

Testing Bachelor Thesis's application

- Write one paragraph about testing in general, when it is applied, and why it is useful

Testing is a critical process applied throughout the creation and maintenance of a software application. It ensures the software meets its specified requirements, functions correctly, and offers a smooth user experience. Testing is crucial as it identifies defects and issues before the software reaches end users, helping to reduce bugs, enhance performance, and improve security.

- Write one paragraph about the features of the application of your Bachelor thesis

The bachelor thesis project is a video application that corrects the poses of persons during fitness exercises. It has a user authentication module so that a user can sign up and log into the system. The video submission module is on its own, and the users can upload their videos on fitness exercises. A feature of this is the division of these videos into repetitions and giving real-time corrective feedback based on the pose analysis. This application utilizes a combination of Python for backend operations, Django as the web framework, and Flutter for the mobile interface, offering a seamless cross-platform user experience.

- Write one paragraph about what testing techniques should be used during the development

During the development, several testing techniques should be employed to ensure quality and functionality. Unit testing will majorly help in testing the isolated components, for example, the video segmentation or user authentication functions at an early stage of their development cycle so that bugs are found. Integration testing is paramount to ensuring the application's different modules interact properly, including the backend server, the database, and the frontend. Herein, the checking of the data flow within the system and whether the components work together or not is paramount. System testing is done on the entire application so that it meets the requirements specified and works as intended in a production-like environment. Notably, usability testing would be of significance given that this application is user-centered; therefore, the user interface must be intuitive and user-friendly.

- Unit testing - for one "main" feature of your application provide one paragraph describing the testing that you could perform

For the video segmentation feature, unit testing can be implemented to ensure that the algorithm correctly identifies and segments different repetitions from a single exercise video. Test cases should cover various scenarios, including videos with exercise types and user positions. Mock objects might be used to simulate video input to ensure the segmentation logic functions as expected independently of external systems.

- Integration testing – provide one paragraph describing the modules that need to be tested when integrated and what integration strategy is suitable

The modules that should be exposed to integration testing are the user authentication system, video processing on the backend, and the database for holding users' history and feedback. The importance of the test lies in the actual processes of these components coming together, primarily towards ensuring that the flow of data progresses correctly from the uploaded videos of users to the pose analysis performed and how the feedback is generated. The correct integration strategy may probably be the bottom-up approach: testing modules at the lowest level, for example, database interaction, and then proceeding to the highest level, for example, video processing and interaction through the user interface.

- **System testing – provide one paragraph describing what scenarios need to be tested**

This should cover end-to-end testing of the application to validate the complete functionality of the system. User registration, user login, video upload, correct pose analysis, correctness of feedback, and retrieval and display of older submissions are focused upon for test scenarios. Stress testing is also key to ensuring the system runs normally under heavy loads, such as multiple users uploading videos simultaneously.