NANYANG TECHNOLOGICAL UNIVERSITY
SINGAPORE

School of Computer Science and Engineering
College of Engineering

Automatic Assessment of Body Motion and Pose Imitation

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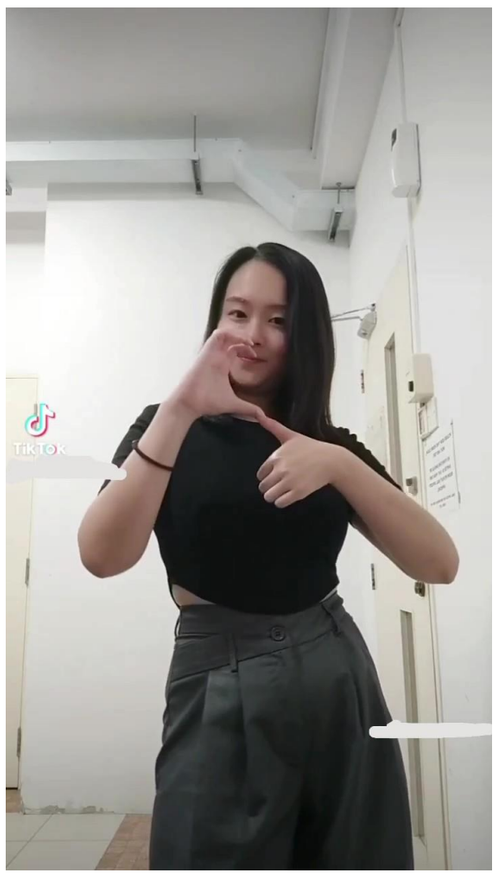
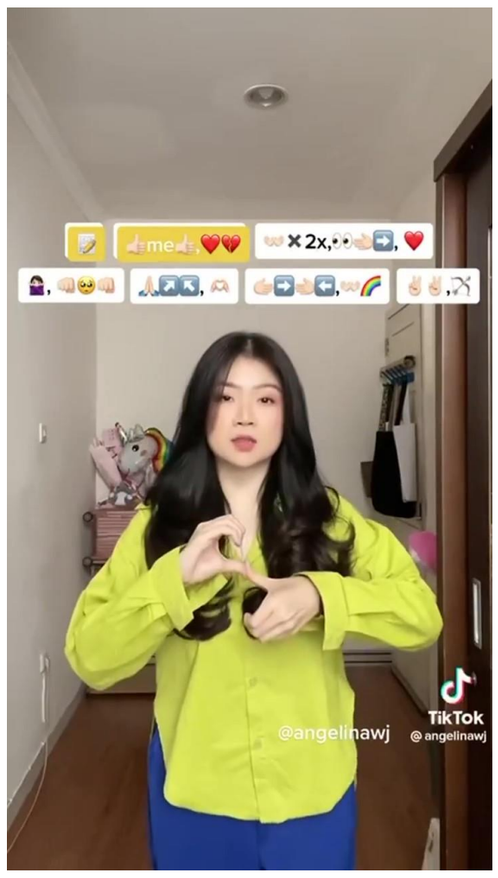
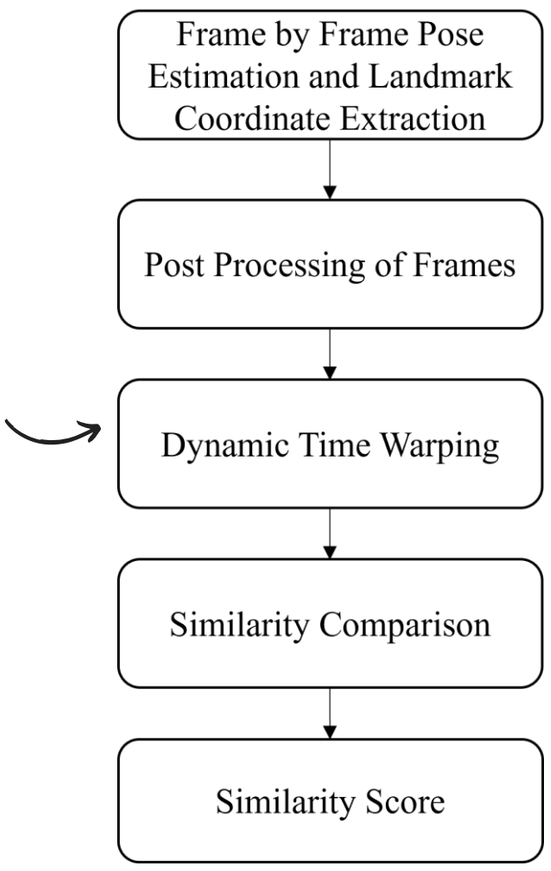
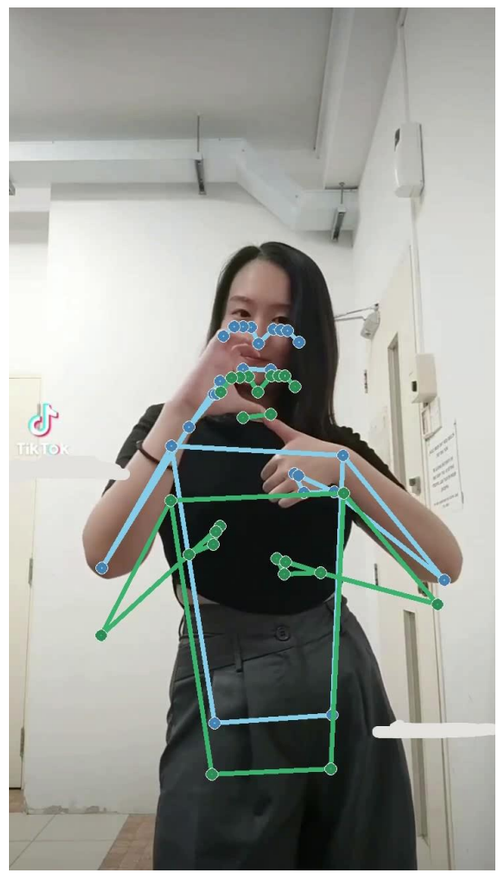


Student Video



Teacher Video





Feedback Video

Project Objectives

This project aims to leverage on pose estimation technologies to develop an application that can generate a similarity score of a learner's dance movements compared to their instructor's and provide them with personalized feedback on areas to improve on. The pose of the learner and instructor are extracted frame-by-frame. By aligning the frames using Dynamic Time Warping, the accuracy in each frame is calculated to generate an overall similarity score.

User Study

For pose estimation, MediaPipe Pose and YOLOv7 Pose were explored, with angle and cosine similarity used for similarity comparison. The various methods implemented were evaluated against a user study to find the one with the best performance to use in the application. The various methods were evaluated in eight scenarios.

1. Non-Occluded Movements
2. Occluded Movements
3. Transition Movements
4. Motion Blurring
5. Three-Dimensional Space
6. Distance from Camera
7. Clothing and Background Contrasts
8. Resolution of Video