Name	Thera.py - AI based mental care and wellness assistance using NLP
Description	The main idea of the project we are proposing is to implement a deep learning based system to provide accessible and supportive mental health assistance. We propose to plan a conversational system where people who are dealing with various problems in life can have at least someone they can talk to at the end of the day. We aim to use audio-to-text conversion, NLP to understand the problem the user is facing and then generate an appropriate response and use text-to-audio conversion to respond to the user. With this system, we are trying to contribute to the advancement of conversational AI and making mental health assistance accessible and affordable for each and every one.
Group Members	1. Aishwarya Krishnamurthy (ak73043@usc.edu) 2. Janhavi Pradhan (jpradhan@usc.edu) 3. Juhi Chhatlani (chhatlan@usc.edu) 4. Shubham S Darekar (sdarekar@usc.edu) 5. Sparsh N Prabhakar (sprabhak@usc.edu) 6. Tejas Mahajan (tejasnag@usc.edu)
Literature Survey	With the increasing prevalence of mental health issues and the potential benefits of leveraging technology in providing personalized support, a voice sentiment analysis and a responsive therapeutics application serves as a boon. Xiao et al. (2022) demonstrate reduced social anxiety in users interacting with a conversational AI for anxiety management. Scherer (2018) provides a comprehensive overview of speech emotion recognition based on advances in deep learning techniques. Liu and Zhang (2017) describes context aware sentiment analysis methods for understanding therapeutic conversations. AI based therapy applications like Lyssn and Wyssa generate clinical quality metrics based on the conversations with patients and determine potential actions like advise, affirm, confront, reflect, inform and more.
Project Flow	1. Data Preprocessing: Clean and process audio and text data for model training. 2. Emotion Detection: Train a model to recognize emotions from audio input using Wave2Vec and similar libraries. 3. Contextual Understanding: Develop an NLP model or leverage LLMs to analyze the conversational context and user intent. 4. Response Generation: Use LLM API to generate relevant and therapeutic responses based on user input, emotion, and context. 5. Speech Synthesis: Convert generated text responses into natural-sounding audio using a text-to-speech model. 6. Evaluation: Development of a metric to score the response on the basis of multiple factors and follow a voting system with LLMs as well as human feedback for the defined situations.
Expected Outcomes	1. Prototype AI therapist capable of basic conversation and emotional understanding. 2. Generation of empathetic and therapeutic responses tailored to user input. 3. Improved accessibility and affordability of mental health support. 4. Enhanced engagement and self-reflection through interactive therapy sessions.