
Deep Speech Processing (DSP) Assignment 2

Objective

1. To study the different sound units present in the majority of Indian languages.
2. To understand the production mechanism for each sound unit.
3. To learn the time-domain and frequency-domain characteristics of various sound units.

Instructions

1. **Speech Recording**
   - Record speech data for all the sound units in your mother tongue as listed in the theory.
   - Use a **16 kHz sampling frequency** and **16 bits/sample resolution** for all recordings.
2. **Sound Units to Record**
   - **Vowels**: Short vowels, Long vowels, and Diphthongs
   - **Consonants**:
     - Stops
     - Nasals
     - Fricatives
     - Semivowels
     - Affricates
   - **Special Instructions for Stops**:
     When recording stop consonants, include vowels both before and after the stop consonants.
     Example: Record "akha" where "kha" is the stop consonant, and "a" is a short vowel.
3. **Analysis and Plotting**
   - For each sound unit:
     a. Plot the **time-domain waveform** of the entire speech data.
     b. Plot **30 ms segments** to observe the expanded version.
     c. Plot the **log magnitude spectrum** for the 30 ms segment.
   - Create a sound unit chart.
4. **Observations and Analysis**
   - Note your observations for each sound unit, including:
     - Place of articulation
     - Manner of articulation

Submission Requirements: Upload in Google classroom

1. **Audio Files**: Submit all recorded audio files for the sound units.
2. **Plots and Observations Report**: Submit a report including:
   - Time-domain plots, 30 ms segment plots, and log magnitude spectrum for each sound unit.
   - Detailed observations about each sound unit.
3. **Code**: Submit the complete Python code for the assignment in **notebook format (.ipynb)**.

Deadline

- **Submission Date**: 22nd January

Helpful Tools and Libraries

1. **Python Functions and Libraries**
   - Example notebook: lab1.ipynb
   - Libraries: `torchaudio`, `matplotlib`, `numpy`
2. **Software for Audio Manipulation :** Audacity, Wavesurfer

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