

ECE3001 Project: Speaker Identification

Part II: Experiment and Analysis

In this part, we will train a speaker identification neural network. The training process can be deployed on Google Colab, where you can utilize GPUs to accelerate training.

1 Model training

1. (preliminaries) Make sure you have a Google Account first.
2. (preliminaries) Get familiar with Colab. You can read the `ColabTutorial.pdf` on Blackboard.
3. Download the Jupyter Notebook (`ECE3001Project.ipynb`) from the Blackboard. And upload the notebook to the **Colab** (See Fig. 1). You may need to login with your Google Account first.

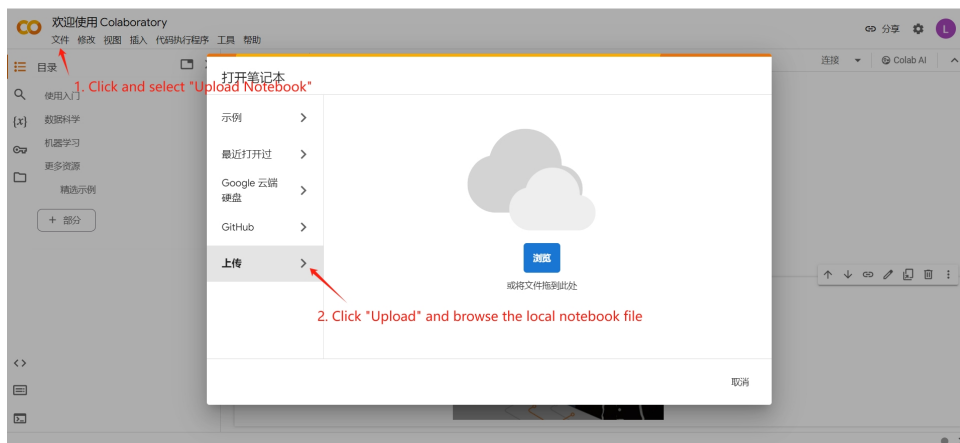


Figure 1: Upload the notebook to Colab

4. Once you have uploaded the notebook, you can start a GPU runtime (See Fig. 2).

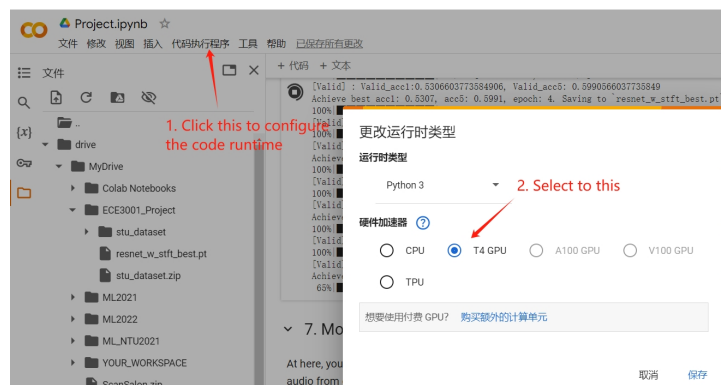


Figure 2: Select the GPU runtime

- In the first code cell, you will be asked to bind with your Google Drive. Follow the procedures to agree binding. (See Fig. 3).

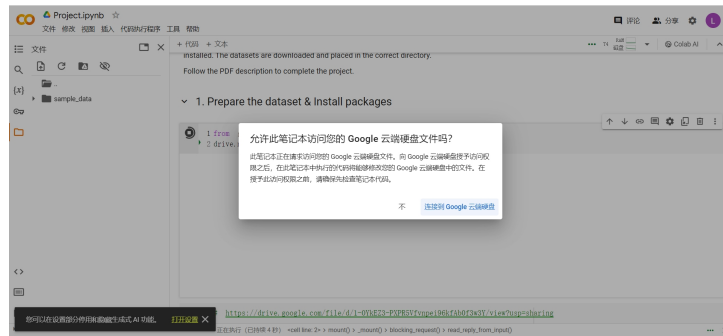


Figure 3: Press "Agree" to allow binding with the Google Drive.

- Then, you can run the remaining cells one by one to execute all codes. **Necessary explanations are with the code. Please read them carefully.**

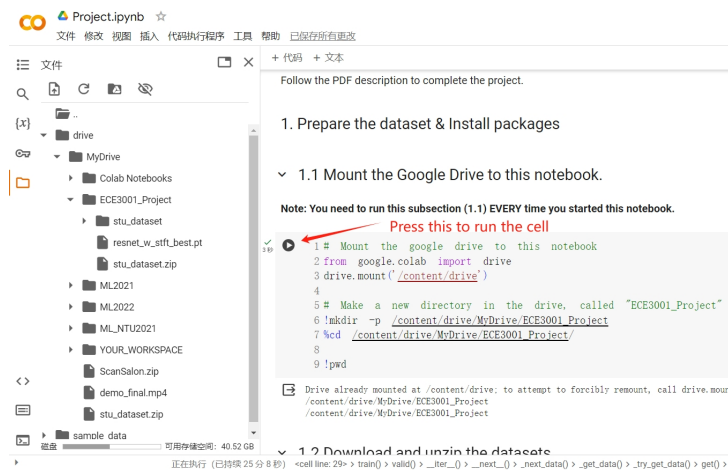


Figure 4: Run each cell by the button attached on the cell.

- We start training our model at Section 6 of the Notebook. It may take ≈ 40 min to train the model with default arguments. See Fig. 5 for some explanations. **Note: Here are something you need to care about:**

- Please keep this Colab webpage active** (e.g., by clicking this page every 15 min during training). Otherwise, the session would be disconnected automatically, and your training would be discarded. In that case, don't be worried, the latest trained weights should be saved in Google Drive. You can continue training with the saved weights. (But you may modified the code to load the weights first)
- The GPU resources are limited.** You have a quota of 4-12 hours to use the Colab GPU everyday. After that, you account would reach the quota limit, and cannot start new GPU-enabled Colab notebooks until the next day. Therefore, if you want to train, please work on this continuously, otherwise please shutdown the session in time (not merely close the web page, but to kill the runtime session).
- Use GPU instead of CPU for training.** Training on CPU is extremely slow (i.e., ≈ 3 -4 hours per epoch). If you reach the GPU quota limit, please consider train this on the next day. (The CPU-enabled Colab notebooks would be killed after about 12 hours. You can't finish your job on that case.)

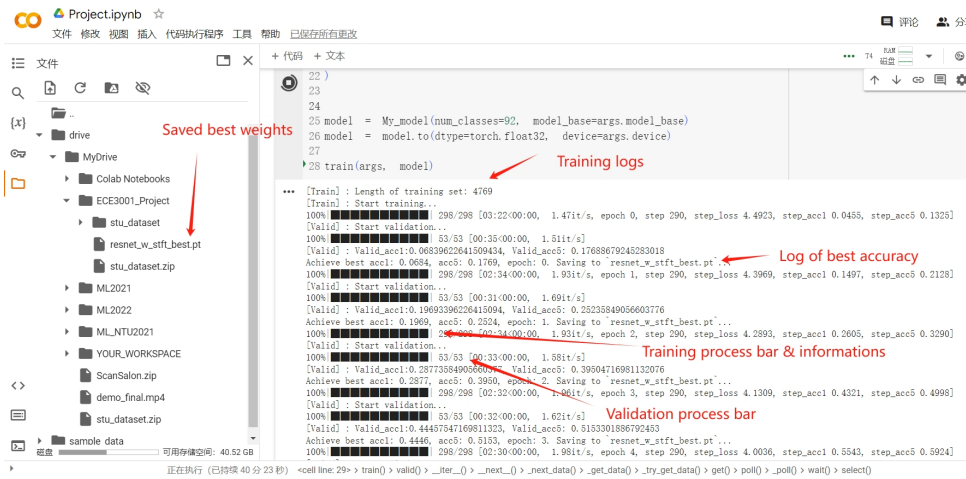


Figure 5: The training cells with explanations

1.1 Training instruction

1. You need to change at least two parameters: `model_base`, `use_stft` to compare the experiment results.
2. You can try modifying other parameters to get more results. (Not necessary)
3. More instructions are included in the `ECE3001Project.ipynb` notebook.

2 Report and Submission

1. Write a report showing the results of your experiment and analyze the results.
 - Plot the validation **accuracy** curves (at least 10 epochs) with and without stft for different trained models (e.g., vgg11, vggbn11, resnet18). A sample figure is shown in Fig. 6. *Hint: You can modify the code to save the accuracy at each epoch; Or you can extract the accuracy from the training logs by **Regular Expression**.*

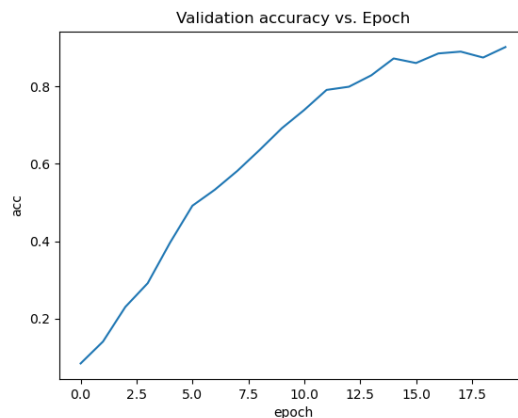


Figure 6: The validation accuracy curves

- Analyze experiment results from loss and prediction accuracy.
 - If you change the parameters of the model, or use a new model, explain the parameters changed or the new model used and show your training results.
2. Only submit the report file to the project link on the Blackboard, named in the format of `name+student_id+report.pdf`