**EIE558 Speech Processing and Recognition**

**Lab: DNN-Based Voice Cloning**

**A. Objectives and Outcomes**

After finishing this lab, you should be able to perform the following

* Use Google Colab to perform voice cloning
* Understand the concept of speaker embedding
* Use speaker embedding to represent speaker characteristics
* Understand the relationship between utterance length and the representation capability of speaker embedding vectors

**B. Google Colab**

Google Colab is a free cloud service with GPU support. You may use Colab to develop deep learning applications based on popular libraries such as Keras, TensorFlow, PyTorch, and OpenCV.

**C. Submission**

Write a report, convert it to PDF, and submit it to Blackboard before the deadline. Your report may contain the following:

1. Discussions on your observations, e.g., the correlation between utterance length and speaker information in speaker embedding vectors
2. Waveforms and spectrograms of the utterances spoken by the target speakers
3. Waveforms and spectrograms of synthetic speech
4. The cosine distance between target-speaker’s utterance and his/her synthetic utterances
5. The effect of some other modifications that you may think of

Submit the waveform files in your clone/ folder to Blackboard.

**D. Procedures**

***D.1 Prepare Colab Environment***

1. Colab runs on browsers. You need a Google account to use Colab. If you do not have one, visit https://support.google.com/mail/answer/56256?hl=en.
2. Display the Google Drive page (https://drive.google.com/drive/my-drive) in your browser. Use the “+ New” button on the left panel to create the following directory structure in your Google Drive:

My Drive/Learning/EIE558/lab3

Later, you may mount your folders in Google Drive to the working environment of Colab.

1. Download the Colab file from

<http://bioinfo.eie.polyu.edu.hk/download/EIE558/voice-clone/Voice_clone.ipynb>. Save the file as “Voice\_clone.ipynb” on your Desktop. Remove the .txt extension if your browser adds one for you. Upload the file to your Google Drive under “My Drive/Learning/EIE558/lab3”.

1. Right click the file “Voice\_clone.ipynb” on your Google Drive folder and then select “Open with”. If you see “Google Colaboratory”, select it. If your Google account has not been connected with Colaboratory yet, select “Connect more apps” and then select Colaboratory. Then, click “Install”. Then, right click the file again and select “Google Colaboratory”.

Graphical user interface, text, application, chat or text message

Description automatically generated

1. Configure the Colab to use GPU by clicking Edit 🡪 Notebook settings. Select “GPU” in the pop-up window:

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1. Follow the procedure in this Colab file.

**References:**

1. <https://medium.com/deep-learning-turkey/google-colab-free-gpu-tutorial-e113627b9f5d>

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