Kaggle_Competition_Min_Shi

March 8, 2024

1 Kaggle Competition

Min Shi

1.1 A List of Attempts to Get the Highest Validation Accuracy

1st try:

- model: resnet26d
- DataBlock setting:

  item_tfms= Resize(800, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
- Learning Rate: steep point
- Threshold: 0.2750
- Validation f1 score: 0.8964

2nd try:

- model: resnet50
- DataBlock setting:

  item_tfms= Resize(800, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
- Learning Rate: steep point
- Threshold: 0.3714
- Validation f1 score: 0.848

3rd try:

- model: resnet34
- DataBlock setting:

  item_tfms= Resize(800, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
- Learning Rate: steep point

- Threshold: 0.3393

- Validation f1 score: 0.831

4th try:

- model: vit_base_patch16_224

  learn = vision_learner(dls,'vit_base_patch16_224', metrics = [F1ScoreMulti(thresh = 0.5)], path = model_folder).to_fp16()

- DataBlock setting:

  item_tfms= Resize(800, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))

- Learning Rate: steep point

- Threshold: 0.3393

- Validation f1 score: 0.812

5th try:

- model: convnext_tiny_in22k

- DataBlock setting:

  item_tfms= Resize(800, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))

- Learning Rate: steep

- Threshold: 0.3393

- Validation f1 score: 0.812

6th try (4th submission):

- model: convnext_tiny

- DataBlock setting:

  item_tfms= Resize(800, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))

- Learning Rate: steep point

- Threshold: 0.4679

- Validation f1 score: 0.909

7th try:

- model: convnext_tiny

- DataBlock setting:

  item_tfms= Resize(900, method = 'squish'),

batch_tfms= aug_transforms(size = 612, min_scale = 0.75))

- learn.fine_tune(5, 0.083176) # 5 epoches

- Learning Rate: steep point

- Threshold: 0.4036

- Validation f1 score: 0.904

8th try:

- model: convnext_tiny

- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))

- Learning Rate: steep point

- Threshold: 0.3714

- Validation f1 score: 0.907

9th try:

- model: convnext_tiny

- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.85))

- Learning Rate: steep point

- Threshold: 0.4679

- Validation f1 score: 0.909

10th try (5th submission):

- model: convnext_tiny

- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))

- Learning Rate: min point

- Results:
    - Threshold: 0.4357
    - Validation f1 score: 0.913
    - **Test score: 0.87150 (Kaggle's score)** – my best score among 14 tries and 7 submissions

11th try:

- model: convnext_tiny
- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.5))
- Learning Rate: min point
- Threshold: 0.3393
- Validation f1 score: 0.903

12th try:

- model: swinv2_cr_small_ns_224
- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
- Learning Rate: min point
- Threshold: 0.4357
- Validation f1 score: 0.8418

13th try (6th submission):

- model: convnext_tiny
- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
- Learning Rate: min point
- learn.fine_tune(5, 0.0209) # 5 epoches
- Threshold: 0.3393
- Validation f1 score: 0.9145

14th try (7th submission):

- model: convnext_tiny
- DataBlock setting:

  item_tfms= Resize(400, method = 'squish'),

  batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
- Learning Rate: min point
- learn.fine_tune(5, 0.0209) # 5 epoches
- Threshold: 0.4036

- Validation f1 score: 0.913

- Test score: 0.85769 (Kaggle's score)

2 Install Libraries/ Set Google Colab

```
[1]: from pathlib import Path
     if 'google.colab' in str(get_ipython()):
       print('Running on CoLab')
       from google.colab import drive
       drive.mount('/content/drive')
       !pip install --upgrade fastai timm kaggle -qq
       base_folder = Path('/content/drive/MyDrive/BUAN6382ADL/data')
       data_folder = Path('/content')
     else:
       base_folder = Path('/Users/min/Desktop/2023_Fall_Semester/
       ↪BUAN_6382_Appiled_Deep_Learning/')
       data_folder = Path('/Users/min/Desktop/2023_Fall_Semester/
       ↪BUAN_6382_Appiled_Deep_Learning/')
       print('Not running on CoLab')
```

```
Running on CoLab
Mounted at /content/drive
                            2.2/2.2 MB
23.3 MB/s eta 0:00:00
                            84.6/84.6 kB
13.6 MB/s eta 0:00:00
  Preparing metadata (setup.py) … done
  Building wheel for kaggle (setup.py) … done
```

3 Specify Project Folder

```
[2]: kaggle_api = base_folder/'.kaggle'
     data_folder = data_folder/'inclass_kaggle_data'
     model_folder = base_folder/'models/inclass_kaggle'
     archive_folder  = data_folder/'archive'
```

```
[3]: data_folder.mkdir(exist_ok=True)
     kaggle_api.mkdir(exist_ok=True)
     model_folder.mkdir(exist_ok=True, parents=True)
     archive_folder.mkdir(exist_ok=True)
```

```
[4]: import os
     if 'google.colab' in str(get_ipython()):
         os.environ['KAGGLE_CONFIG_DIR'] = "/content/drive/MyDrive/BUAN6382ADL/data/.
       ↪kaggle/"
```

```
[5]: if 'google.colab' in str(get_ipython()):
         !chmod 600 /content/drive/MyDrive/BUAN6382ADL/data/.kaggle/kaggle.json
```

```
[6]: if 'google.colab' in str(get_ipython()):
         ! ls -la  /content/drive/MyDrive/BUAN6382ADL/data/.kaggle/kaggle.json
```

```
-rw------- 1 root root 63 Sep 28 17:15
/content/drive/MyDrive/BUAN6382ADL/data/.kaggle/kaggle.json
```

4   Import Libraries

```
[7]: import fastai; fastai.__version__
```

```
[7]: '2.7.14'
```

```
[8]: from fastai.vision.all import *
     from kaggle import api
     from zipfile import ZipFile
     import timm
```

5   Get Data from kaggle

```
[9]: ! kaggle competitions download inclassplantpathologysmallf23 -p {archive_folder}
```

```
Downloading inclassplantpathologysmallf23.zip to
/content/inclass_kaggle_data/archive
100% 550M/552M [00:26<00:00, 21.4MB/s]
100% 552M/552M [00:26<00:00, 21.9MB/s]
```

```
[10]: file = archive_folder/'inclassplantpathologysmallf23.zip'
      with ZipFile(file , 'r') as f:
          filenames = f.namelist()
```

```
[11]: filenames[0:10]
```

```
[11]: ['sample_submission.csv',
       'test/test/test_image_1.jpg',
       'test/test/test_image_10.jpg',
       'test/test/test_image_100.jpg',
       'test/test/test_image_1000.jpg',
       'test/test/test_image_1001.jpg',
       'test/test/test_image_1002.jpg',
       'test/test/test_image_1003.jpg',
       'test/test/test_image_1004.jpg',
       'test/test/test_image_1005.jpg']
```

```
[12]: with ZipFile(file ,'r') as f:
        f.extractall(path = data_folder)
```

6   Understand Data

```
[13]: train_path = data_folder/'train/train'
```

```
[14]: files = get_image_files(train_path)
```

6.1   Look at a sample Image

```
[15]: sample_image = PILImage.create(files[0])
      print(sample_image.size)
      sample_image.to_thumb(256)
```

```
(600, 450)
```

[15]:

6.2   Check size of all the images

```
[16]: from fastcore.parallel import *
```

```
[17]: def get_sizes(image):
          return PILImage.create(image).size
```

```
[18]: sizes = parallel(get_sizes, files, progress=True)
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

```
[19]: pd.Series(sizes).value_counts() # a maximum dimension of 600 pixels while␣
       ↪maintaining the aspect ratio.
```

```
[19]: (600, 400)    12409
      (600, 450)      627
      (600, 600)        3
      (450, 600)        2
      (600, 337)        1
      dtype: int64
```

7   Data Loader

```
[20]: df = pd.read_csv(data_folder/'train.csv')
```

```
[21]: df.head()
```

```
[21]:              image                    labels
      0  train_image_1.jpg          powdery_mildew
      1  train_image_2.jpg                    scab
      2  train_image_3.jpg  scab frog_eye_leaf_spot
      3  train_image_4.jpg          powdery_mildew
      4  train_image_5.jpg                 complex
```

```
[22]: df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 13042 entries, 0 to 13041
Data columns (total 2 columns):
 #   Column  Non-Null Count  Dtype
---  ------  --------------  -----
 0   image   13042 non-null  object
 1   labels  13042 non-null  object
dtypes: object(2)
memory usage: 203.9+ KB
```

```
[23]: df.iloc[0:10, ]
```

```
[23]:              image                    labels
      0  train_image_1.jpg          powdery_mildew
      1  train_image_2.jpg                    scab
      2  train_image_3.jpg  scab frog_eye_leaf_spot
      3  train_image_4.jpg          powdery_mildew
      4  train_image_5.jpg                 complex
      5  train_image_6.jpg                    rust
      6  train_image_7.jpg  scab frog_eye_leaf_spot
      7  train_image_8.jpg  scab frog_eye_leaf_spot
```

```
    8    train_image_9.jpg          frog_eye_leaf_spot
    9    train_image_10.jpg         frog_eye_leaf_spot
```

```
[24]: # def get_x(df): return str(small_train_images) + '/' + (df['image'])
      def get_x(df):
        return data_folder/'train/train'/df['image']
      def get_y(df):
        return df['labels'].split(' ')
      dblock = DataBlock(get_x= get_x,
                         get_y = get_y,
                         splitter = RandomSplitter(seed = 42))
      dsets = dblock.datasets(df)
      dsets.train[15]
```

```
[24]: (Path('/content/inclass_kaggle_data/train/train/train_image_10535.jpg'),
       ['rust', 'complex'])
```

```
[25]: dblock = DataBlock(blocks= (ImageBlock, MultiCategoryBlock),
                         get_x = get_x,
                         get_y = get_y,
                         splitter = RandomSplitter(seed = 42))
      dsets = dblock.datasets(df)
      dsets.train[15]
```

```
[25]: (PILImage mode=RGB size=600x400, TensorMultiCategory([1., 0., 0., 0., 1., 0.]))
```

```
[26]: dsets.train.vocab
```

```
[26]: ['complex', 'frog_eye_leaf_spot', 'healthy', 'powdery_mildew', 'rust', 'scab']
```

```
[27]: idxs = torch.where(dsets.train[15][1] == 1.)[0]
```

```
[28]: dsets.train.vocab[idxs]
```

```
[28]: (#2) ['complex','rust']
```

```
[29]: dblock = DataBlock(blocks= (ImageBlock, MultiCategoryBlock),
                         get_x= get_x,
                         get_y = get_y,
                         splitter = RandomSplitter(seed = 42),
                         item_tfms= Resize(400, method = 'squish'),
                         batch_tfms= aug_transforms(size = 256, min_scale = 0.75))
      dsets = dblock.datasets(df)
      dsets.train[3]
```

```
[29]: (PILImage mode=RGB size=600x400, TensorMultiCategory([0., 0., 0., 0., 0., 1.]))
```

```
[30]: import os
      os.cpu_count()
```

[30]: 2

```
[31]: dls = dblock.dataloaders(df, bs = 64, num_workers =8)
```

```
[32]: dls.train.show_batch(max_n=3)
```



```
[33]: dls.device
```

[33]: device(type='cuda', index=0)

8   Model

```
[34]: f1score = F1ScoreMulti(thresh = 0.5) # F1 socre is calculated based on␣
      ↪precision and recall
      loss_func = nn.BCEWithLogitsLoss() # binary cross entropy loss
      # loss_func = nn.CrossEntropyLoss() # multi class cross entropy loss
      learn = vision_learner(dls,'convnext_tiny', metrics = [F1ScoreMulti(thresh = 0.
      ↪5)], path = model_folder).to_fp16()
```

/usr/local/lib/python3.10/dist-packages/huggingface_hub/utils/_token.py:88:
UserWarning:
The secret `HF_TOKEN` does not exist in your Colab secrets.
To authenticate with the Hugging Face Hub, create a token in your settings tab
(https://huggingface.co/settings/tokens), set it as secret in your Google Colab
and restart your session.
You will be able to reuse this secret in all of your notebooks.
Please note that authentication is recommended but still optional to access
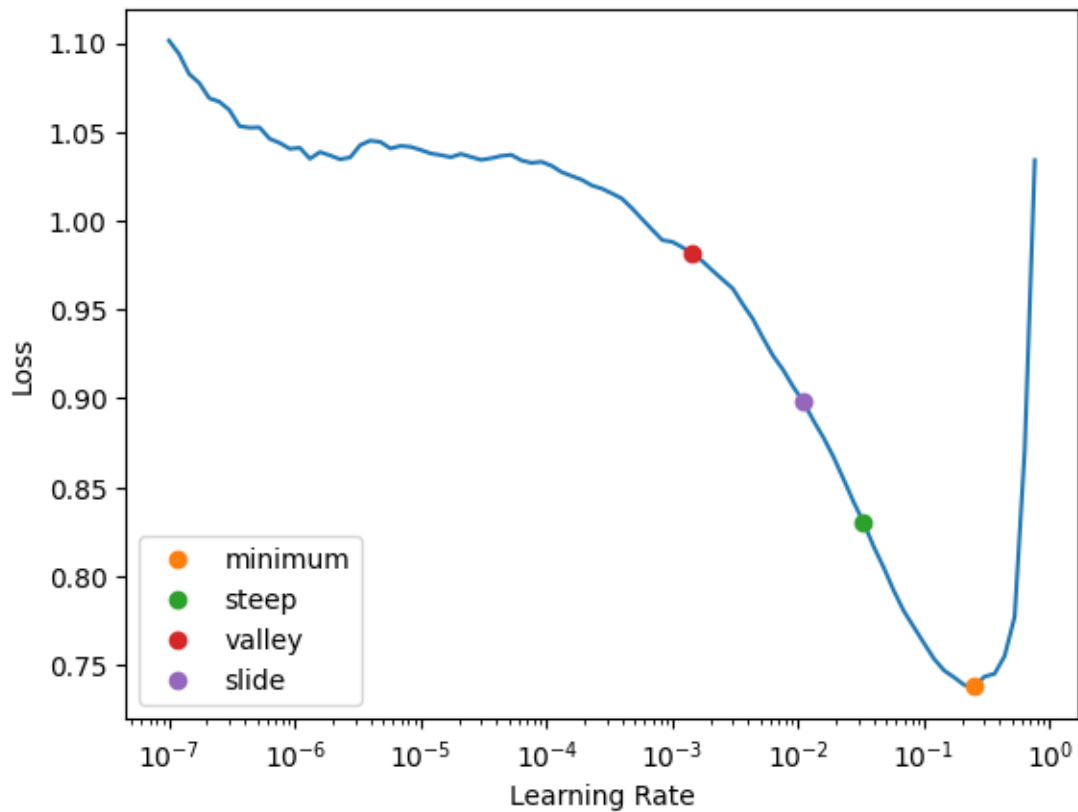public models or datasets.
  warnings.warn(

```
model.safetensors:    0%|              | 0.00/114M [00:00<?, ?B/s]
```

[35]: `learn.lr_find(suggest_funcs = (minimum, steep, valley, slide))`

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

[35]: `SuggestedLRs(minimum=0.025118863582611083, steep=0.033113110810518265, valley=0.0014454397605732083, slide=0.010964781977236271)`

[36]: `learn.fine_tune(3, 0.02512)` *# 3 epoches*

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

9 Find the threshold

```
[37]: # F1ScoreMulti?? ## best model is tested on loss, with multiple thresholds
```

```
[38]: learn.metrics = F1ScoreMulti(thresh = 0.1)
```

```
[39]: learn.metrics
```

```
[39]: (#1) [<fastai.metrics.AccumMetric object at 0x7a727cc8c100>]
```

```
[40]: learn.validate()
```

    <IPython.core.display.HTML object>

    <IPython.core.display.HTML object>

```
[40]: (#2) [0.07607706636190414,0.8777854028512085]
```

```
[41]: learn.metrics = F1ScoreMulti(thresh = 0.9)
```

```
[42]: learn.validate()
```

    <IPython.core.display.HTML object>

    <IPython.core.display.HTML object>

```
[42]: (#2) [0.07607706636190414,0.8054284257066034]
```

```
[43]: preds, targs = learn.get_preds()
```

    <IPython.core.display.HTML object>

    <IPython.core.display.HTML object>

```
[44]: preds.shape, targs.shape
```

```
[44]: (torch.Size([2608, 6]), torch.Size([2608, 6]))
```

```
[45]: f1score = F1ScoreMulti(thresh = None, sigmoid=False)
```

```
[46]: idxs = (preds>0.5) * 1
```
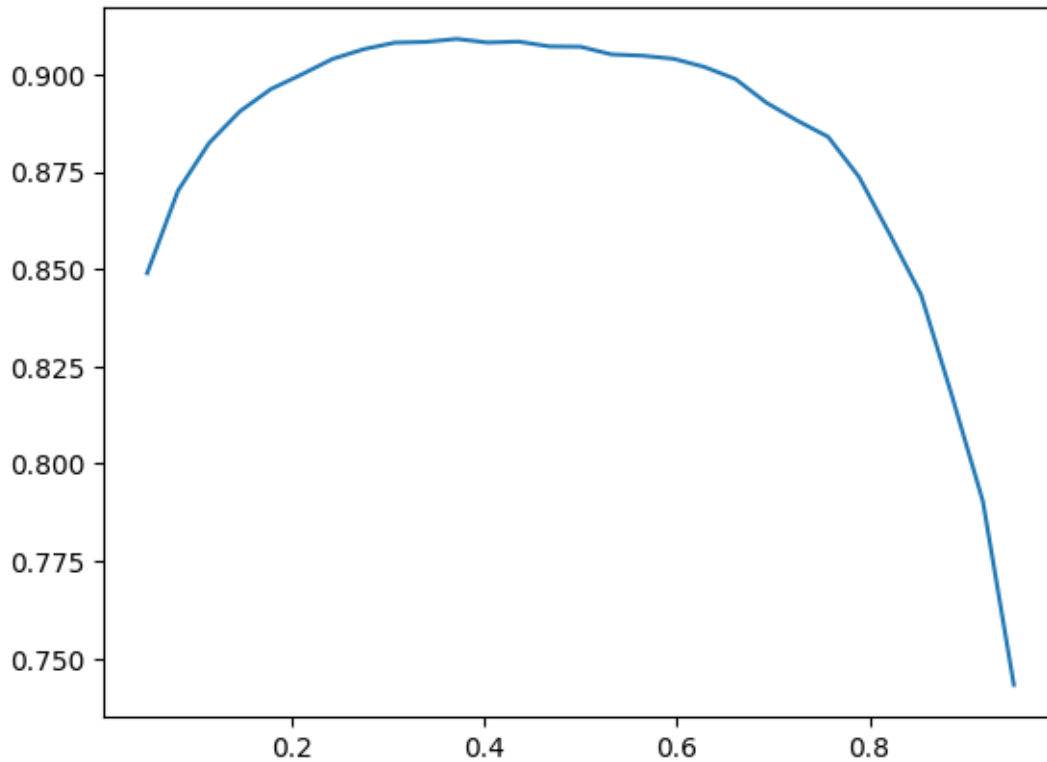
```
[47]: f1score(idxs, targs)
```

```
[47]: 0.9070662447672367
```

```
[48]: xs = torch.linspace(0.05, 0.95, 29) # try 29 values between 0.05 and 0.95
```

```
[49]: f1scores = [f1score((preds>i) * 1, targs) for i in xs]
```

```
[50]: plt.plot(xs, f1scores)
```

```
[50]: [<matplotlib.lines.Line2D at 0x7a726b353250>]
```



```
[51]: torch.argmax(torch.tensor(f1scores))
```

```
[51]: tensor(10)
```

```
[52]: xs[11]
```

```
[52]: tensor(0.4036)
```

```
[53]: f1scores[11]
```

```
[53]: 0.9081472502308339
```

10 Test Predictions

```
[54]: test_files = get_image_files(data_folder/'test/test').sorted()
```

```
[55]: test_files
```

```
[55]: (#5590) [Path('/content/inclass_kaggle_data/test/test/test_image_1.jpg'),Path('/
      content/inclass_kaggle_data/test/test/test_image_10.jpg'),Path('/content/inclass
      _kaggle_data/test/test/test_image_100.jpg'),Path('/content/inclass_kaggle_data/t
      est/test/test_image_1000.jpg'),Path('/content/inclass_kaggle_data/test/test/test
      _image_1001.jpg'),Path('/content/inclass_kaggle_data/test/test/test_image_1002.j
      pg'),Path('/content/inclass_kaggle_data/test/test/test_image_1003.jpg'),Path('/c
      ontent/inclass_kaggle_data/test/test/test_image_1004.jpg'),Path('/content/inclas
      s_kaggle_data/test/test/test_image_1005.jpg'),Path('/content/inclass_kaggle_data
      /test/test/test_image_1006.jpg')…]
```

```
[56]: test_dl = learn.dls.test_dl(test_files)
```

```
[57]: test_dl.show_batch(max_n=3)
```



```
[58]: preds, _ = learn.tta(dl = test_dl)
```

```
<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>
```

```
[59]: preds
```

```
[59]: tensor([[4.3595e-04, 1.0465e-03, 9.9030e-01, 6.3662e-03, 6.4945e-05,
      1.7461e-03],
             [8.0512e-01, 4.3242e-01, 6.8968e-04, 1.9956e-03, 3.0413e-03,
      1.8856e-01],
             [2.3592e-01, 8.2450e-01, 1.9685e-04, 3.1756e-03, 2.2212e-03,
      1.0197e-02],
             …,
             [1.0657e-04, 6.1449e-05, 1.0000e+00, 3.3732e-07, 9.4395e-06,
      1.4358e-06],
             [4.1713e-01, 7.6943e-01, 7.7215e-05, 2.2562e-04, 8.9109e-04,
```

```
          2.5118e-02],
          [1.7998e-04, 2.9268e-05, 8.1980e-05, 9.9997e-01, 1.8202e-05,
          8.1850e-04]])
```

[60]:
```python
pred_decoded = [torch.where(pred>0.4036)[0] for pred in preds]
```

[61]:
```python
pred_decoded[0:20]
```

[61]:
```
[tensor([2]),
 tensor([0, 1]),
 tensor([1]),
 tensor([1]),
 tensor([0, 4]),
 tensor([1]),
 tensor([1]),
 tensor([0, 1, 5]),
 tensor([0]),
 tensor([5]),
 tensor([2]),
 tensor([5]),
 tensor([2]),
 tensor([1]),
 tensor([5]),
 tensor([5]),
 tensor([0, 4]),
 tensor([2]),
 tensor([2]),
 tensor([5])]
```

[62]:
```python
vocab = learn.dls.vocab
```

[63]:
```python
pred_labels = [vocab[pred] for pred in pred_decoded[0:20]]
```

[64]:
```python
pred_labels
```

[64]:
```
[(#1) ['healthy'],
 (#2) ['complex','frog_eye_leaf_spot'],
 (#1) ['frog_eye_leaf_spot'],
 (#1) ['frog_eye_leaf_spot'],
 (#2) ['complex','rust'],
 (#1) ['frog_eye_leaf_spot'],
 (#1) ['frog_eye_leaf_spot'],
 (#3) ['complex','frog_eye_leaf_spot','scab'],
 (#1) ['complex'],
 (#1) ['scab'],
 (#1) ['healthy'],
 (#1) ['scab'],
```

```
         (#1) ['healthy'],
         (#1) ['frog_eye_leaf_spot'],
         (#1) ['scab'],
         (#1) ['scab'],
         (#2) ['complex','rust'],
         (#1) ['healthy'],
         (#1) ['healthy'],
         (#1) ['scab']]
```

[65]:
```python
[" ".join(pred)for pred in pred_labels]
```

[65]:
```python
['healthy',
 'complex frog_eye_leaf_spot',
 'frog_eye_leaf_spot',
 'frog_eye_leaf_spot',
 'complex rust',
 'frog_eye_leaf_spot',
 'frog_eye_leaf_spot',
 'complex frog_eye_leaf_spot scab',
 'complex',
 'scab',
 'healthy',
 'scab',
 'healthy',
 'frog_eye_leaf_spot',
 'scab',
 'scab',
 'complex rust',
 'healthy',
 'healthy',
 'scab']
```

[66]:
```python
pred_labels = [' '.join(vocab[torch.where(pred>0.4036)[0]]) for pred in preds]
```

[67]:
```python
pred_labels[0:20]
```

[67]:
```python
['healthy',
 'complex frog_eye_leaf_spot',
 'frog_eye_leaf_spot',
 'frog_eye_leaf_spot',
 'complex rust',
 'frog_eye_leaf_spot',
 'frog_eye_leaf_spot',
 'complex frog_eye_leaf_spot scab',
 'complex',
 'scab',
 'healthy',
```

```
'scab',
'healthy',
'frog_eye_leaf_spot',
'scab',
'scab',
'complex rust',
'healthy',
'healthy',
'scab']
```

11   Kaggle Submission

[68]:
```
sample_submission= pd.read_csv(data_folder/'sample_submission.csv')
```

[69]:
```
sample_submission
```

[69]:
```
                       image    labels
0             test_image_1.jpg  healthy
1             test_image_2.jpg  healthy
2             test_image_3.jpg  healthy
3             test_image_4.jpg  healthy
4             test_image_5.jpg  healthy
...                        ...      ...
5585   test_image_5586.jpg  healthy
5586   test_image_5587.jpg  healthy
5587   test_image_5588.jpg  healthy
5588   test_image_5589.jpg  healthy
5589   test_image_5590.jpg  healthy

[5590 rows x 2 columns]
```

[70]:
```
sample_submission = sample_submission.sort_values(by = 'image')
```

[71]:
```
sample_submission
```

[71]:
```
                        image    labels
0             test_image_1.jpg  healthy
9            test_image_10.jpg  healthy
99          test_image_100.jpg  healthy
999        test_image_1000.jpg  healthy
1000       test_image_1001.jpg  healthy
...                        ...      ...
994         test_image_995.jpg  healthy
995         test_image_996.jpg  healthy
996         test_image_997.jpg  healthy
997         test_image_998.jpg  healthy
```

```
998     test_image_999.jpg  healthy

[5590 rows x 2 columns]
```

[72]: ```python
sample_submission['labels'] = pred_labels
```

[73]: ```python
sample_submission
```

[73]:
```
                    image                          labels
0           test_image_1.jpg                       healthy
9          test_image_10.jpg   complex frog_eye_leaf_spot
99        test_image_100.jpg              frog_eye_leaf_spot
999     test_image_1000.jpg              frog_eye_leaf_spot
1000    test_image_1001.jpg                    complex rust
...                      ...                             ...
994       test_image_995.jpg                  powdery_mildew
995       test_image_996.jpg                       healthy
996       test_image_997.jpg                       healthy
997       test_image_998.jpg   complex frog_eye_leaf_spot
998       test_image_999.jpg                  powdery_mildew

[5590 rows x 2 columns]
```

[74]: ```python
sample_submission.to_csv(model_folder/'seventh_sub.csv', index = False)
```

[75]: ```python
!head {model_folder/'seventh_sub.csv'}
```

```
image,labels
test_image_1.jpg,healthy
test_image_10.jpg,complex frog_eye_leaf_spot
test_image_100.jpg,frog_eye_leaf_spot
test_image_1000.jpg,frog_eye_leaf_spot
test_image_1001.jpg,complex rust
test_image_1002.jpg,frog_eye_leaf_spot
test_image_1003.jpg,frog_eye_leaf_spot
test_image_1004.jpg,complex frog_eye_leaf_spot scab
test_image_1005.jpg,complex
```

[76]: ```python
comp = 'inclassplantpathologysmallf23'
api.competition_submit(model_folder/'seventh_sub.csv', 'dec 9', comp)
```

Warning: Looks like you're using an outdated API Version, please consider
updating (server 1.6.7 / client 1.6.6)

100%|      | 167k/167k [00:01<00:00, 105kB/s]

[76]: Successfully submitted to Inclass_Plant_Pathology_Small_F23

```
[ ]: !sudo apt-get install texlive-xetex texlive-fonts-recommended␣
     ↪texlive-plain-generic
     !jupyter nbconvert --to pdf '/content/drive/MyDrive/BUAN6382ADL/
     ↪Kaggle_Competition/Kaggle_Competition_Min_Shi.ipynb' --output '/content/
     ↪drive/MyDrive/BUAN6382ADL/Kaggle_Competition/Kaggle_Competition_Min_Shi.pdf'
```

```
Reading package lists… Done
Building dependency tree… Done
Reading state information… Done
The following additional packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libfontenc1 libgs9 libgs9-common
  libidn12 libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1
  libruby3.0 libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1
  libzzip-0-13 lmodern poppler-data preview-latex-style rake ruby
  ruby-net-telnet ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0
  rubygems-integration t1utils teckit tex-common tex-gyre texlive-base
  texlive-binaries texlive-latex-base texlive-latex-extra
  texlive-latex-recommended texlive-pictures tipa xfonts-encodings
  xfonts-utils
Suggested packages:
  fonts-noto fonts-freefont-otf | fonts-freefont-ttf libavalon-framework-java
  libcommons-logging-java-doc libexcalibur-logkit-java liblog4j1.2-java
  poppler-utils ghostscript fonts-japanese-mincho | fonts-ipafont-mincho
  fonts-japanese-gothic | fonts-ipafont-gothic fonts-arphic-ukai
  fonts-arphic-uming fonts-nanum ri ruby-dev bundler debhelper gv
  | postscript-viewer perl-tk xpdf | pdf-viewer xzdec
  texlive-fonts-recommended-doc texlive-latex-base-doc python3-pygments
  icc-profiles libfile-which-perl libspreadsheet-parseexcel-perl
  texlive-latex-extra-doc texlive-latex-recommended-doc texlive-luatex
  texlive-pstricks dot2tex prerex texlive-pictures-doc vprerex
  default-jre-headless tipa-doc
The following NEW packages will be installed:
  dvisvgm fonts-droid-fallback fonts-lato fonts-lmodern fonts-noto-mono
  fonts-texgyre fonts-urw-base35 libapache-pom-java libcommons-logging-java
  libcommons-parent-java libfontbox-java libfontenc1 libgs9 libgs9-common
  libidn12 libijs-0.35 libjbig2dec0 libkpathsea6 libpdfbox-java libptexenc1
  libruby3.0 libsynctex2 libteckit0 libtexlua53 libtexluajit2 libwoff1
  libzzip-0-13 lmodern poppler-data preview-latex-style rake ruby
  ruby-net-telnet ruby-rubygems ruby-webrick ruby-xmlrpc ruby3.0
  rubygems-integration t1utils teckit tex-common tex-gyre texlive-base
  texlive-binaries texlive-fonts-recommended texlive-latex-base
  texlive-latex-extra texlive-latex-recommended texlive-pictures
  texlive-plain-generic texlive-xetex tipa xfonts-encodings xfonts-utils
0 upgraded, 54 newly installed, 0 to remove and 35 not upgraded.
Need to get 182 MB of archives.
```

After this operation, 571 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-droid-fallback all
1:6.0.1r16-1.1build1 [1,805 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-lato all 2.0-2.1
[2,696 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/main amd64 poppler-data all
0.4.11-1 [2,171 kB]
Get:4 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-common all 6.17
[33.7 kB]
Get:5 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-urw-base35 all
20200910-1 [6,367 kB]
Get:6 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9-common
all 9.55.0~dfsg1-0ubuntu5.6 [751 kB]
Get:7 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libidn12 amd64
1.38-4ubuntu1 [60.0 kB]
Get:8 http://archive.ubuntu.com/ubuntu jammy/main amd64 libijs-0.35 amd64
0.35-15build2 [16.5 kB]
Get:9 http://archive.ubuntu.com/ubuntu jammy/main amd64 libjbig2dec0 amd64
0.19-3build2 [64.7 kB]
Get:10 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libgs9 amd64
9.55.0~dfsg1-0ubuntu5.6 [5,031 kB]
Get:11 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libkpathsea6
amd64 2021.20210626.59705-1ubuntu0.1 [60.3 kB]
Get:12 http://archive.ubuntu.com/ubuntu jammy/main amd64 libwoff1 amd64
1.0.2-1build4 [45.2 kB]
Get:13 http://archive.ubuntu.com/ubuntu jammy/universe amd64 dvisvgm amd64
2.13.1-1 [1,221 kB]
Get:14 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-lmodern all
2.004.5-6.1 [4,532 kB]
Get:15 http://archive.ubuntu.com/ubuntu jammy/main amd64 fonts-noto-mono all
20201225-1build1 [397 kB]
Get:16 http://archive.ubuntu.com/ubuntu jammy/universe amd64 fonts-texgyre all
20180621-3.1 [10.2 MB]
Get:17 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libapache-pom-java
all 18-1 [4,720 B]
Get:18 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-parent-
java all 43-1 [10.8 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libcommons-logging-
java all 1.2-2 [60.3 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy/main amd64 libfontenc1 amd64
1:1.1.4-1build3 [14.7 kB]
Get:21 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libptexenc1
amd64 2021.20210626.59705-1ubuntu0.1 [39.1 kB]
Get:22 http://archive.ubuntu.com/ubuntu jammy/main amd64 rubygems-integration
all 1.18 [5,336 B]
Get:23 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby3.0 amd64
3.0.2-7ubuntu2.4 [50.1 kB]
Get:24 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-rubygems all

3.3.5-2 [228 kB]
Get:25 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby amd64 1:3.0~exp1
[5,100 B]
Get:26 http://archive.ubuntu.com/ubuntu jammy/main amd64 rake all 13.0.6-2 [61.7
kB]
Get:27 http://archive.ubuntu.com/ubuntu jammy/main amd64 ruby-net-telnet all
0.1.1-2 [12.6 kB]
Get:28 http://archive.ubuntu.com/ubuntu jammy/universe amd64 ruby-webrick all
1.7.0-3 [51.8 kB]
Get:29 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 ruby-xmlrpc all
0.3.2-1ubuntu0.1 [24.9 kB]
Get:30 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libruby3.0
amd64 3.0.2-7ubuntu2.4 [5,113 kB]
Get:31 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libsynctex2
amd64 2021.20210626.59705-1ubuntu0.1 [55.5 kB]
Get:32 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 libteckit0 amd64
2.5.11+ds1-1 [421 kB]
Get:33 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexlua53
amd64 2021.20210626.59705-1ubuntu0.1 [120 kB]
Get:34 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 libtexluajit2
amd64 2021.20210626.59705-1ubuntu0.1 [267 kB]
Get:35 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libzzip-0-13 amd64
0.13.72+dfsg.1-1.1 [27.0 kB]
Get:36 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-encodings all
1:1.0.5-0ubuntu2 [578 kB]
Get:37 http://archive.ubuntu.com/ubuntu jammy/main amd64 xfonts-utils amd64
1:7.7+6build2 [94.6 kB]
Get:38 http://archive.ubuntu.com/ubuntu jammy/universe amd64 lmodern all
2.004.5-6.1 [9,471 kB]
Get:39 http://archive.ubuntu.com/ubuntu jammy/universe amd64 preview-latex-style
all 12.2-1ubuntu1 [185 kB]
Get:40 http://archive.ubuntu.com/ubuntu jammy/main amd64 t1utils amd64
1.41-4build2 [61.3 kB]
Get:41 http://archive.ubuntu.com/ubuntu jammy/universe amd64 teckit amd64
2.5.11+ds1-1 [699 kB]
Get:42 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tex-gyre all
20180621-3.1 [6,209 kB]
Get:43 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 texlive-
binaries amd64 2021.20210626.59705-1ubuntu0.1 [9,848 kB]
Get:44 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-base all
2021.20220204-1 [21.0 MB]
Get:45 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-fonts-
recommended all 2021.20220204-1 [4,972 kB]
Get:46 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-base
all 2021.20220204-1 [1,128 kB]
Get:47 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libfontbox-java all
1:1.8.16-2 [207 kB]
Get:48 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libpdfbox-java all

```
1:1.8.16-2 [5,199 kB]
Get:49 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-
recommended all 2021.20220204-1 [14.4 MB]
Get:50 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-pictures
all 2021.20220204-1 [8,720 kB]
Get:51 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-latex-extra
all 2021.20220204-1 [13.9 MB]
Get:52 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-plain-
generic all 2021.20220204-1 [27.5 MB]
Get:53 http://archive.ubuntu.com/ubuntu jammy/universe amd64 tipa all 2:1.3-21
[2,967 kB]
Get:54 http://archive.ubuntu.com/ubuntu jammy/universe amd64 texlive-xetex all
2021.20220204-1 [12.4 MB]
Fetched 182 MB in 28s (6,494 kB/s)
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line 78,
<> line 54.)
debconf: falling back to frontend: Readline
debconf: unable to initialize frontend: Readline
debconf: (This frontend requires a controlling tty.)
debconf: falling back to frontend: Teletype
dpkg-preconfigure: unable to re-open stdin:
Selecting previously unselected package fonts-droid-fallback.
(Reading database … 121749 files and directories currently installed.)
Preparing to unpack …/00-fonts-droid-fallback_1%3a6.0.1r16-1.1build1_all.deb
…
Unpacking fonts-droid-fallback (1:6.0.1r16-1.1build1) …
Selecting previously unselected package fonts-lato.
Preparing to unpack …/01-fonts-lato_2.0-2.1_all.deb …
Unpacking fonts-lato (2.0-2.1) …
Selecting previously unselected package poppler-data.
Preparing to unpack …/02-poppler-data_0.4.11-1_all.deb …
Unpacking poppler-data (0.4.11-1) …
Selecting previously unselected package tex-common.
Preparing to unpack …/03-tex-common_6.17_all.deb …
Unpacking tex-common (6.17) …
Selecting previously unselected package fonts-urw-base35.
Preparing to unpack …/04-fonts-urw-base35_20200910-1_all.deb …
Unpacking fonts-urw-base35 (20200910-1) …
Selecting previously unselected package libgs9-common.
Preparing to unpack …/05-libgs9-common_9.55.0~dfsg1-0ubuntu5.6_all.deb …
Unpacking libgs9-common (9.55.0~dfsg1-0ubuntu5.6) …
Selecting previously unselected package libidn12:amd64.
Preparing to unpack …/06-libidn12_1.38-4ubuntu1_amd64.deb …
Unpacking libidn12:amd64 (1.38-4ubuntu1) …
Selecting previously unselected package libijs-0.35:amd64.
Preparing to unpack …/07-libijs-0.35_0.35-15build2_amd64.deb …
```

```
Unpacking libijs-0.35:amd64 (0.35-15build2) …
Selecting previously unselected package libjbig2dec0:amd64.
Preparing to unpack …/08-libjbig2dec0_0.19-3build2_amd64.deb …
Unpacking libjbig2dec0:amd64 (0.19-3build2) …
Selecting previously unselected package libgs9:amd64.
Preparing to unpack …/09-libgs9_9.55.0~dfsg1-0ubuntu5.6_amd64.deb …
Unpacking libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.6) …
Selecting previously unselected package libkpathsea6:amd64.
Preparing to unpack …/10-libkpathsea6_2021.20210626.59705-1ubuntu0.1_amd64.deb
…
Unpacking libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.1) …
Selecting previously unselected package libwoff1:amd64.
Preparing to unpack …/11-libwoff1_1.0.2-1build4_amd64.deb …
Unpacking libwoff1:amd64 (1.0.2-1build4) …
Selecting previously unselected package dvisvgm.
Preparing to unpack …/12-dvisvgm_2.13.1-1_amd64.deb …
Unpacking dvisvgm (2.13.1-1) …
Selecting previously unselected package fonts-lmodern.
Preparing to unpack …/13-fonts-lmodern_2.004.5-6.1_all.deb …
Unpacking fonts-lmodern (2.004.5-6.1) …
Selecting previously unselected package fonts-noto-mono.
Preparing to unpack …/14-fonts-noto-mono_20201225-1build1_all.deb …
Unpacking fonts-noto-mono (20201225-1build1) …
Selecting previously unselected package fonts-texgyre.
Preparing to unpack …/15-fonts-texgyre_20180621-3.1_all.deb …
Unpacking fonts-texgyre (20180621-3.1) …
Selecting previously unselected package libapache-pom-java.
Preparing to unpack …/16-libapache-pom-java_18-1_all.deb …
Unpacking libapache-pom-java (18-1) …
Selecting previously unselected package libcommons-parent-java.
Preparing to unpack …/17-libcommons-parent-java_43-1_all.deb …
Unpacking libcommons-parent-java (43-1) …
Selecting previously unselected package libcommons-logging-java.
Preparing to unpack …/18-libcommons-logging-java_1.2-2_all.deb …
Unpacking libcommons-logging-java (1.2-2) …
Selecting previously unselected package libfontenc1:amd64.
Preparing to unpack …/19-libfontenc1_1%3a1.1.4-1build3_amd64.deb …
Unpacking libfontenc1:amd64 (1:1.1.4-1build3) …
Selecting previously unselected package libptexenc1:amd64.
Preparing to unpack …/20-libptexenc1_2021.20210626.59705-1ubuntu0.1_amd64.deb
…
Unpacking libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.1) …
Selecting previously unselected package rubygems-integration.
Preparing to unpack …/21-rubygems-integration_1.18_all.deb …
Unpacking rubygems-integration (1.18) …
Selecting previously unselected package ruby3.0.
Preparing to unpack …/22-ruby3.0_3.0.2-7ubuntu2.4_amd64.deb …
Unpacking ruby3.0 (3.0.2-7ubuntu2.4) …
```

```
Selecting previously unselected package ruby-rubygems.
Preparing to unpack …/23-ruby-rubygems_3.3.5-2_all.deb …
Unpacking ruby-rubygems (3.3.5-2) …
Selecting previously unselected package ruby.
Preparing to unpack …/24-ruby_1%3a3.0~exp1_amd64.deb …
Unpacking ruby (1:3.0~exp1) …
Selecting previously unselected package rake.
Preparing to unpack …/25-rake_13.0.6-2_all.deb …
Unpacking rake (13.0.6-2) …
Selecting previously unselected package ruby-net-telnet.
Preparing to unpack …/26-ruby-net-telnet_0.1.1-2_all.deb …
Unpacking ruby-net-telnet (0.1.1-2) …
Selecting previously unselected package ruby-webrick.
Preparing to unpack …/27-ruby-webrick_1.7.0-3_all.deb …
Unpacking ruby-webrick (1.7.0-3) …
Selecting previously unselected package ruby-xmlrpc.
Preparing to unpack …/28-ruby-xmlrpc_0.3.2-1ubuntu0.1_all.deb …
Unpacking ruby-xmlrpc (0.3.2-1ubuntu0.1) …
Selecting previously unselected package libruby3.0:amd64.
Preparing to unpack …/29-libruby3.0_3.0.2-7ubuntu2.4_amd64.deb …
Unpacking libruby3.0:amd64 (3.0.2-7ubuntu2.4) …
Selecting previously unselected package libsynctex2:amd64.
Preparing to unpack …/30-libsynctex2_2021.20210626.59705-1ubuntu0.1_amd64.deb
…
Unpacking libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.1) …
Selecting previously unselected package libteckit0:amd64.
Preparing to unpack …/31-libteckit0_2.5.11+ds1-1_amd64.deb …
Unpacking libteckit0:amd64 (2.5.11+ds1-1) …
Selecting previously unselected package libtexlua53:amd64.
Preparing to unpack …/32-libtexlua53_2021.20210626.59705-1ubuntu0.1_amd64.deb
…
Unpacking libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.1) …
Selecting previously unselected package libtexluajit2:amd64.
Preparing to unpack
…/33-libtexluajit2_2021.20210626.59705-1ubuntu0.1_amd64.deb …
Unpacking libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.1) …
Selecting previously unselected package libzzip-0-13:amd64.
Preparing to unpack …/34-libzzip-0-13_0.13.72+dfsg.1-1.1_amd64.deb …
Unpacking libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) …
Selecting previously unselected package xfonts-encodings.
Preparing to unpack …/35-xfonts-encodings_1%3a1.0.5-0ubuntu2_all.deb …
Unpacking xfonts-encodings (1:1.0.5-0ubuntu2) …
Selecting previously unselected package xfonts-utils.
Preparing to unpack …/36-xfonts-utils_1%3a7.7+6build2_amd64.deb …
Unpacking xfonts-utils (1:7.7+6build2) …
Selecting previously unselected package lmodern.
Preparing to unpack …/37-lmodern_2.004.5-6.1_all.deb …
Unpacking lmodern (2.004.5-6.1) …
```

```
Selecting previously unselected package preview-latex-style.
Preparing to unpack …/38-preview-latex-style_12.2-1ubuntu1_all.deb …
Unpacking preview-latex-style (12.2-1ubuntu1) …
Selecting previously unselected package t1utils.
Preparing to unpack …/39-t1utils_1.41-4build2_amd64.deb …
Unpacking t1utils (1.41-4build2) …
Selecting previously unselected package teckit.
Preparing to unpack …/40-teckit_2.5.11+ds1-1_amd64.deb …
Unpacking teckit (2.5.11+ds1-1) …
Selecting previously unselected package tex-gyre.
Preparing to unpack …/41-tex-gyre_20180621-3.1_all.deb …
Unpacking tex-gyre (20180621-3.1) …
Selecting previously unselected package texlive-binaries.
Preparing to unpack …/42-texlive-
binaries_2021.20210626.59705-1ubuntu0.1_amd64.deb …
Unpacking texlive-binaries (2021.20210626.59705-1ubuntu0.1) …
Selecting previously unselected package texlive-base.
Preparing to unpack …/43-texlive-base_2021.20220204-1_all.deb …
Unpacking texlive-base (2021.20220204-1) …
Selecting previously unselected package texlive-fonts-recommended.
Preparing to unpack …/44-texlive-fonts-recommended_2021.20220204-1_all.deb …
Unpacking texlive-fonts-recommended (2021.20220204-1) …
Selecting previously unselected package texlive-latex-base.
Preparing to unpack …/45-texlive-latex-base_2021.20220204-1_all.deb …
Unpacking texlive-latex-base (2021.20220204-1) …
Selecting previously unselected package libfontbox-java.
Preparing to unpack …/46-libfontbox-java_1%3a1.8.16-2_all.deb …
Unpacking libfontbox-java (1:1.8.16-2) …
Selecting previously unselected package libpdfbox-java.
Preparing to unpack …/47-libpdfbox-java_1%3a1.8.16-2_all.deb …
Unpacking libpdfbox-java (1:1.8.16-2) …
Selecting previously unselected package texlive-latex-recommended.
Preparing to unpack …/48-texlive-latex-recommended_2021.20220204-1_all.deb …
Unpacking texlive-latex-recommended (2021.20220204-1) …
Selecting previously unselected package texlive-pictures.
Preparing to unpack …/49-texlive-pictures_2021.20220204-1_all.deb …
Unpacking texlive-pictures (2021.20220204-1) …
Selecting previously unselected package texlive-latex-extra.
Preparing to unpack …/50-texlive-latex-extra_2021.20220204-1_all.deb …
Unpacking texlive-latex-extra (2021.20220204-1) …
Selecting previously unselected package texlive-plain-generic.
Preparing to unpack …/51-texlive-plain-generic_2021.20220204-1_all.deb …
Unpacking texlive-plain-generic (2021.20220204-1) …
Selecting previously unselected package tipa.
Preparing to unpack …/52-tipa_2%3a1.3-21_all.deb …
Unpacking tipa (2:1.3-21) …
Selecting previously unselected package texlive-xetex.
Preparing to unpack …/53-texlive-xetex_2021.20220204-1_all.deb …
```

```
Unpacking texlive-xetex (2021.20220204-1) …
Setting up fonts-lato (2.0-2.1) …
Setting up fonts-noto-mono (20201225-1build1) …
Setting up libwoff1:amd64 (1.0.2-1build4) …
Setting up libtexlua53:amd64 (2021.20210626.59705-1ubuntu0.1) …
Setting up libijs-0.35:amd64 (0.35-15build2) …
Setting up libtexluajit2:amd64 (2021.20210626.59705-1ubuntu0.1) …
Setting up libfontbox-java (1:1.8.16-2) …
Setting up rubygems-integration (1.18) …
Setting up libzzip-0-13:amd64 (0.13.72+dfsg.1-1.1) …
Setting up fonts-urw-base35 (20200910-1) …
Setting up poppler-data (0.4.11-1) …
Setting up tex-common (6.17) …
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
update-language: texlive-base not installed and configured, doing nothing!
Setting up libfontenc1:amd64 (1:1.1.4-1build3) …
Setting up libjbig2dec0:amd64 (0.19-3build2) …
Setting up libteckit0:amd64 (2.5.11+ds1-1) …
Setting up libapache-pom-java (18-1) …
Setting up ruby-net-telnet (0.1.1-2) …
Setting up xfonts-encodings (1:1.0.5-0ubuntu2) …
Setting up t1utils (1.41-4build2) …
Setting up libidn12:amd64 (1.38-4ubuntu1) …
Setting up fonts-texgyre (20180621-3.1) …
Setting up libkpathsea6:amd64 (2021.20210626.59705-1ubuntu0.1) …
Setting up ruby-webrick (1.7.0-3) …
Setting up fonts-lmodern (2.004.5-6.1) …
Setting up fonts-droid-fallback (1:6.0.1r16-1.1build1) …
Setting up ruby-xmlrpc (0.3.2-1ubuntu0.1) …
Setting up libsynctex2:amd64 (2021.20210626.59705-1ubuntu0.1) …
Setting up libgs9-common (9.55.0~dfsg1-0ubuntu5.6) …
Setting up teckit (2.5.11+ds1-1) …
Setting up libpdfbox-java (1:1.8.16-2) …
Setting up libgs9:amd64 (9.55.0~dfsg1-0ubuntu5.6) …
Setting up preview-latex-style (12.2-1ubuntu1) …
Setting up libcommons-parent-java (43-1) …
Setting up dvisvgm (2.13.1-1) …
Setting up libcommons-logging-java (1.2-2) …
Setting up xfonts-utils (1:7.7+6build2) …
Setting up libptexenc1:amd64 (2021.20210626.59705-1ubuntu0.1) …
Setting up texlive-binaries (2021.20210626.59705-1ubuntu0.1) …
update-alternatives: using /usr/bin/xdvi-xaw to provide /usr/bin/xdvi.bin
(xdvi.bin) in auto mode
update-alternatives: using /usr/bin/bibtex.original to provide /usr/bin/bibtex
```

```
(bibtex) in auto mode
Setting up lmodern (2.004.5-6.1) …
Setting up texlive-base (2021.20220204-1) …
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
/usr/bin/ucfr
mktexlsr: Updating /var/lib/texmf/ls-R-TEXLIVEDIST…
mktexlsr: Updating /var/lib/texmf/ls-R-TEXMFMAIN…
mktexlsr: Updating /var/lib/texmf/ls-R…
mktexlsr: Done.
tl-paper: setting paper size for dvips to a4:
/var/lib/texmf/dvips/config/config-paper.ps
tl-paper: setting paper size for dvipdfmx to a4:
/var/lib/texmf/dvipdfmx/dvipdfmx-paper.cfg
tl-paper: setting paper size for xdvi to a4: /var/lib/texmf/xdvi/XDvi-paper
tl-paper: setting paper size for pdftex to a4: /var/lib/texmf/tex/generic/tex-
ini-files/pdftexconfig.tex
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based
frontend cannot be used. at /usr/share/perl5/Debconf/FrontEnd/Dialog.pm line
78.)
debconf: falling back to frontend: Readline
```