given poses.
- Actual Outputs/Results: Final score is properly outputted on the app for pose accuracy, displaying the expected result.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Whitebox
- Functional/Performance Test Indication: Performance
- Unit/Integration Test Indication: Unit

4. Pose estimation and web interface integration:
Part I. Description of Overall Test Plan:
The test aims to see how well the pose estimation program is integrated into the web application.
Part II. Test Case Descriptions:

Test Case Identifier: VC4

- Purpose: Pose estimation and web interface integration
- Description: See if the pose estimation is integrated seamlessly into the web application with no hiccups.
- Inputs: Inputs used the the test include the web application and the pose estimation program.
- Expected Outputs/Results: The expected output should be an accurate integration of the pose estimation program and the web application.
- Actual Outputs/Results: Pose estimation was successfully integrated with web component.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Integration

Audio Component:

1. Lyrical Transcription from Audio Track:
Part I. Description of Overall Test Plan:
This test primarily focuses on ensuring that a given audio track can properly be transcribed into a text file that we can utilize for various scoring purposes.
Part II. Test Case Descriptions:

Test Case Identifier: AC1

- Purpose of Test: Lyrical Transcription Verification

- Description: Validate functionality of lyrical transcription feature, ensure that spoken words are properly transcribed and saved to the proper output file
- Inputs: Simulated user audio files with varying degrees of audibility
- Expected Output: Text file that contains properly transcribed text from provided audio file(s)
- Actual Output: Text file contains expected text from audio file.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

2. Pitch Detection Verification for Audio Track
Part I. Description of Overall Test Plan:
This test is meant to ensure that the project is able to take in an audio track and detect the exact pitch being output by a vocalist at a given time.
Part II. Test Case Descriptions:

Test Case Identifier: AC2

- Purpose of Test: Audio Pitch Detection Verification
- Description: Ensure that audio files are properly processed and have proper pitch values (within a specified range)
- Inputs: User audio file with varying pitch ranges
- Expected Output: Display output that provides the proper values for each pitch
- Actual Output: Each pitch can be properly outputted and displayed.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

3. Octave Detection Validation for Audio Track
Part I. Description of Overall Test Plan:
This test focuses on ensuring that the program can take an audio track and normalize the pitches in order for different octaves to be registered as the same.
Part II. Test Case Descriptions:

Test Case Identifier: AC3

- Purpose of Test: Audio Pitch Octave Detection Verification
- Description: Ensure that the function to normalize pitches using octaves (i.e., two differing tones that hit the same note will register as the same) works properly

- Inputs: Two audio files that contain the same pitches in different octaves
- Expected Output: Match percentage of the two audio files (should be >= 90% matching)
- Actual Output: Audio files are properly matched depending on their similarity.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

4. Timing Detection Verification for Audio Tracks

Part I. Description of Overall Test Plan:

This test ensures that the program can properly match the different pitch timings of two different audio tracks and output a proper score.

Part II. Test Case Descriptions:

Test Case Identifier: AC4

- Purpose of Test: Lyrical Timing Verification
- Description: Ensure that lyrical timings between two audio files can be accurately matched and compared with each other
- Inputs: Three audio files - two with matching lyrics and timings, one without
- Expected Output: Three different accuracy scores (file 1 and 2, 1 and 3, 2 and 3), where the first score should be >= 95% and the last two should be <= 25%
- Actual Output: Accuracy scores match the above depending on which is being compared. First score is closer to 85% than 95%.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

5. Accuracy Score for Audio Track Lyrics Verification

Part I. Description of Overall Test Plan:

This test is meant to ensure that the program can properly match the lyrics for a user audio track and the audio track they were attempting to emulate.

Part II. Test Case Descriptions:

Test Case Identifier: AC5

- Purpose of Test: Lyrical Accuracy Score Verification
- Description: Ensure that a user's lyrical accuracy is scored properly after singing given lyrics for a song
- Inputs: Two matching text files, one non-matching
- Expected Output: Display matching score for each text file with each other. Matching files should have a score of 100%, non-matching should match the other two <= 20%
- Actual Output: Matching files have a score of 100%, non-matching much lower as described.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

6. Accuracy Score for Audio Track Pitches Verification

Part I. Description of Overall Test Plan:

This test primarily ensures that the program can properly match audio pitches for a user audio track and the track they were trying to mimic (with octaves normalized).

Part II. Test Case Descriptions:

Test Case Identifier: AC6

- Purpose of Test: Audio Pitch Score Verification
- Description: Ensure that a user's sung audio can have its pitches properly matched to a given audio file (i.e., the karaoke song)
- Inputs: Three audio files - one of an actual song (just the vocals), two sung by a user (one accurate, the other inaccurate)
- Expected Outputs: Display audio pitch score for accurate singing and inaccurate with the actual song. Accurate vocals should provide a score >= 70%, inaccurate <= 40%.
- Actual Outputs: Accurate vocals hover over 50%, while inaccurate are closer to 30%.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

7. Composite Score Calculation Verification

Part I. Description of Overall Test Plan:

This test ensures that the final composite score (utilizing all of the logic implemented above) is properly calculated and outputs an accurate score.

Part II. Test Case Descriptions:

Test Case Identifier: AC7

- Purpose of Test: Composite Score Verification
- Description: Ensure that the composite score of all score values is computed and executed properly
- Inputs: Various lyrical, pitch, and timing score values
- Expected Output: Accurate outputs for different combinations of the above values, where the score is calculated using weighted values for each
- Actual Output: Different combinations provide accurate outputs using weighted values for each.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Integration

Web Component:

1. User Authentication and Authorization:
Part I. Description of Overall Test Plan:
Our testing strategy for user authentication and authorization focuses on ensuring secure and seamless access to the web application. We will perform functional and security tests to validate user registration, login, and access control mechanisms.
Part II. Test Case Descriptions:

Test Case Identifier: TC1

- Purpose: User Registration
- Description: Verify that users can successfully register with valid information.
- Inputs: User registration details.
- Expected Outputs/Results: Confirmation of successful user registration.
- Actual Outputs/Results: Confirmation successfully displays as well as updates to Firebase depending on user actions.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Integration

(Repeat similar structure for other test cases related to authentication and authorization)

2. Responsive Design and Cross-Browser Compatibility:
Part I. Description of Overall Test Plan:
This testing plan focuses on ensuring a responsive design and cross-browser compatibility for the web application. We will conduct visual and functional tests to confirm consistent behavior across different devices and browsers.
Part II. Test Case Descriptions:

Test Case Identifier: TC2

- Purpose: Responsive Design on Mobile
- Description: Confirm that the web app layout is responsive and user-friendly on mobile devices.
- Inputs: Access the web app from various mobile devices.
- Expected Outputs/Results: Consistent and visually appealing layout on mobile screens.
- Actual Outputs/Results: Layout is consistent, user-friendly and responsive.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional

- Unit/Integration Test Indication: Integration

(Repeat similar structure for other test cases related to responsive design and cross-browser compatibility)

3. Form Validation and User Input Handling:

Part I. Description of Overall Test Plan:

This testing plan focuses on validating the form validation and user input handling functionalities of the web application. We will conduct functional tests to ensure that user inputs are accurately validated and processed, preventing errors and enhancing user experience.

Part II. Test Case Descriptions:

Test Case Identifier: TC3

- Purpose: Form Field Validation
- Description: Verify that all form fields (e.g., text fields, dropdowns) enforce appropriate validation rules, such as required fields, character limits, and valid formats.
- Inputs: Enter data into various form fields, including valid and invalid inputs.
- Expected Outputs/Results: Validation errors for invalid inputs, successful submission for valid inputs.
- Actual Outputs/Results: Validation errors successfully display and submission is successful for valid inputs.
- Normal Case Indication: Yes
- Blackbox/Whitebox Test Indication: Blackbox
- Functional/Performance Test Indication: Functional
- Unit/Integration Test Indication: Unit

Test Case Matrix

Test Plan ID	Normal/ Abnormal	Blackbox/ Whitebox	Functional/ Performance	Unit/ Integration
VC1	Normal	Blackbox	Functional	Unit
VC2	Normal	Blackbox	Functional	Unit
VC3	Normal	Whitebox	Performance	Unit
VC4	Normal	Blackbox	Functional	Integration
AC1	Normal	Blackbox	Functional	Unit
AC2	Normal	Blackbox	Functional	Unit
AC3	Normal	Blackbox	Functional	Unit
AC4	Normal	Blackbox	Functional	Unit
AC5	Normal	Blackbox	Functional	Unit
AC6	Normal	Blackbox	Functional	Unit
AC7	Normal	Blackbox	Functional	Integration
TC1	Normal	Blackbox	Functional	Integration
TC2	Normal	Blackbox	Functional	Integration
TC3	Normal	Blackbox	Functional	Unit
TC4	Normal	Blackbox	Functional	Integration