MELOSPEECH APPLICATION

A machine learning-based desktop application for enhancing language learning through music

Background of the project – Introduction

Language learning is an exciting but often challenging journey for many individuals. Traditional methods sometimes fail to engage learners, leading to boredom or slow progress. To address this, **MeloSpeech** introduces an innovative approach — combining **music** and **speech analysis** to make language acquisition more fun**,** interactive**,** and efficient.

MeloSpeech is a desktop-based application designed to help users improve their pronunciation, vocabulary, and fluency by using musical elements along with machine learning models**.** The application integrates speech recognition**,** music-based exercises**,** progress tracking**,** and an intuitive graphical user interface for a seamless user experience.

The idea for MeloSpeech originated from the observation that music greatly influences memory and language retention. Scientific studies show that songs help in better pronunciation, vocabulary acquisition, and emotional connection to language learning. Realizing the gap between traditional e-learning apps and the motivational role of music, the MeloSpeech project was conceptualized.

Objective

- To develop an interactive desktop application that assists language learners using music and speech analysis.
- To implement machine learning algorithms for speech assessment and feedback.
- To create a simple**,** user-friendly interface for smooth navigation.
- To provide real-time progress tracking for users.

Software Requirements

Operating system : Windows 10/11
Programming Language : Python 3.10v or older version
IDE : Visual Studio Code
Libraries used : Scikit-learn, TensorFlow, SpeechRecognition, Tkinter, matplotlib, numpy, pandas
Audio processing : Librosa, Pydub
Database : Sqlite
Machine learning models : Speech Recognition, Pronunciation Analysis, Sentiment or tone analysis

Future Scope/ Conclusion

- **Mobile App Extension**: Transform MeloSpeech into a cross-platform mobile app for Android/iOS using frameworks like Kivy or Flutter.
- **Multilingual Support**: Extend support to multiple languages beyond English for a wider user base.
- **AI Personalization**: Incorporate AI-driven personal tutors that adapt exercises based on the user's weaknesses and strengths.