

- ✓ Tạo môi trường conda ảo để cố định phiên bản

```
# tải conda về và run
!wget https://repo.anaconda.com/miniconda/Miniconda3-latest-Linux-x86_64.sh
!bash Miniconda3-latest-Linux-x86_64.sh -bfp /usr/local

# cho phép conda tải về các gói
!/usr/local/bin/conda tos accept --override-channels --channel https://repo.ana
!/usr/local/bin/conda tos accept --override-channels --channel https://repo.ana

# khởi tạo môi trường conda
!/usr/local/bin/conda create -y -n py311 python=3.11

# demo chạy thử
!bash -c "source /usr/local/bin/activate py311 && python --version"
```

```
python-3.11.14 | 29.8 MB | : 85% 0.8477874342526752/1 [00:00<00:00,
setuptools-80.9.0 | 1.9 MB | : 100% 1.0/1 [00:00<00:00, 1.35it/s]
```

```
Preparing transaction: done
Verifying transaction: done
Executing transaction: done
#
# To activate this environment, use
#
#     $ conda activate py311
#
# To deactivate an active environment, use
#
#     $ conda deactivate
```

```
Python 3.11.14
```

▼ Lấy repo mẫu và chỉnh sửa

```
!git clone https://github.com/hungithust/basic-multimodal-speech-emotion-recognition
Cloning into 'basic-multimodal-speech-emotion-recognition'...
remote: Enumerating objects: 126, done.
remote: Counting objects: 100% (126/126), done.
remote: Compressing objects: 100% (86/86), done.
remote: Total 126 (delta 55), reused 105 (delta 37), pack-reused 0 (from 0)
Receiving objects: 100% (126/126), 1.49 MiB | 24.16 MiB/s, done.
Resolving deltas: 100% (55/55), done.
```

```
# cài đặt các thư viện cần thiết
%cd basic-multimodal-speech-emotion-recognition
!bash -c 'source /usr/local/bin/activate py311 && pip install -r requirements.txt'
```

```

  Downloading jaconv-0.4.1-py3-none-any.whl (15 kB)
  Downloading jamo-0.4.1-py3-none-any.whl (9.5 kB)
  Downloading jinja2-3.1.6-py3-none-any.whl (134 kB)
  Downloading markupsafe-3.0.3-cp311-cp311-manylinux2014_x86_64.manylinux_2_17_x
  Downloading modelscope-1.33.0-py3-none-any.whl (6.1 MB)
  ━━━━━━━━━━━━━━━━ 6.1/6.1 MB 124.0 MB/s 0:00:00
  Downloading networkx-3.6.1-py3-none-any.whl (2.1 MB)
  ━━━━━━━━━━━━━━ 2.1/2.1 MB 80.1 MB/s 0:00:00
  Downloading nvidia_nvjitlink_cu12-12.9.86-py3-none-manylinux2010_x86_64.manyli
  ━━━━━━━━━━━━ 39.7/39.7 MB 56.6 MB/s 0:00:00
  Downloading jmespath-0.10.0-py2.py3-none-any.whl (24 kB)
  Downloading aliyun_python_sdk_kms-2.16.5-py2.py3-none-any.whl (99 kB)
  Downloading cryptography-46.0.3-cp311-abi3-manylinux_2_34_x86_64.whl (4.5 MB)
  ━━━━━━━━━━ 4.5/4.5 MB 114.6 MB/s 0:00:00
  Downloading pycryptodome-3.23.0-cp37-abi3-manylinux_2_17_x86_64.manylinux2014_
  ━━━━━━━━ 2.3/2.3 MB 85.6 MB/s 0:00:00
  Downloading pure_eval-0.2.3-py3-none-any.whl (11 kB)
  Downloading pyparser-2.23-py3-none-any.whl (118 kB)
  Downloading pytorch_wpe-0.0.1-py3-none-any.whl (8.1 kB)
  Downloading sympy-1.14.0-py3-none-any.whl (6.3 MB)
  ━━━━━━━━ 6.3/6.3 MB 133.5 MB/s 0:00:00
  Downloading mpmath-1.3.0-py3-none-any.whl (536 kB)
  ━━━━━━ 536.2/536.2 kB 26.0 MB/s 0:00:00
  Downloading torch_complex-0.4.4-py3-none-any.whl (9.1 kB)
  Downloading umap_learn-0.5.7-py3-none-any.whl (88 kB)
  Downloading pynndescent-0.5.13-py3-none-any.whl (56 kB)
  Downloading wcwidth-0.2.14-py2.py3-none-any.whl (37 kB)
  Building wheels for collected packages: antlr4-python3-runtime, jieba, oss2, a
    Building wheel for antlr4-python3-runtime (pyproject.toml) ... done
    Created wheel for antlr4-python3-runtime: filename=antlr4_python3_runtime-4.
    Stored in directory: /root/.cache/pip/wheels/1a/97/32/461f837398029ad7691110
    Building wheel for jieba (pyproject.toml) ... done
    Created wheel for jieba: filename=jieba-0.42.1-py3-none-any.whl size=1931450
    Stored in directory: /root/.cache/pip/wheels/ac/60/cf/538a1f183409caf1fc136b
    Building wheel for oss2 (pyproject.toml) ... done
    Created wheel for oss2: filename=oss2-2.19.1-py3-none-any.whl size=124035 sh
    Stored in directory: /root/.cache/pip/wheels/56/27/a3/50e7db0dd68810d9d4e383
    Building wheel for aliyun-python-sdk-core (pyproject.toml) ... done
    Created wheel for aliyun-python-sdk-core: filename=aliyun_python_sdk_core-2.
    Stored in directory: /root/.cache/pip/wheels/2b/9a/95/60f111d2a488c5f7f7ed2a
    Building wheel for crcmod (pyproject.toml) ... done
    Created wheel for crcmod: filename=crcmod-1.7-cp311-cp311-linux_x86_64.whl s
    Stored in directory: /root/.cache/pip/wheels/23/94/7a/8cb7d14597e6395ce96993
Successfully built antlr4-python3-runtime jieba oss2 aliyun-python-sdk-core cr
Installing collected packages: sentencepiece, pytz, pure-eval, ptyprocess, mpm
  ━━━━━━━━ 115/115 [funasr]
Successfully installed TPvthon-9.8.0 Markupsafe-3.0.3 PyYAML-6.0.3 aliyun-nvth

```

> Thử nghiệm với bộ dữ liệu IEMOCAP

↳ 37 ô bị ẩn

▼ Thực hiện với bộ dữ liệu tự làm

REPO này chạy hết bằng CPU

TODO:

1. Xử lý data rồi lưu vào thành audio_and_text.pkl
2. Tìm hiểu tại sao lại có frame khác nhau 91 - 170 dù data vẫn thế
3. Tìm xem các mô hình đầu ra là bao nhiêu để xử lý lớp linear phù hợp
4. Tìm cách chạy trên GPU (nếu được)

▼ Mount data từ drive

```
from google.colab import drive  
drive.mount('/content/drive')
```

Mounted at /content/drive

```
# chuyển data sang thư mục data của repo  
!mkdir /content/basic-multimodal-speech-emotion-recognition/data  
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/raw  
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/raw/Preprocess  
# !cp -r /content/drive/MyDrive/project3/Preprocessed/* /content/basic-multimod
```

```
!cp -r /content/drive/MyDrive/project3/Preprocessed/* /content/basic-multimodal
```

```
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/raw/happy+neut  
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/raw/scare  
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/raw/surprise  
!cp -r /content/drive/MyDrive/project3/happy+neutral+angry+sad/* /content/basic  
!cp -r /content/drive/MyDrive/project3/scare/* /content/basic-multimodal-speech  
!cp -r /content/drive/MyDrive/project3/surprise/* /content/basic-multimodal-spe
```

```
dal-speech-emotion-recognition/saved_models/* /content/drive/MyDrive/proj
```

```
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/inference  
!mkdir /content/basic-multimodal-speech-emotion-recognition/data/inference/Infe
```

```
!cp -r /content/drive/MyDrive/project3/inference/* /content/basic-multimodal-s
```

```
!mkdir saved_models  
!cp -r /content/drive/MyDrive/project3/saved_models/* /content/basic-multimodal  
  
!cp -r /content/basic-multimodal-speech-emotion-recognition/pictures/* /content  
  
!cp -r /content/basic-multimodal-speech-emotion-recognition/saved_models/* /content/basic-multimodal  
  
# !rm -rf /content/basic-multimodal-speech-emotion-recognition/data/raw/happy+surprise  
# !rm -rf /content/basic-multimodal-speech-emotion-recognition/data/raw/scare  
# !rm -rf /content/basic-multimodal-speech-emotion-recognition/data/raw/surprise
```

▼ Data processing

```
# import sys  
# import os  
  
# # Đường dẫn đến thư mục hiện tại (thư mục gốc của repo)  
# current_dir = os.getcwd()  
  
# # Thêm đường dẫn gốc vào sys.path  
# if current_dir not in sys.path:  
#     sys.path.append(current_dir)  
#     print(f"Đã thêm đường dẫn gốc: {current_dir} vào sys.path")  
  
Đã thêm đường dẫn gốc: /content/multimodal-speech-emotion-recognition vào sys.path
```

```
# tạo file setup.py để tìm và cài package, lưu ý phải để ở thư mục chính  
!echo "from setuptools import setup, find_packages" > setup.py  
!echo "" >> setup.py  
!echo "setup(" >> setup.py  
!echo "    name='mer',)" >> setup.py  
!echo "    version='0.1.0',)" >> setup.py  
!echo "    packages=find_packages()," >> setup.py  
!echo ")" >> setup.py
```

```
# cài đặt các module thành package nhờ file setup.py  
!bash -c 'source /usr/local/bin/activate py311 && pip install -e .'
```

```
Obtaining file:///content/basic-multimodal-speech-emotion-recognition  
Installing build dependencies ... done  
Checking if build backend supports build_editable ... done  
Getting requirements to build editable ... done  
Preparing editable metadata (pyproject.toml) ... done  
Building wheels for collected packages: mer  
Building editable for mer (pyproject.toml) ... done  
Created wheel for mer: filename=mer-0.1.0-0.editable-py3-none-any.whl size=359
```

```
Stored in directory: /tmp/pip-ephem-wheel-cache-w8ll8rss/wheels/e4/9c/df/84f23
Successfully built mer
Installing collected packages: mer
  Attempting uninstall: mer
    Found existing installation: mer 0.1.0
    Uninstalling mer-0.1.0:
      Successfully uninstalled mer-0.1.0
Successfully installed mer-0.1.0
```

Lưu ý: Chạy các file module thì đều có dạng:

```
!bash -c 'source py311/bin/activate && python -m mer.scripts.preprocess_data'
```

Cài đặt core

Chạy main theo từng bước

```
# # Đợi vài phút để PyPI cập nhật
# !pip install --upgrade protonx
```

Hiện kết quả đã ẩn

```
# !bash -c 'source /usr/local/bin/activate py311 && pip install --upgrade protc
```

Hiện kết quả đã ẩn

```
# bước 1 tạo file audio_and_text.pkl từ dataset
!bash -c 'source /usr/local/bin/activate py311 && python main.py'
```

Hiện kết quả đã ẩn

```
# đổi tên file để backup
# !mv /content/multimodal-speech-emotion-recognition/data/IEMOCAP/Preprocessed/
```

```
# df_moi = df.head(100)
# file_moi = '/content/multimodal-speech-emotion-recognition/data/IEMOCAP/Prepr
# df_moi.to_pickle(file_moi)
# print("đã lưu thành công")
```

đã lưu thành công

```
# bước 2
!bash -c 'source /usr/local/bin/activate py311 && python main.py'
```

```
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
warnings.warn(
```

```
Ignored unknown kwarg option normalize
Turning audio into W2V2s:  0% 2/7274 [00:00<10:41, 11.34it/s]/usr/local/envs/py
    warnings.warn(
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Ignored unknown kwarg option normalize
Turning audio into W2V2s: 100% 7274/7274 [02:21<00:00, 51.37it/s]
```

Nhấp đúp (hoặc nhấn Enter) để chỉnh sửa

Hiện mã

```
# bước 3
!bash -c 'source /usr/local/bin/activate py311 && python main.py'

/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Ignored unknown kwarg option normalize
vocab.txt: 895kB [00:00, 33.7MB/s]
bpe.codes: 1.14MB [00:00, 126MB/s]
tokenizer.json: 3.13MB [00:00, 184MB/s]
```

```
!bash -c 'source /usr/local/bin/activate py311 && pip install matplotlib-inline

Collecting matplotlib-inline
  Downloading matplotlib_inline-0.2.1-py3-none-any.whl.metadata (2.3 kB)
Collecting traitlets (from matplotlib-inline)
  Downloading traitlets-5.14.3-py3-none-any.whl.metadata (10 kB)
Downloaded matplotlib_inline-0.2.1-py3-none-any.whl (9.5 kB)
Downloaded traitlets-5.14.3-py3-none-any.whl (85 kB)
Installing collected packages: traitlets, matplotlib-inline
  _____ 2/2 [matplotlib-inline]
Successfully installed matplotlib-inline-0.2.1 traitlets-5.14.3
```

```
# để đọc được parquet thì cần engine
!bash -c 'source /usr/local/bin/activate py311 && pip install pyarrow fastparqu
```

Hiện kết quả đã ẩn

```
!bash -c 'source /usr/local/bin/activate py311 && pip install IPython'
```

Hiện kết quả đã ẩn

Lưu ý: Thêm để có thể chạy không GUI trên colab, và phải build lại package

```
import matplotlib
```

```
matplotlib.use("Agg")
```

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

```
# bước 4
```

```
!bash -c 'source /usr/local/bin/activate py311 && python main.py'
```

```
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
  warnings.warn(
Ignored unknown kwarg option normalize
Some weights of RobertaForSequenceClassification were not initialized from the m
You should probably TRAIN this model on a down-stream task to be able to use it
Đã khởi tạo xong model
Epoch 1:  0% 0/364 [00:00<?, ?it/s]We strongly recommend passing in an `attenti
Epoch 1: 100% 364/364 [04:17<00:00,  1.41it/s, accuracy=0.273, loss=1.49]
Epoch 2: 100% 364/364 [04:22<00:00,  1.38it/s, accuracy=0.364, loss=1.42]
Epoch 3: 100% 364/364 [04:23<00:00,  1.38it/s, accuracy=0.364, loss=1.06]
Evaluating the model: 100% 91/91 [00:18<00:00,  4.84it/s]
Accuracy: 0.4824742268041237
```

Lưu ý: Fix linear thành 91 * 768, do frame của file audio khác nhau, gốc là 170, dữ liệu này là 91

```
# bước 5
```

```
!bash -c 'source /usr/local/bin/activate py311 && python main.py'
```

```
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
  warnings.warn(
Ignored unknown kwarg option normalize
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
  warnings.warn(
Some weights of Wav2Vec2Model were not initialized from the model checkpoint at
You should probably TRAIN this model on a down-stream task to be able to use it
```

```

INFO:scripts.run_model:Getting the train dataloader...
INFO:dataloaders.iemocap:Loaded train dataset. Size: 5819
INFO:dataloaders.iemocap:Each emotion percentages: angry - 1182 | scare - 810 |
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Starting the training process...
INFO:core.trainer:Training the audio model...
Epoch 1:  0% 0/364 [00:00<?, ?it/s]/usr/local/envs/py311/lib/python3.11/site-pa
    return collate([torch.as_tensor(b) for b in batch], collate_fn_map=collate_fn_
Epoch 1: 100% 364/364 [02:21<00:00,  2.57it/s, accuracy=0.182, loss=1.86]
Epoch 2: 100% 364/364 [02:29<00:00,  2.43it/s, accuracy=0.636, loss=1.4]
Epoch 3: 100% 364/364 [02:29<00:00,  2.44it/s, accuracy=0.455, loss=1.58]
INFO:scripts.run_model:Saving the model...
INFO:scripts.run_model:Getting the eval dataloader...
INFO:dataloaders.iemocap:Loaded test dataset. Size: 1455
INFO:dataloaders.iemocap:Each emotion percentages: angry - 284 | scare - 184 | n
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Evaluating the model...
Evaluating the model: 100% 91/91 [00:15<00:00,  5.72it/s]
Accuracy: 0.5896907216494846

```

Lưu ý: Sửa fushion/model:

Phần mlp_head: sửa 170 thành 123 và bỏ đi +4

```

# bước 6
!bash -c 'source /usr/local/bin/activate py311 && python main.py'

/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Ignored unknown kwarg option normalize
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Some weights of Wav2Vec2Model were not initialized from the model checkpoint at
You should probably TRAIN this model on a down-stream task to be able to use it
INFO:scripts.run_model:Getting the train dataloader...
INFO:dataloaders.iemocap:Loaded train dataset. Size: 5819
INFO:dataloaders.iemocap:Each emotion percentages: angry - 1182 | scare - 810 |
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Starting the training process...
INFO:core.trainer:Training the fusion model...
Epoch 1:  0% 0/364 [00:00<?, ?it/s]/usr/local/envs/py311/lib/python3.11/site-pa
    return collate([torch.as_tensor(b) for b in batch], collate_fn_map=collate_fn_
We strongly recommend passing in an `attention_mask` since your input_ids may be
Epoch 1: 100% 364/364 [02:27<00:00,  2.47it/s, accuracy=0.818, loss=1.34]
Epoch 2: 100% 364/364 [02:35<00:00,  2.34it/s, accuracy=0.727, loss=1.46]
Epoch 3: 100% 364/364 [02:35<00:00,  2.34it/s, accuracy=0.455, loss=1.65]
INFO:scripts.run_model:Saving the model...
INFO:scripts.run_model:Getting the eval dataloader...
INFO:dataloaders.iemocap:Loaded test dataset. Size: 1455
INFO:dataloaders.iemocap:Each emotion percentages: angry - 284 | scare - 184 | n

```

```
INFO:dataloadersiemocap:Shapes: audio - (39526,); text - (256,)  
INFO:scripts.run_model:Evaluating the model...  
Evaluating the model: 100% 91/91 [00:35<00:00, 2.55it/s]  
Accuracy: 0.5993127147766323
```

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

```
# inference  
!bash -c 'source /usr/local/bin/activate py311 && python main.py'  
  
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download  
    warnings.warn()  
Ignored unknown kwarg option normalize  
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download  
    warnings.warn()  
Some weights of Wav2Vec2Model were not initialized from the model checkpoint at  
You should probably TRAIN this model on a down-stream task to be able to use it  
✓ Loaded full checkpoint  
/usr/local/envs/py311/lib/python3.11/site-packages/torch/utils/data/_utils/colla  
    return collate([torch.as_tensor(b) for b in batch], collate_fn_map=collate_fn_  
Traceback (most recent call last):  
  File "/content/basic-multimodal-speech-emotion-recognition/main.py", line 71,  
    print(predict_emotions_from_folder(CONFIG.inference_dataset_path()))  
                                ^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^^  
  File "/content/basic-multimodal-speech-emotion-recognition/inference/predict.p  
    outputs = fusion_trainer.model(text, audio)  
                ^^^^^^  
  File "/usr/local/envs/py311/lib/python3.11/site-packages/torch/nn/modules/modu  
    return self._call_impl(*args, **kwargs)  
                ^^^^^^  
  File "/usr/local/envs/py311/lib/python3.11/site-packages/torch/nn/modules/modu  
    return forward_call(*args, **kwargs)  
                ^^^^^^  
  File "/content/basic-multimodal-speech-emotion-recognition/fusion/model.py", l  
    self.audio_model.cls_head(self.audio_model.lm_head(audio_features))  
                ^^^^^^  
  File "/usr/local/envs/py311/lib/python3.11/site-packages/torch/nn/modules/modu  
    return self._call_impl(*args, **kwargs)  
                ^^^^^^  
  File "/usr/local/envs/py311/lib/python3.11/site-packages/torch/nn/modules/modu  
    return forward_call(*args, **kwargs)  
                ^^^^^^  
  File "/usr/local/envs/py311/lib/python3.11/site-packages/torch/nn/modules/line  
    return F.linear(input, self.weight, self.bias)  
                ^^^^^^  
RuntimeError: mat1 and mat2 shapes cannot be multiplied (1x23040 and 94464x256)
```

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

✓ chạy lại main

```
# bước 4
!bash -c 'source /usr/local/bin/activate py311 && python main.py'

/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Ignored unknown kwarg option normalize
    /usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
        warnings.warn(
config.json: 100% 557/557 [00:00<00:00, 2.56MB/s]
pytorch_model.bin: 100% 543M/543M [00:05<00:00, 101MB/s]
Some weights of RobertaForSequenceClassification were not initialized from the m
You should probably TRAIN this model on a down-stream task to be able to use it
INFO:scripts.run_model:Getting the train dataloader...
INFO:dataloaders.iemocap:Loaded train dataset. Size: 5819
INFO:dataloaders.iemocap:Each emotion percentages: angry - 1182 | scare - 810 |
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Starting the training process...
INFO:core.trainer:Training the text model...
Epoch 1:  0% 0/364 [00:00<?, ?it/s]/usr/local/envs/py311/lib/python3.11/site-pa
    return collate([torch.as_tensor(b) for b in batch], collate_fn_map=collate_fn_
We strongly recommend passing in an `attention_mask` since your input_ids may be
Epoch 1: 100% 364/364 [04:36<00:00,  1.32it/s, accuracy=0.273, loss=1.49]
Epoch 2: 100% 364/364 [04:40<00:00,  1.30it/s, accuracy=0.364, loss=1.42]
Epoch 3: 100% 364/364 [04:39<00:00,  1.30it/s, accuracy=0.364, loss=1.06]
INFO:scripts.run_model:Saving the model...
INFO:scripts.run_model:Getting the eval dataloader...
INFO:dataloaders.iemocap:Loaded test dataset. Size: 1455
INFO:dataloaders.iemocap:Each emotion percentages: angry - 284 | scare - 184 | n
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Evaluating the model...
Evaluating the model: 100% 91/91 [00:19<00:00,  4.67it/s]
Accuracy: 0.4824742268041237
```

```
# bước 5
!bash -c 'source /usr/local/bin/activate py311 && python main.py'

/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Ignored unknown kwarg option normalize
    /usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
        warnings.warn(
Some weights of Wav2Vec2Model were not initialized from the model checkpoint at
You should probably TRAIN this model on a down-stream task to be able to use it
```

```
INFO:scripts.run_model:Getting the train dataloader...
INFO:dataloaders.iemocap:Loaded train dataset. Size: 5819
INFO:dataloaders.iemocap:Each emotion percentages: angry - 1182 | scare - 810 |
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Starting the training process...
INFO:core.trainer:Training the audio model...
Epoch 1:  0% 0/364 [00:00<?, ?it/s]/usr/local/envs/py311/lib/python3.11/site-pa
    return collate([torch.as_tensor(b) for b in batch], collate_fn_map=collate_fn_
Epoch 1: 100% 364/364 [02:26<00:00,  2.49it/s, accuracy=0.273, loss=1.72]
Epoch 2: 100% 364/364 [02:33<00:00,  2.37it/s, accuracy=0.727, loss=1.33]
Epoch 3: 100% 364/364 [02:33<00:00,  2.37it/s, accuracy=0.636, loss=1.4]
INFO:scripts.run_model:Saving the model...
INFO:scripts.run_model:Getting the eval dataloader...
INFO:dataloaders.iemocap:Loaded test dataset. Size: 1455
INFO:dataloaders.iemocap:Each emotion percentages: angry - 284 | scare - 184 | n
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Evaluating the model...
Evaluating the model: 100% 91/91 [00:16<00:00,  5.37it/s]
Accuracy: 0.5903780068728522
```

```
# bước 6
!bash -c 'source /usr/local/bin/activate py311 && python main.py'

/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Ignored unknown kwarg option normalize
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Some weights of RobertaForSequenceClassification were not initialized from the m
You should probably TRAIN this model on a down-stream task to be able to use it
/usr/local/envs/py311/lib/python3.11/site-packages/huggingface_hub/file_download
    warnings.warn(
Some weights of Wav2Vec2Model were not initialized from the model checkpoint at
You should probably TRAIN this model on a down-stream task to be able to use it
INFO:scripts.run_model:Getting the train dataloader...
INFO:dataloaders.iemocap:Loaded train dataset. Size: 5819
INFO:dataloaders.iemocap:Each emotion percentages: angry - 1182 | scare - 810 |
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
INFO:scripts.run_model:Starting the training process...
INFO:core.trainer:Training the fusion model...
Epoch 1:  0% 0/364 [00:00<?, ?it/s]/usr/local/envs/py311/lib/python3.11/site-pa
    return collate([torch.as_tensor(b) for b in batch], collate_fn_map=collate_fn_
We strongly recommend passing in an `attention_mask` since your input_ids may be
Epoch 1: 100% 364/364 [02:25<00:00,  2.49it/s, accuracy=0.818, loss=1.61]
Epoch 2: 100% 364/364 [02:35<00:00,  2.34it/s, accuracy=0.818, loss=1.4]
Epoch 3: 100% 364/364 [02:36<00:00,  2.33it/s, accuracy=0.727, loss=1.47]
INFO:scripts.run_model:Saving the model...
INFO:scripts.run_model:Getting the eval dataloader...
INFO:dataloaders.iemocap:Loaded test dataset. Size: 1455
INFO:dataloaders.iemocap:Each emotion percentages: angry - 284 | scare - 184 | n
INFO:dataloaders.iemocap:Shapes: audio - (39526,); text - (256,)
```

```
INFO:scripts.run_model:Evaluating the model...
Evaluating the model: 100% 91/91 [00:37<00:00,  2.45it/s]
Accuracy: 0.5924398625429553
```

We strongly recommend passing in an `attention_mask` since your input_ids may
Transcription: mình rung lên khi cửa thang máy đóng sầm và cabin tối đi vài gi
Predicted Emotion: scare

confidence: 5 ' anonymity': 0 116655270215212220 'scope': 0 20199760010017915 'point'

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

Tạo dataframe rồi lưu vào dạng pkl trong
data/preprocessed/audio_and_text.pkl

```
!bash -c 'source /usr/local/bin/activate py311 && python main.py'
```

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

Bắt đầu lập trình hoặc tạo mã bằng trí tuệ nhân tạo (AI).

- ✓ Thủ faster whisper và photonx

```
!bash -c 'source /usr/local/bin/activate py311 && pip install transformers accelerate' > /dev/null
```

Hiện kết quả đã ẩn

```
import torch
from transformers import WhisperProcessor, WhisperForConditionalGeneration
import librosa
import numpy as np

# 1. Định nghĩa tên mô hình PhoWhisper Small
model_name = "vinai/phowhisper-small"

# 2. Tải Processor và Model
# Processor sẽ tải tokenizer và feature extractor
```

```

processor = WhisperProcessor.from_pretrained(model_name)
model = WhisperForConditionalGeneration.from_pretrained(model_name)

# 3. Chuyển mô hình sang GPU nếu có
device = "cuda" if torch.cuda.is_available() else "cpu"
model.to(device)

print(f"Đã tải mô hình {model_name} và sử dụng trên thiết bị: {device}")

```

Đã tải mô hình vinai/phowhisper-small và sử dụng trên thiết bị: cpu

```

AttributeError                                                 Traceback (most recent call last)
/tmp/ipython-input-4180741552.py in <cell line: 0>()
      58
      59 # transcribe_vietnamese_audio('female_00003.wav')
---> 60 segments,info = model.transcribe("female_00003.wav")
      61 for segment in segments:
      62     print("[%.2fs -> %.2fs] %s" % (segment.start, segment.end,
segment.text))

/usr/local/lib/python3.12/dist-packages/torch/nn/modules/module.py in
__getattr__(self, name)
    1962         if name in modules:
    1963             return modules[name]
-> 1964         raise AttributeError(
    1965             f"'{type(self).__name__}' object has no attribute '{name}'"
    1966     )

AttributeError: 'WhisperForConditionalGeneration' object has no attribute
'transcribe'

```

```

def transcribe_vietnamese_audio(audio_path):
    """
    Chuyển đổi tệp âm thanh Tiếng Việt sang văn bản bằng PhoWhisper Small.

    Args:
        audio_path (str): Đường dẫn đến tệp âm thanh (ví dụ: .wav, .mp3).

    Returns:
        str: Văn bản đã được chuyển đổi.
    """

    # 1. Tải và lấy mẫu lại (resample) tệp âm thanh về tần số 16kHz (yêu cầu củ
    # librosa.load trả về numpy array và sample rate (sr)
    speech_array, sampling_rate = librosa.load(audio_path, sr=16000)

    # 2. Xử lý đầu vào: trích xuất features
    # Cần đảm bảo rằng audio là một mảng 1D (mono)

```

```
input_features = processor(  
    speech_array,  
    sampling_rate=sampling_rate,  
    return_tensors="pt"  
).input_features  
  
# 3. Chuyển input features sang thiết bị (GPU/CPU)  
input_features = input_features.to(device)  
  
# 4. Chạy Inference (tạo văn bản)  
with torch.no_grad():  
    # Tham số language="vi" và task="transcribe" là bắt buộc đối với PhoWho  
    predicted_ids = model.generate(  
        input_features,  
        forced_decoder_ids=processor.get_decoder_prompt_ids(language="vi",  
    )  
  
    # 5. Giải mã ID thành chuỗi văn bản  
    transcription = processor.batch_decode(predicted_ids, skip_special_tokens=True)  
  
return transcription
```

transcribe_vietnamese_audio('female_00003.wav')

'sau khi mà cho vào thì ông ấy đã đổ những viên đá nhỏ cùng với cát đặt bằng phẳng thì vừa vặn có thể đủ hết những cái viên đá vào bên trong.'

✓ thử emotion2vec

```
!pip install funasr  
from funasr import AutoModel
```



```
Collecting funasr
  Downloading funasr-1.2.7-py3-none-any.whl.metadata (32 kB)
Requirement already satisfied: scipy>=1.4.1 in /usr/local/lib/python3.12/dist-
Requirement already satisfied: librosa in /usr/local/lib/python3.12/dist-packa
Collecting jamo (from funasr)
  Downloading jamo-0.4.1-py3-none-any.whl.metadata (2.3 kB)
Requirement already satisfied: PyYAML>=5.1.2 in /usr/local/lib/python3.12/dist-
Requirement already satisfied: soundfile>=0.12.1 in /usr/local/lib/python3.12/
Collecting kaldio>=2.17.0 (from funasr)
  Downloading kaldio-2.18.1-py3-none-any.whl.metadata (13 kB)
Collecting torch-complex (from funasr)
  Downloading torch_complex-0.4.4-py3-none-any.whl.metadata (3.1 kB)
Requirement already satisfied: sentencepiece in /usr/local/lib/python3.12/dist-
Requirement already satisfied: jieba in /usr/local/lib/python3.12/dist-package
Collecting pytorch-wpe (from funasr)
  Downloading pytorch_wpe-0.0.1-py3-none-any.whl.metadata (242 bytes)
Requirement already satisfied: editdistance>=0.5.2 in /usr/local/lib/python3.1
Collecting oss2 (from funasr)
  Downloading oss2-2.19.1.tar.gz (298 kB)
298.8/298.8 kB 7.9 MB/s eta 0:00:
  Preparing metadata (setup.py) ... done
Requirement already satisfied: tqdm in /usr/local/lib/python3.12/dist-packages
Requirement already satisfied: umap-learn in /usr/local/lib/python3.12/dist-pa
Collecting jaconv (from funasr)
  Downloading jaconv-0.4.1-py3-none-any.whl.metadata (8.0 kB)
Collecting hydra-core>=1.3.2 (from funasr)
  Downloading hydra_core-1.3.2-py3-none-any.whl.metadata (5.5 kB)
Collecting tensorboardX (from funasr)
  Downloading tensorboardx-2.6.4-py3-none-any.whl.metadata (6.2 kB)
Requirement already satisfied: requests in /usr/local/lib/python3.12/dist-pack
Collecting modelscope (from funasr)
  Downloading modelscope-1.33.0-py3-none-any.whl.metadata (43 kB)
43.3/43.3 kB 3.0 MB/s eta 0:00:0
Requirement already satisfied: omegaconf<2.4,>=2.2 in /usr/local/lib/python3.1
Requirement already satisfied: antlr4-python3-runtime==4.9.* in /usr/local/lib
Requirement already satisfied: packaging in /usr/local/lib/python3.12/dist-pac
Requirement already satisfied: numpy in /usr/local/lib/python3.12/dist-package
Requirement already satisfied: cffi>=1.0 in /usr/local/lib/python3.12/dist-pac
Requirement already satisfied: audioread>=2.1.9 in /usr/local/lib/python3.12/d
Requirement already satisfied: numba>=0.51.0 in /usr/local/lib/python3.12/dist
Requirement already satisfied: scikit-learn>=1.1.0 in /usr/local/lib/python3.1
Requirement already satisfied: joblib>=1.0 in /usr/local/lib/python3.12/dist-p
Requirement already satisfied: decorator>=4.3.0 in /usr/local/lib/python3.12/d
Requirement already satisfied: pooch>=1.1 in /usr/local/lib/python3.12/dist-pa
Requirement already satisfied: soxr>=0.3.2 in /usr/local/lib/python3.12/dist-p
Requirement already satisfied: typing_extensions>=4.1.1 in /usr/local/lib/pyth
Requirement already satisfied: lazy_loader>=0.1 in /usr/local/lib/python3.12/d
Requirement already satisfied: msgpack>=1.0 in /usr/local/lib/python3.12/dist-
Requirement already satisfied: filelock in /usr/local/lib/python3.12/dist-pack
Requirement already satisfied: setuptools in /usr/local/lib/python3.12/dist-pa
Requirement already satisfied: urllib3>=1.26 in /usr/local/lib/python3.12/dist-
Requirement already satisfied: charset_normalizer<4,>=2 in /usr/local/lib/pyth
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.12/dist-
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.12
Collecting crcmod>=1.7 (from oss2->funasr)
  Downloading crcmod-1.7.tar.gz (89 kB)
```

```
----- 89.7/89.7 kB 6.8 MB/s eta 0:00:0
Preparing metadata (setup.py) ... done
Collecting pycryptodome>=3.4.7 (from oss2->funasr)
    Downloading pycryptodome-3.23.0-cp37-abi3-manylinux_2_17_x86_64.manylinux201_
Collecting aliyun-python-sdk-kms>=2.4.1 (from oss2->funasr)
    Downloading aliyun_python_sdk_kms-2.16.5-py2.py3-none-any.whl.metadata (1.5
Collecting aliyun-python-sdk-core>=2.13.12 (from oss2->funasr)
    Downloading aliyun-python-sdk-core-2.16.0.tar.gz (449 kB)
----- 449.6/449.6 kB 19.0 MB/s eta 0:00:
Preparing metadata (setup.py) ... done
Requirement already satisfied: six in /usr/local/lib/python3.12/dist-packages
Requirement already satisfied: protobuf>=3.20 in /usr/local/lib/python3.12/dis_
Requirement already satisfied: pyndescent>=0.5 in /usr/local/lib/python3.12/d
Collecting jmespath<1.0.0,>=0.9.3 (from aliyun-python-sdk-core>=2.13.12->oss2-
    Downloading jmespath-0.10.0-py2.py3-none-any.whl.metadata (8.0 kB)
Requirement already satisfied: cryptography>=3.0.0 in /usr/local/lib/python3.1
Requirement already satisfied: pyparser in /usr/local/lib/python3.12/dist-pac
Requirement already satisfied: llvmlite<0.44,>=0.43.0dev0 in /usr/local/lib/py
Requirement already satisfied: platformdirs>=2.5.0 in /usr/local/lib/python3.1
Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.
Downloading funasr-1.2.7-py3-none-any.whl (703 kB)
----- 703.2/703.2 kB 41.7 MB/s eta 0:00:
Downloading hydra_core-1.3.2-py3-none-any.whl (154 kB)
----- 154.5/154.5 kB 11.9 MB/s eta 0:00:
Downloading kaldio-2.18.1-py3-none-any.whl (29 kB)
Downloading jaconv-0.4.1-py3-none-any.whl (15 kB)
Downloading jamo-0.4.1-py3-none-any.whl (9.5 kB)
Downloading modelscope-1.33.0-py3-none-any.whl (6.1 MB)
----- 6.1/6.1 MB 113.2 MB/s eta 0:00:00
Downloading pytorch_wpe-0.0.1-py3-none-any.whl (8.1 kB)
Downloading tensorboardx-2.6.4-py3-none-any.whl (87 kB)
----- 87.2/87.2 kB 6.2 MB/s eta 0:00:00
Downloading torch_complex-0.4.4-py3-none-any.whl (9.1 kB)
Downloading aliyun_python_sdk_kms-2.16.5-py2.py3-none-any.whl (99 kB)
----- 99.5/99.5 kB 7.9 MB/s eta 0:00:00
Downloading pycryptodome-3.23.0-cp37-abi3-manylinux_2_17_x86_64.manylinux2014_
----- 2.3/2.3 MB 55.0 MB/s eta 0:00:00
Downloading jmespath-0.10.0-py2.py3-none-any.whl (24 kB)
Building wheels for collected packages: oss2, aliyun-python-sdk-core, crcmod
    Building wheel for oss2 (setup.py) ... done
        Created wheel for oss2: filename=oss2-2.19.1-py3-none-any.whl size=123940 sh
        Stored in directory: /root/.cache/pip/wheels/a6/aa/ce/a0c9e73f8e4a3b7813b6b0
    Building wheel for aliyun-python-sdk-core (setup.py) ... done
        Created wheel for aliyun-python-sdk-core: filename=aliyun_python_sdk_core-2.
        Stored in directory: /root/.cache/pip/wheels/5a/60/7c/80d5fdcd6d0e016e4a7ff4
    Building wheel for crcmod (setup.py) ... done
        Created wheel for crcmod: filename=crcmod-1.7-cp312-cp312-linux_x86_64.whl s
        Stored in directory: /root/.cache/pip/wheels/76/08/0b/caa8b1380122cbfe6a03ea
Successfully built oss2 aliyun-python-sdk-core crcmod
Installing collected packages: jamo, jaconv, crcmod, torch-complex, tensorboar
Successfully installed aliyun-python-sdk-core-2.16.0 aliyun-python-sdk-kms-2.1
/usr/local/lib/python3.12/dist-packages/pydub/utils.py:300: SyntaxWarning: inv
    m = re.match('([su][0-9]{1,2})p?) \(([0-9]{1,2}) bit\)$', token)
/usr/local/lib/python3.12/dist-packages/pydub/utils.py:301: SyntaxWarning: inv
    m2 = re.match('([su][0-9]{1,2})p?)( \(\d+)?$', token)
/usr/local/lib/python3.12/dist-packages/pydub/utils.py:310: SyntaxWarning: inv
    elif re.match('(\d+\n?)( \(\d+\))?', token).group(1) == token.group(1):
-----
```

```

from funasr import AutoModel

model = AutoModel(model="iic/emotion2vec_plus_base")

wav_file = "female_00003.wav"
res = model.generate(wav_file, output_dir="./outputs", granularity="utterance",
print(res)

Downloading [config.yaml]: 100%                                5.42k/5.42k [00:01<00:00, 5.29kB/s]
Downloading [.DS_Store]: 100%                                 6.00k/6.00k [00:01<00:00, 4.46kB/s]
Downloading [configuration.json]: 100%                         343/343 [00:01<00:00, 248B/s]
Downloading [emotion2vec+data.png]: 100%                      267k/267k [00:01<00:00, 191kB/s]
Downloading [emotion2vec+radar.png]: 100%                     666k/666k [00:01<00:00, 513kB/s]
Downloading [logo.png]: 100%                                  1.76M/1.76M [00:01<00:00, 654kB/s]
Downloading [model.pt]: 100%                                 1.81G/1.81G [04:41<00:00, 5.80MB/s]
Downloading [README.md]: 100%                               5.26k/5.26k [00:01<00:00, 4.08kB/s]
Downloading [requirements.txt]: 100%                          43.0/43.0 [00:03<00:00, 13.5B/s]
Downloading [example/test.wav]: 100%                        128k/128k [00:01<00:00, 69.7kB/s]
Downloading [tokens.txt]: 100%                            119/119 [00:01<00:00, 87.9B/s]

-----
KeyboardInterrupt                                     Traceback (most recent call last)
/tmp/ipython-input-2893262403.py in <cell line: 0>()
      2 from funasr import AutoModel
      3
----> 4 model = AutoModel(model="iic/emotion2vec_plus_large")
      5
      6 wav_file = f"{model.model_path}/example/test.wav"

_____  

          ▽ 11 frames _____
/usr/lib/python3.12/threading.py in wait(self, timeout)
    353         try:    # restore state no matter what (e.g.,
KeyboardInterrupt)
    354             if timeout is None:
--> 355                 waiter.acquire()
    356                 gotit = True
    357             else:

KeyboardInterrupt:

```



```

funasr version: 1.2.7.
Check update of funasr, and it would cost few times. You may disable it by set
You are using the latest version of funasr-1.2.7
Downloading Model from https://www.modelscope.cn to directory: /root/.cache/mo
2025-12-14 07:37:21,580 - modelscope - INFO - Got 10 files, start to download

Processing 10 items: 100%                                         10.0/10.0 [01:42<00:00, 28.8s/it]

Downloading [config.yaml]: 100%                                     3.10k/3.10k [00:01<00:00, 2.75kB/s]

Downloading [emotion2vec+data.png]: 100%                           267k/267k [00:01<00:00, 181kB/s]

Downloading [.DS_Store]: 100%                                     6.00k/6.00k [00:01<00:00, 4.58kB/s]

Downloading [emotion2vec+radar.png]: 100%                         666k/666k [00:01<00:00, 391kB/s]

Downloading [logo.png]: 100%                                      1.76M/1.76M [00:01<00:00, 755kB/s]

Downloading [configuration.json]: 100%                           343/343 [00:01<00:00, 316B/s]

Downloading [model.pt]: 100%                                      1.04G/1.04G [01:41<00:00, 10.1MB/s]

Downloading [README.md]: 100%                                     5.26k/5.26k [00:00<00:00, 5.88kB/s]

Downloading [example/test.wav]: 100%                            128k/128k [00:01<00:00, 74.8kB/s]

Downloading [tokens.txt]: 100%                                     120/120 [00:00<00:00, 137B/s]

2025-12-14 07:39:04,394 - modelscope - INFO - Download model 'iic/emotion2vec_
WARNING:root:trust_remote_code: False
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.0.0.weight,
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.0.0.bias, /r
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.1.0.weight,
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.1.0.bias, /r
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.2.0.weight,
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.2.0.bias, /r
Warning, miss key in ckpt: modality_encoders.AUDIO.decoder.blocks.3.0.weight,
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4.68055367e-01,	-9.65257287e-01,	3.12693477e-01,	1.73984122e+00,
-1.34550297e+00,	-7.05765426e-01,	-1.47963655e+00,	3.64977449e-01,