TASK-1 REPORT

1. Introduction:

This project aims to develop a feature that can predict emotions from female voice recordings. Users can either upload a pre-recorded voice note or record their voice in real-time. The system is designed to work exclusively with female voices and will prompt the user to upload a female voice if another type of audio is detected.

2. Background:

With advancements in machine learning and audio processing, it has become possible to analyze vocal features to determine emotional states. This project builds upon these technologies to create a specialized tool for emotion detection in female voices.

3. Learning Objectives:

- Understand the principles of audio processing and feature extraction.
- Implement machine learning models for emotion prediction.
- Develop a user-friendly interface for audio recording and uploading.
- Ensure the model can distinguish between female and non-female voices.

4. Activities and Tasks:

1.Data Collection and Preprocessing:

- Gathered a dataset of voice recordings with labeled emotions.
- Preprocessed the audio files to extract relevant features.
- Label Encoding: The categorical labels were encoded as follows: male labeled as 1 ,female labeled as 0.
- Feature and Target Separation:The features were separated from the target variable: X: Features (excluding the label column) ,y: Target variable (label).

2. Model training :

- A logistic regression model was trained on the standardized training data. The model was fitted using the training set X_train and y_train.

3. Model Evaluation:

- The trained model was used to make predictions on the test set X_test. The accuracy of the model was calculated using the accuracy_score function from scikit-learn.

4. User Interface Development:

- Created an interface for recording and uploading voice notes.
- Integrated the emotion prediction model with the interface.

5. Testing and Validation

- Test the model with various voice samples to ensure accuracy.
- Validate the system's ability to detect and prompt for female voices

5. Skills and Competencies:

- Technical Skills: Proficiency in Python, machine learning, audio processing libraries (librosa, pydub), and frameworks (TensorFlow, Keras).
- Software Development: Experience with developing and integrating user interfaces (Streamlit).
- Analytical Skills: Ability to preprocess and analyze audio data for feature extraction and model training.

6. Feedback and Evidence:

- Collect feedback from test users on the accuracy and usability of the system.
- Gather evidence of the system's performance through metrics like accuracy, precision, recall, and F1-score.

7. Challenges and Solutions:

- Challenge: Differentiating between female and non-female voices accurately.

- Solution: Implemented a robust voice recognition model or use a pre-trained model for gender classification.

- Challenge: Ensuring high accuracy in emotion prediction.

- Solution: Used a diverse and comprehensive dataset for training and apply techniques like data augmentation.

8. Outcomes and Impact:

- Outcome: A functional system that accurately predicts emotions from female voice recordings and prompts users to upload the correct type of audio.
- Impact: Potential applications in mental health, customer service, and personal wellness, providing insights into emotional states from voice recordings.

9. Conclusion:

This project demonstrates the potential of machine learning in emotion detection from voice recordings, with a specific focus on female voices. The developed system can be a valuable tool in various fields, offering a blend of technical innovation and practical application. Future work may involve expanding the model to handle a broader range of voices and emotions, improving its robustness and applicability.