

Submission of Model for Validation

This document is intended to provide guidelines for the submission of model for validation. Multiple submissions are allowed. Please limit your submission once a day. Note that the release of 2nd sets of dataset will be adjusted accordingly to the initial submission deadline of the IEEE BioCAS 2022. You will need to use both datasets to develop and finetune your model. We will have separate dataset for blind test on our system.

1. Supported Language:

Python3 & Matlab (Please notify us if you are submitting Matlab script)

2. Tasks:

Before submitting your model, please read the classification tasks.

Task 1 (Respiratory Sound Classification at Event Level):

Task 1-1 is a binary class classification challenge (Normal and Adventitious).

Task 1-2 is a multiclass classification challenge (Normal, Rhonchi, Wheeze, Stridor, Coarse Crackle, Fine Crackle, Wheeze & Crackle).

Task 2 (Respiratory Sound Classification at Record Level):

Task 2-1 is a ternary class classification challenge (Normal, Adventitious, and Poor Quality).

Task 2-2 is a multiclass classification challenge (Normal, CAS, DAS, CAS & DAS, or Poor Quality).

3. File Format:

The submitted files must be compressed in zip format. **The main script** (main.py) should be provided in the submitted files, which is the executable file for model evaluation. **The readme.md and requirements.txt** should be provided to describe the model architecture and list all the dependencies of your python project, respectively.

The command line and parameter requirements of the execution code are as follows:

```
python3 main.py --task task_level --wav /path/to/wav_path/ --out  
/path/to/output.json
```

The task_level is 11, 12, 21, or 22 (representing task 1-1, task 1-2, task 2-1, and task 2-2, respectively).

Notice that the wav files for respiratory sound classification at event level (task 1-1 & task 1-2) are segmented wav files.

The format of output json (**UTF-8**) is as follows:

```
{
  wav_file_name1: predicted_type1,
  wav_file_name2: predicted_type2,
  wav_file_name3: predicted_type3,
  ...
}
```

For task 1-1, the predicted type for each wav file is “Normal” or “Adventitious”.

For task 1-2, the predicted type for each wav file is “Normal”, “Rhonchi”, “Wheeze”, “Stridor”, “Coarse Crackle”, “Fine Crackle”, or “Wheeze & Crackle”.

For task 2-1, the predicted type for each wav file is “Normal”, “Adventitious”, or “Poor Quality”.

For task 2-2, the predicted type for each wav file is “Normal”, “CAS”, “DAS”, “CAS & DAS”, or “Poor Quality”.

4. Evaluation:

Submissions are evaluated based on the following metrics including sensitivity (SE), specificity (SP), average score (AS), and harmonic score (HS).

$$SE = \frac{\text{\# of correctly predicted adventitious events/records}}{\text{\# of total adventitious events/records}}$$

$$SP = \frac{\text{\# of correctly predicted normal events/records}}{\text{\# of total normal events/records}}$$

$$AS = \frac{SE + SP}{2}$$

$$HS = \frac{2 * SE * SP}{SE + SP}$$

$$Score = \frac{AS + HS}{2}$$

The total score is as follows:

$$\begin{aligned} \text{Total Score} = & 0.2 * \text{Score}_{1-1} + 0.3 * \text{Score}_{1-2} + \\ & 0.2 * \text{Score}_{2-1} + 0.3 * \text{Score}_{2-2} + 0.1 * \text{Bonus} \end{aligned}$$

*Bonus (Maximum 0.1 points)

Note that a bonus is provided after the final submission to award the submission with significant runtime improvement (**top-6**). This bonus is calculated based on the logarithm scale of runtime difference as compared to the worst-case solution.

$$\text{Bonus} = \log(t_0) - \log(t),$$

where t and t_0 are the runtimes of the solution and the worst-case solution. The score will be normalized to the best result.