جامعة بيرزيت
BIRZEIT UNIVERSITY

Electrical and computer engineering

**Digital Signal Processing (DSP)**

**Assignment**

Submission deadline: **Sunday January 20th, 2024** only through Ritaj

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In this assignment, you are required to develop and demonstrate a simple gender recognition and classification of speech signal. In order to distinguish male from female, you are required to use both time and frequency domains for analyze the speech signal.

## Speech Dataset:

For this project, you need to have sufficient speech recordings for different male and female speakers (no less than 20 recordings for female and 20 recordings for male). You have to take different ages, and different environment, etc into account. The sentences which you have to recorded is "Zero". Make sure that all audio files (.wav) you will record have the same sampling frequency 44100 Hz.

## Tasks:

- Split Recording file into two files naming testing files and training file.
- Evaluate correlation, energy, and zero-crossing count.
- Evaluate the power spectral density
- Applying correlation, energy, zero-crossing count, and power spectral density techniques to evaluate the accuracy of the system.
- Given a speech person saying "zero".
    - Plot his recorded signal in time domain and frequency domain.
    - Match his record with your training data and finally decide if this for male or female.

## Other Resources:

For more information, you are highly encouraged to watch the following youtube video by Eng. Ahmad Dar-Khalil which describes a very similar assignment of previous semesters.

https://www.youtube.com/playlist?list=PLnyw1IVZpaTsFgcU2QlK9x2jU8vIFaRBl

**Deliverables (i.e. what you should submit)**:

By the specified deadline, everyone has to submit the followings:

1 – Matalb code for the time-domain system with inline comments.

2 – Matlab code for the spectral domain system with inline comments.

3- Short description of the testing data you have recorded and the performance of each system.

4- Few statements of how do you think this system can be improved and extended to any different words other than zero.

***Bonus***: if you implement Matlab GUI application, which can do the recording, present the recorded signal in time domain and frequency domain, zero crossing account, and result accuracy, you will get a bonus!