**Week 6 Report**

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## **1. Completed Work This Week**

#### **1.1 Data Collection & Organization**

* Continued gathering and organizing voice recordings from participants.
* Ensured all files were correctly labeled and stored in the designated dataset folder.
* Updated metadata CSV file to include relevant information such as participant ID, sentence spoken, and audio file path.

#### **1.2 Research & Learning from Existing Datasets**

* Explored Kaggle datasets **Global Speech Accent Recognition** and **Speaker Accent Recognition Dataset**.
* Analyzed how these datasets structured their metadata and extracted phonetic features.
* Applied key structuring insights from these datasets to improve our metadata organization and feature extraction process.

#### **1.3 Feature Extraction & Analysis**

* Identified key phonetic features to focus on: consonant pronunciation changes for ('p', 't', 'r', 'd').
* Extracted MFCC (Mel-Frequency Cepstral Coefficients), formants, pitch, and energy features from 2 voice samples and applied it .
* Addressed technical challenges such as:
  + Fixing import errors related to missing libraries (librosa, parselmouth, scipy.signal).
  + Restructuring file paths to avoid Unicode errors.
  + Handling missing or inaccessible directories by integrating files directly from the GitHub repository.

#### **1.4 Data Processing & CSV Integration**

* Combined extracted phonetic features into a structured [CSV](https://onedrive.live.com/personal/c90891f3b1b9a586/_layouts/15/doc.aspx?resid=8228ab01-22a8-4f0e-9b58-3fdeb4f0661d&cid=c90891f3b1b9a586) file.
* Ensured that each audio file was correctly mapped to its corresponding phonetic data.
* Validated the dataset to check for missing values and inconsistencies.

## **2. Findings & Insights**

* Observed distinct patterns in how Somali speakers pronounce the consonants ('p', 't', 'r', 'd').
* Somali speakers tend to replace certain consonants with alternative phonemes due to linguistic influences.
* Feature extraction revealed key differences in MFCC patterns, which could be used for classification.
* Initial clustering analysis suggests that pronunciation variations can be grouped into specific patterns.

## **3. Research Review**

* Reviewed linguistic studies on Somali phonetics and how certain consonants are pronounced differently compared to English.
* Analyzed formant structures of consonant pronunciation and their impact on accent identification.
* Investigated different feature extraction techniques commonly used in accent recognition models.

## **4. Future Work**

* Collect additional voice recordings to reach more than **200 participants** for better model generalization.
* Finalize the dataset structure and ensure feature completeness.
* Perform in-depth pattern analysis on extracted phonetic features to confirm pronunciation differences.
* Begin exploratory modeling to predict whether a speaker is Somali based on phonetic patterns.

## 6.Used code

//this is the [code](https://chatgpt.com/canvas/shared/67b40881f1b08191a74cc433c1afe17e) used to extract Features