Deep Speech Processing (DSP) Assignment: 7

Estimation of pitch from speech signals

Feb 2025

Instructions

- When uploading to Google Classroom, compress your files into a ZIP archive. Name the ZIP file as `SRN_Name.zip`
- All students are required to submit their assignments before coming for evaluation
- From now on, there is no need to upload a separate report. Instead, include your observations directly within the IPython notebook. For each experiment, create a text cell to write your observations. In addition, embed audio files directly into the notebook.
- During the the evaluation, you will present the concepts using the IPython notebook exclusively.
- Any deviation from the guidelines cannot be considered during the evaluation.
- For all the questions in the Basics section, ensure that both the time-domain representation and the magnitude spectrum plots are included in your Ipython notebook.
- If any doubts, please mail to `kishorks@iitdh.ac.in`

Autocorrelation based [Q1]

Concepts to read: Autocorrelation

- Select 30ms segment of voiced segment denoted as $s(n)$ from the given audio samples.
- Plot $s(n)$, log magnitude spectrum, autocorrelation signal
- Measure pitch from log magnitude spectrum and autocorrelation plot.
- The experiment is conducted for voiced segments of male, female speakers and violin sound.
- Audio samples of `male.wav`, `female.wav`, `voilin.wav` is given

Cepstrum based [Q2]

Concepts to read: Refer assignment 6

- Measure pitch by applying cepstrum analysis and low time liftering.
- Plot $s(n)$, log magnitude spectrum, cepstrum, low time liftered signal
- The experiment is conducted for voiced segments of male, female speakers and violin sound.
- Audio samples of `male.wav`, `female.wav`, `voilin.wav` is given

Utils

- lab1: `https://colab.research.google.com/drive/1nX20djsBuHpdy29TNpbDCXc_6TCzyMlo?usp=sharing`
- lab3: `https://colab.research.google.com/drive/1yDGsctDdYIyCzTv2hJPCsRkzFJB9aOO-?usp=sharing`
- For recording audio, use wavsurfer or Audacity