

CHAPTER 9

TESTING

Testing is a critical phase in software development, ensuring that the application functions as intended and meets the specified requirements. For the SignSpeak sign language to text conversion project, testing is essential to confirm that the system accurately translates sign language into text, operates smoothly, and delivers a user-friendly experience.

The testing process for SignSpeak involves several key steps:

1. Dataset Evaluation:

- The model was tested on a dataset of 36 distinct actions, each containing 1000 images.
- The dataset was split into training and testing sets to assess the model's performance on unseen data.

2. Performance Metrics:

- Accuracy: The model achieved a high accuracy of 99.58%, indicating that it correctly predicted gestures in nearly all cases.
- Precision, Recall, F1-Score: All gesture classes maintained consistently high values across these metrics, reflecting the model's ability to distinguish gestures effectively and minimize false positives and false negatives.

3. Real-Time Prediction:

- The model was tested on real-time video input to ensure it could handle live gesture recognition efficiently.
- The system provided accurate text translations with minimal latency, validating its practical usability.

4. Robustness:

- The model demonstrated strong performance across both one-hand and two-hand gestures.
- Testing confirmed the model's reliability for real-world applications involving sign language recognition.

5. Deployment Readiness:

- The testing phase affirmed the model's robustness, efficiency, and high accuracy, confirming its suitability for deployment in practical sign language interpretation systems.

In summary, testing is a crucial step in the development of SignSpeak, ensuring that the system works as intended, meets user needs, and provides a secure, accurate, and user-friendly experience. The testing process includes unit testing, integration testing, system testing, UAT, load testing, and security testing. Once testing is complete, the system is refined and prepared for deployment to deliver the best possible performance.