Bano Qabil 2.0

Sign Speak

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Sign Speak: Sign Language Translation Project

1. Introduction

Sign Speak is a project aimed at bridging the communication gap between deaf and hearing individuals. It utilizes machine learning and computer vision techniques to translate sign language into written text and spoken audio, promoting accessibility and inclusivity.

2. System Architecture

- **Input:** Captures real-time video of sign language gestures using a webcam or other video device.
- **Preprocessing:** Applies image processing techniques to normalize the video stream, reduce noise, and isolate hand regions.
- **Hand Detection and Tracking:** Employs MediaPipe libraries to recognize and track hand movements within the video frame.
- **Feature Extraction:** Extracts key features from the hand poses and motion patterns, such as finger positions, orientations, and trajectories.
- **Sign Recognition:** Classifies the extracted features using a machine learning model trained on a dataset of sign language examples.

- **Text Generation:** Translates the recognized sign into corresponding text based on a sign language dictionary or grammar model.
- **Audio Synthesis:** Converts the generated text into spoken audio using text-to-speech (TTS) technology.
- **Output:** Presents the translated text and spoken audio to the user.

3. Technology Stack

- **Computer Vision:** MediaPipe for hand detection and tracking
- **Machine Learning:** Framework(s) like TensorFlow or PyTorch for sign recognition model
- **Natural Language Processing:** Libraries like NLTK for text generation
- **Text-to-Speech:** APIs or engines like Google Text-to-Speech
- **Game Development:** Pygame for user interface and presentation

4. Evaluation

- **Accuracy:** The model's ability to correctly recognize and translate signs.
- **Speed:** The processing time required for translation.
- **Usability:** The user-friendliness and overall experience of the application.
- **Accessibility:** Compatibility with various devices and accessibility features.

5. Future Developments

- Incorporate a larger and more diverse sign language dataset for improved accuracy.
- Implement speaker personalization for natural-sounding audio output.
- Integrate with translation services for multi-lingual support.
- Develop mobile applications for broader accessibility.

6. Conclusion

Sign Speak is a promising project with the potential to significantly improve communication for deaf and hard-of-hearing individuals. By leveraging innovative technologies, the project aims to promote inclusivity and empower individuals with diverse communication needs. This documentation serves as a starting point for further development and collaboration in this impactful field.

Project Screenshots:

DESCRIPTION: This program translates sign language into english language

SIGNSPEAK
BY THE KREKHEDS

START

CREATED BY
DANYAL ABBAS

CREATED BY
HAMZA MUGHAL

FPS:13.72
Finger Gesture:Stop

Right:help me