Assignment 1 - Problem 3: Surgical Phase Recognition

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In [1]:
```python
from collections import OrderedDict
from copy import deepcopy
from pytorch_metric_learning import losses
from sklearn.utils.class_weight import compute_class_weight
from torch import nn
from torch.autograd import Variable
from torch.nn import init
from torch.utils.data import Dataset, DataLoader
from torchvision import datasets
from torchvision.transforms import (
    CenterCrop,
    ColorJitter,
    Compose,
    Normalize,
    RandomHorizontalFlip,
    RandomVerticalFlip,
    RandomResizedCrop,
    RandomRotation,
    Resize,
    ToTensor,
)
from transformers import (
    AutoConfig, AutoFeatureExtractor, AutoModelForImageClassification,
    TrainingArguments, Trainer, EarlyStoppingCallback, TrainerCallback)
from tqdm import tqdm

import datasets
import h5py
import matplotlib.image as mpimg
import matplotlib.pyplot as plt
import numpy as np
import os
import pandas as pd
import random
import torch
import torch.nn.functional as F
import torch.optim as optim
import torchvision
```

In [2]:
```python
RANDOM_SEED = 42

def set_all_seeds(seed):
    random.seed(seed)
    np.random.seed(seed)
    torch.manual_seed(seed)
    torch.cuda.manual_seed(seed)
    torch.backends.cudnn.deterministic = True

set_all_seeds(RANDOM_SEED)
```

Problem 3: Surgical Phase Recognition

```
In [3]:  NUM_CLASSES = 7
         NUM_PREV_FRAMES = 2
```

```
In [4]:  model_name_or_path = "microsoft/resnet-50"
```

Data loading

Function declaration

Loading function for `problem3_datas` dataset.

Class 0 corresponds to `Preparation`, 1 corresponds to `Calot Triangle Dissection`, 2 corresponds to `Clipping Cutting`, 3 corresponds to `Gallbladder Dissection`, 4 corresponds to `Gallbladder Packaging`, 5 corresponds to `Cleaning Coagulation`, and 6 corresponds to `Gallbladder Retraction`.

```
In [5]:  def problem3_load_dataset(
             manifest_dir_path,
             vid_dir_path,
             only_these_ids=[],
             num_prev_frames=0,
             img_column_name="Frame",
             label_column_name="Phase",
             return_df=False):

             all_manifest_dfs = []

             for manifest_file_name in os.listdir(manifest_dir_path):
                 data_id = int(manifest_file_name.split("_")[-1].replace(".csv", ""))
                 if data_id in only_these_ids:
                     manifest_path = os.path.join(manifest_dir_path, manifest_file_name)
                     manifest_df = pd.read_csv(manifest_path)
                     manifest_df["video_id"] = data_id
                     manifest_df[img_column_name] = f"{os.path.join(vid_dir_path, str(data_id))}/
                     manifest_df = manifest_df.rename(columns={img_column_name: "image", label_co

                     if num_prev_frames != 0:
                         prev_frames = {}
                         prev_labels = {}
                         total_num_frames = len(manifest_df)
                         for current_frame_id in range(total_num_frames):
                             for n_before_current in range(num_prev_frames):
                                 if prev_frames.get(n_before_current) is None:
                                     prev_frames[n_before_current] = []
                                     prev_labels[n_before_current] = []

                                 if current_frame_id - n_before_current >= 0:
                                     prev_frames[n_before_current].append(
                                         manifest_df["image"][current_frame_id - n_before_current
                                     prev_labels[n_before_current].append(
                                         manifest_df["label"][current_frame_id - n_before_current
                                 else:
                                     prev_frames[n_before_current].append(None)
                                     prev_labels[n_before_current].append(None)

                         for n_before_current in range(num_prev_frames):
                             manifest_df[f"prev_frame_{n_before_current}"] = prev_frames[n_before
                             manifest_df[f"prev_label_{n_before_current}"] = prev_labels[n_before
```

```python
            all_manifest_dfs.append(manifest_df)
        whole_manifest_df = pd.concat(all_manifest_dfs, ignore_index=True)

        dataset = datasets.Dataset.from_pandas(whole_manifest_df)
        dataset = dataset.cast_column("image", datasets.Image(decode=True))
        if num_prev_frames != 0:
            for n_before_current in range(num_prev_frames):
                    dataset = dataset.cast_column(f"prev_frame_{n_before_current}", datasets.Ima
                    dataset = dataset.cast_column(f"prev_label_{n_before_current}", datasets.Val
        dataset.reset_format()
        if return_df:
            return dataset, whole_manifest_df
        else:
            return dataset
```

Function utilization

Load the `problem3_datas` dataset.

```python
In [6]: raw_datasets = datasets.DatasetDict()
        raw_datasets["train"], train_df = problem3_load_dataset(
            "./data/problem3_datas/annotation/",
            "./data/problem3_datas/",
            num_prev_frames=NUM_PREV_FRAMES,
            only_these_ids=range(1, 6),
            return_df=True)
        raw_datasets["valid"] = problem3_load_dataset(
            "./data/problem3_datas/annotation/",
            "./data/problem3_datas/",
            num_prev_frames=NUM_PREV_FRAMES,
            only_these_ids=[41],
            return_df=False)
        raw_datasets
```

```
Casting the dataset:    0%|            | 0/1 [00:00<?, ?ba/s]
Casting the dataset:    0%|            | 0/1 [00:00<?, ?ba/s]
Casting the dataset:    0%|            | 0/1 [00:00<?, ?ba/s]
Casting the dataset:    0%|            | 0/1 [00:00<?, ?ba/s]
```

```
Out[6]: DatasetDict({
            train: Dataset({
                features: ['image', 'label', 'video_id', 'prev_frame_0', 'prev_label_0', 'prev_f
        rame_1', 'prev_label_1'],
                num_rows: 3570
            })
            valid: Dataset({
                features: ['image', 'label', 'video_id', 'prev_frame_0', 'prev_label_0', 'prev_f
        rame_1', 'prev_label_1'],
                num_rows: 776
            })
        })
```

Display the label statistics of the `problem3_datas` dataset.

```python
In [7]: label_stats = train_df["label"].value_counts()
        label_stats
```

```
Out[7]: 1    1849
        3     644
        2     255
        5     255
        6     243
        0     225
```

```
4    99
Name: label, dtype: int64
```

Wow, so imbalanced. Let's get the class weights. They can be used to adjust the cross-entropy loss later.

```python
num_train_labels = sum(label_stats)
train_class_weights = compute_class_weight(
    class_weight="balanced", classes=train_df["label"].unique(), y=train_df["label"]).to
train_class_weights
```

```
[2.2666666666666666,
 0.27582477014602486,
 2.0,
 0.7919254658385093,
 5.151515151515151,
 2.0,
 2.0987654320987654]
```

What do the data look like? Let's display a data sample of each class in the `problem3_datas`.

```python
for class_id in range(NUM_CLASSES):
    # Get the index of the first sample from `class_id`
    index = train_df.index[train_df["label"] == class_id][0]
    plt.figure(figsize=(4, 3))
    plt.suptitle(f'Class {class_id}: Test data #{index}', fontsize=12)
    plt.imshow(raw_datasets["train"][int(index)]["image"])
```
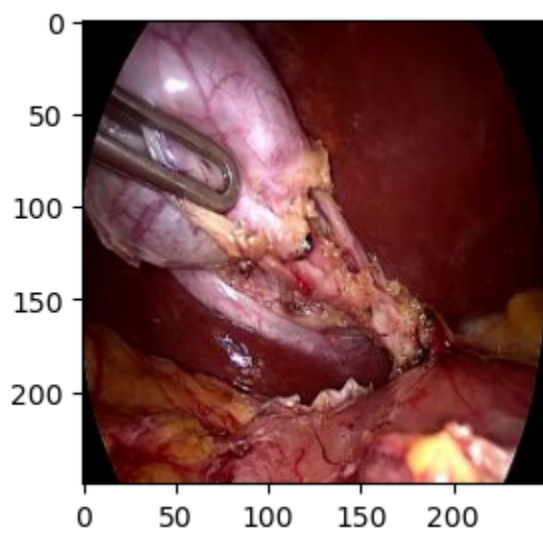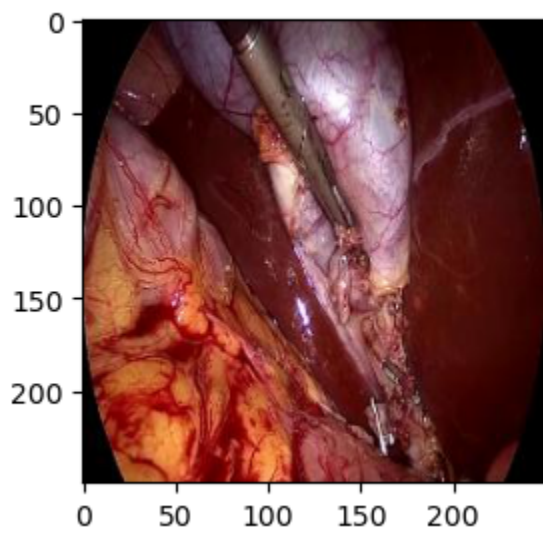

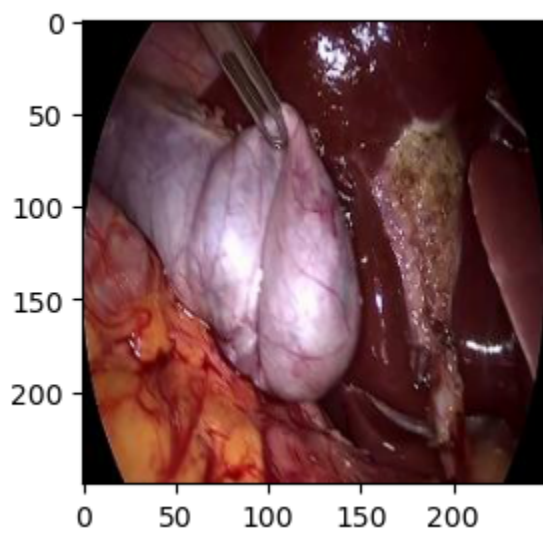Class 0: Test data #0
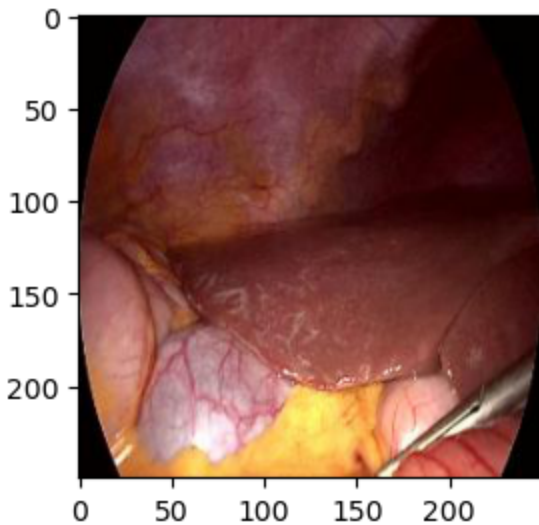
Class 1: Test data #16
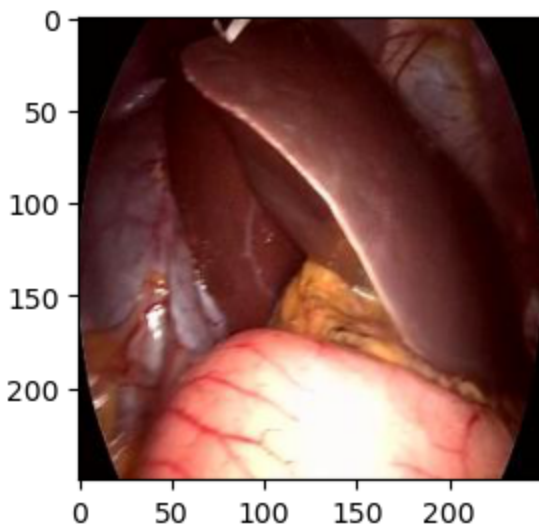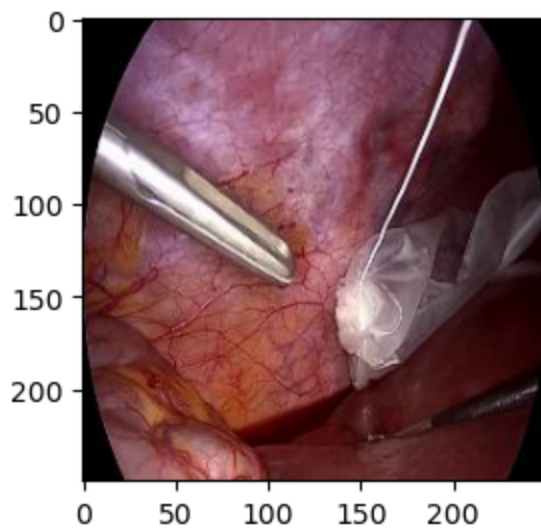
Class 2: Test data #254
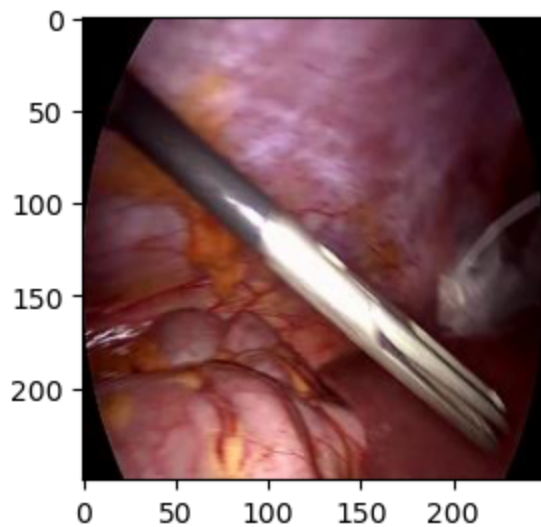

Class 3: Test data #326

Class 4: Test data #386

Class 5: Test data #416

Class 6: Test data #444

Preprocessing

Initialize the feature extractor I want to use.

```
In [10]:  feature_extractor = AutoFeatureExtractor.from_pretrained(model_name_or_path)
```

Function declarations

Augmentation and preprocessing functions.

```
In [11]:  normalize = Normalize(mean=feature_extractor.image_mean, std=feature_extractor.image_std
          train_transforms = Compose(
                  [
                      Resize(feature_extractor.size),
                      CenterCrop(feature_extractor.size),
                      ColorJitter(brightness=0.1, contrast=0.1, saturation=0.1, hue=0.05),
                      RandomHorizontalFlip(),
                      RandomVerticalFlip(),
                      RandomRotation(5),
                      ToTensor(),
                      normalize,
                  ]
          )
```

```python
eval_transforms = Compose(
    [
        Resize(feature_extractor.size),
        CenterCrop(feature_extractor.size),
        ToTensor(),
        normalize,
    ]
)

# import pyarrow as pa
def preprocess_train(example_batch):
    """Apply train_transforms across a batch."""
    example_batch["pixel_values"] = [
        train_transforms(image.convert("RGB")) for image in example_batch["image"]
    ]
    for i in range(NUM_PREV_FRAMES):
        example_batch[f"pixel_values_prev_frame_{i}"] = []
        for image in example_batch[f"prev_frame_{i}"]:
            if image is None:
                example_batch[f"pixel_values_prev_frame_{i}"].append(
                    torch.zeros(example_batch["pixel_values"][0].shape))
            else:
                example_batch[f"pixel_values_prev_frame_{i}"].append(
                    train_transforms(image.convert("RGB")))
    return example_batch

def preprocess_eval(example_batch):
    """Apply eval_transforms across a batch."""
    example_batch["pixel_values"] = [
        eval_transforms(image.convert("RGB")) for image in example_batch["image"]
    ]
    for i in range(NUM_PREV_FRAMES):
        example_batch[f"pixel_values_prev_frame_{i}"] = []
        for image in example_batch[f"prev_frame_{i}"]:
            if image is None:
                example_batch[f"pixel_values_prev_frame_{i}"].append(
                    torch.zeros(example_batch["pixel_values"][0].shape))
            else:
                example_batch[f"pixel_values_prev_frame_{i}"].append(
                    train_transforms(image.convert("RGB")))
    return example_batch
```

Data collator.

This will be useful for batched data processing later.

In [12]:
```python
def collate_fn(examples):
    pixel_values = torch.stack([example["pixel_values"] for example in examples])
    labels = torch.tensor([example["label"] for example in examples])
    return {"pixel_values": pixel_values, "labels": labels}
```

Function utilization

Don't forget to preprocess the `problem3_datas` dataset.

In [13]:
```python
proc_datasets = raw_datasets
proc_datasets["train"].set_transform(preprocess_train, output_all_columns=True)
proc_datasets["valid"].set_transform(preprocess_eval)
```

Training and evaluation

Function declarations

The Trainer I use for non-temporal surgical phase recognition.

```python
In [14]: class NonTemporalTrainer(Trainer):
             pass
```

Accuracy evaluation metric.

```python
In [15]: metric = datasets.load_metric("accuracy")
```

```
/tmp/ipykernel_26179/3770023701.py:1: FutureWarning: load_metric is deprecated and will
be removed in the next major version of datasets. Use 'evaluate.load' instead, from the
new library 🤗 Evaluate: https://huggingface.co/docs/evaluate
  metric = datasets.load_metric("accuracy")
```

```python
In [16]: def compute_metrics(eval_pred):
             """Computes accuracy on a batch of predictions"""
             predictions = np.argmax(eval_pred.predictions, axis=1)
             return metric.compute(predictions=predictions, references=eval_pred.label_ids)
```

Evaluation.

```python
In [17]: def evaluation(trainer, datasets=[], eval_names=[]):
             for dset, name in zip(datasets, eval_names):
                 metrics = trainer.evaluate(dset)
                 trainer.log_metrics(name, metrics)
                 trainer.save_metrics(name, metrics)
```

```python
In [2]: class TrainAccuracyCallback(TrainerCallback):
            def __init__(self, trainer) -> None:
                super().__init__()
                self._trainer = trainer

            def on_epoch_end(self, args, state, control, **kwargs):
                if control.should_evaluate:
                    control_copy = deepcopy(control)
                    self._trainer.evaluate(eval_dataset=self._trainer.train_dataset, metric_key_
                    return control_copy
```

Training loop.

```python
In [18]: def training(
             model,
             output_dir=f"save/problem3/nontemp/{model_name_or_path}__1e-3",
             train_dataset=proc_datasets["train"],
             eval_dataset=proc_datasets["valid"],
             trainer_class=NonTemporalTrainer,
         ):
             args = TrainingArguments(
                 output_dir,
                 remove_unused_columns=False,
                 evaluation_strategy = "epoch",
                 save_strategy = "epoch",
                 learning_rate=1e-3,
                 per_device_train_batch_size=32,
                 gradient_accumulation_steps=4,
                 per_device_eval_batch_size=32,
                 num_train_epochs=200,
                 warmup_ratio=0.1,
                 logging_steps=10,
                 load_best_model_at_end=True,
```

```
            metric_for_best_model="eval_accuracy",
            gradient_checkpointing=True,
            save_total_limit=1,
            seed=RANDOM_SEED,
            data_seed=RANDOM_SEED,
            dataloader_num_workers=4,
            lr_scheduler_type="cosine",
            fp16=True,
            report_to="wandb",
            run_name=output_dir,
        )

        trainer = trainer_class(
            model,
            args,
            train_dataset=train_dataset,
            eval_dataset=eval_dataset,
            tokenizer=feature_extractor,
            compute_metrics=compute_metrics,
            data_collator=collate_fn,
            callbacks=[EarlyStoppingCallback(early_stopping_patience=20)],
        )
        trainer.add_callback(TrainAccuracyCallback(trainer))

        train_results = trainer.train()
        trainer.save_model()

        return trainer
```

Experiment 1: Non-Temporal Surgical Phase Recognition (Non-Weighted)

```
In [20]:  exp1_model = AutoModelForImageClassification.from_pretrained(model_name_or_path)
```

```
In [21]:  trainer = training(
              exp1_model,
              output_dir=f"save/problem3/nontemp/{model_name_or_path}__1e-3",
              train_dataset=proc_datasets["train"],
              eval_dataset=proc_datasets["valid"],
              trainer_class=NonTemporalTrainer)
```

```
Using cuda_amp half precision backend
/home/holy/anaconda3/envs/health/lib/python3.10/site-packages/transformers/optimization.
py:306: FutureWarning: This implementation of AdamW is deprecated and will be removed in
a future version. Use the PyTorch implementation torch.optim.AdamW instead, or set `no_d
eprecation_warning=True` to disable this warning
  warnings.warn(
***** Running training *****
  Num examples = 3570
  Num Epochs = 200
  Instantaneous batch size per device = 32
  Total train batch size (w. parallel, distributed & accumulation) = 128
  Gradient Accumulation steps = 4
  Total optimization steps = 5600
Automatic Weights & Biases logging enabled, to disable set os.environ["WANDB_DISABLED"]
= "true"
wandb: Currently logged in as: holylovenia. Use `wandb login --relogin` to force relogin
```

Tracking run with wandb version 0.13.4

Run data is saved locally in /home/holy/projects/ai-healthcare/assignment1/wandb/run-
20221016_010436-2kw2fft9

Syncing run **save/problem3/nontemp/microsoft/resnet-50__1e-3** to Weights & Biases (docs)

[1764/5600 1:06:33 < 2:24:54, 0.44 it/s, Epoch 63/200]

Epoch	Training Loss	Validation Loss	Accuracy
1	8.024900	7.487028	0.000000
2	6.930900	5.820574	0.023196
3	4.723200	3.146347	0.346649
4	2.047200	2.063026	0.421392
5	1.134900	1.787659	0.360825
6	0.875000	1.396298	0.512887
7	0.664800	1.354722	0.503866
8	0.463700	1.244888	0.539948
9	0.345300	1.346149	0.506443
10	0.302300	1.397681	0.538660
11	0.255100	1.177450	0.576031
12	0.197800	1.325529	0.578608
13	0.163700	1.344401	0.592784
14	0.150200	1.466037	0.581186
15	0.171000	1.530887	0.600515
16	0.118300	1.472156	0.606959
17	0.109600	1.549228	0.605670
18	0.136000	1.390043	0.648196
19	0.102100	1.210044	0.666237
20	0.104900	1.577439	0.614691
21	0.101700	1.361756	0.670103
22	0.071200	1.161202	0.680412
23	0.081300	1.115333	0.746134
24	0.049800	1.023313	0.715206
25	0.053500	1.213300	0.671392
26	0.044800	1.351857	0.667526
27	0.042900	1.320490	0.682990
28	0.047400	1.449430	0.682990
29	0.047300	1.393187	0.662371
30	0.048600	1.161261	0.695876
31	0.031700	1.409274	0.690722
32	0.026000	1.170302	0.743557
33	0.021300	1.299431	0.729381
34	0.019000	1.404753	0.711340
35	0.012900	1.477610	0.686856
36	0.012100	1.410011	0.703608
37	0.023300	1.357602	0.717784
38	0.014900	1.280086	0.706186
39	0.028600	1.458761	0.677835
40	0.033200	1.410323	0.688144

41	0.033500	1.530816	0.682990
42	0.015100	0.974994	0.747423
43	0.014200	0.943808	0.764175
44	0.011400	1.175535	0.735825
45	0.023600	1.402126	0.672680
46	0.015400	1.081974	0.743557
47	0.013200	1.234546	0.730670
48	0.011600	1.133834	0.739691
49	0.009600	1.336181	0.706186
50	0.010500	1.285596	0.719072
51	0.008600	1.423311	0.685567
52	0.005600	1.429182	0.697165
53	0.004800	1.415452	0.695876
54	0.005500	1.467501	0.670103
55	0.019900	1.386131	0.698454
56	0.012000	1.515813	0.689433
57	0.013300	1.345966	0.710052
58	0.015900	1.492783	0.672680
59	0.021400	1.311713	0.706186
60	0.015600	1.411174	0.702320
61	0.024700	1.422717	0.688144
62	0.023000	1.351010	0.676546
63	0.019300	1.142028	0.734536

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-28
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-28/con
fig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-28/pyt
orch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-2
8/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-56
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-56/con
fig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-56/pyt
orch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-5
6/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-2
8] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-84
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-84/con
```

```
fig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-84/pyt
orch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-8
4/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-5
6] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-112/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-112/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
2/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-8
4] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-14
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-140/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-140/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-14
0/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
8
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-168/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-168/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
8/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
2] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-14
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-19
6
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-196/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-196/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-19
6/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-22
4
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-224/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-224/py
torch_model.bin
```

Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-22
4/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
8] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-19
6] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-25
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-252/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-252/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-25
2/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-28
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-280/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-280/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-28
0/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-25
2] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-30
8
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-308/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-308/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-30
8/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-22
4] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-28
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-33
6
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-336/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-336/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-33
6/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-30
8] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-36
4
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-364/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-364/py

torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-36
4/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-33
6] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-39
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-392/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-392/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-39
2/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-42
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-420/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-420/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-42
0/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-36
4] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-39
2] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-44
8
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-448/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-448/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-44
8/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-42
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-47
6
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-476/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-476/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-47
6/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-50
4
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-504/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-504/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-50
4/preprocessor_config.json

Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-44
8] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-47
6] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-53
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-532/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-532/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-53
2/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-50
4] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-56
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-560/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-560/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-56
0/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-58
8
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-588/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-588/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-58
8/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-53
2] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-56
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-61
6
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-616/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-616/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-61
6/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-58
8] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-64
4
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-644/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-644/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-64

```
4/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-61
6] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-67
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-672/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-672/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-67
2/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-70
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-700/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-700/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-70
0/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-67
2] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-72
8
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-728/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-728/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-72
8/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-70
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-75
6
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-756/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-756/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-75
6/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-72
8] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-78
4
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-784/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-784/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-78
4/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-75
6] due to args.save_total_limit
```

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-81
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-812/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-812/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-81
2/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-78
4] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-84
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-840/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-840/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-84
0/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-81
2] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-86
8
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-868/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-868/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-86
8/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-84
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-89
6
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-896/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-896/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-89
6/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-86
8] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-92
4
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-924/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-924/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-92
4/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-89
6] due to args.save_total_limit
***** Running Evaluation *****
```

  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-95
2
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-952/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-952/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-95
2/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-92
4] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-98
0
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-980/co
nfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-980/py
torch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-98
0/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-95
2] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
08
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1008/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1008/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
08/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-98
0] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
36
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1036/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1036/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
36/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
08] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
64
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1064/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1064/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
64/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
36] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776

```
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
92
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1092/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1092/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
92/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
64] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
20
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1120/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1120/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
20/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-10
92] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
48
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1148/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1148/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
48/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
20] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
76
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1176/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1176/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
76/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-64
4] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
48] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
04
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1204/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1204/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
04/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-11
76] due to args.save_total_limit
***** Running Evaluation *****
```

```
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
32
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1232/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1232/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
32/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
60
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1260/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1260/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
60/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
32] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
88
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1288/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1288/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
88/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
60] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-13
16
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1316/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1316/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-13
16/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-12
88] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-13
44
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1344/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1344/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-13
44/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-13
16] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-13
```

72
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1372/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1372/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1372/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1344] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1400
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1400/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1400/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1400/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1372] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1428
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1428/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1428/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1428/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1400] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1456
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1456/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1456/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1456/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1428] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1484
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1484/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1484/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1484/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1456] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1512

Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1512/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1512/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1512/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1484] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1540
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1540/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1540/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1540/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1512] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1568
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1568/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1568/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1568/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1540] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1596
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1596/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1596/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1596/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1568] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1624
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1624/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1624/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1624/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1596] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1652
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1652/c

onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1652/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
52/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
24] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
80
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1680/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1680/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
80/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
52] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
08
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1708/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1708/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
08/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-16
80] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
36
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1736/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1736/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
36/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
08] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
64
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1764/c
onfig.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1764/p
ytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
64/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-17
36] due to args.save_total_limit

Training completed. Do not forget to share your model on huggingface.co/models =)

Loading best model from save/problem3/nontemp/microsoft/resnet-50__1e-3/checkpoint-1204
(score: 0.7641752577319587).

```
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3/preprocessor_
config.json
```

In [22]:
```python
evaluation(
    trainer,
    datasets=[proc_datasets["valid"]],
    eval_names=["problem3_datas__valid"]
)
```

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
```
[25/25 00:08]

```
***** problem3_datas__valid metrics *****
  epoch                    =        63.0
  eval_accuracy            =      0.7642
  eval_loss                =      0.9438
  eval_runtime             = 0:00:10.29
  eval_samples_per_second =      75.394
  eval_steps_per_second    =       2.429
```
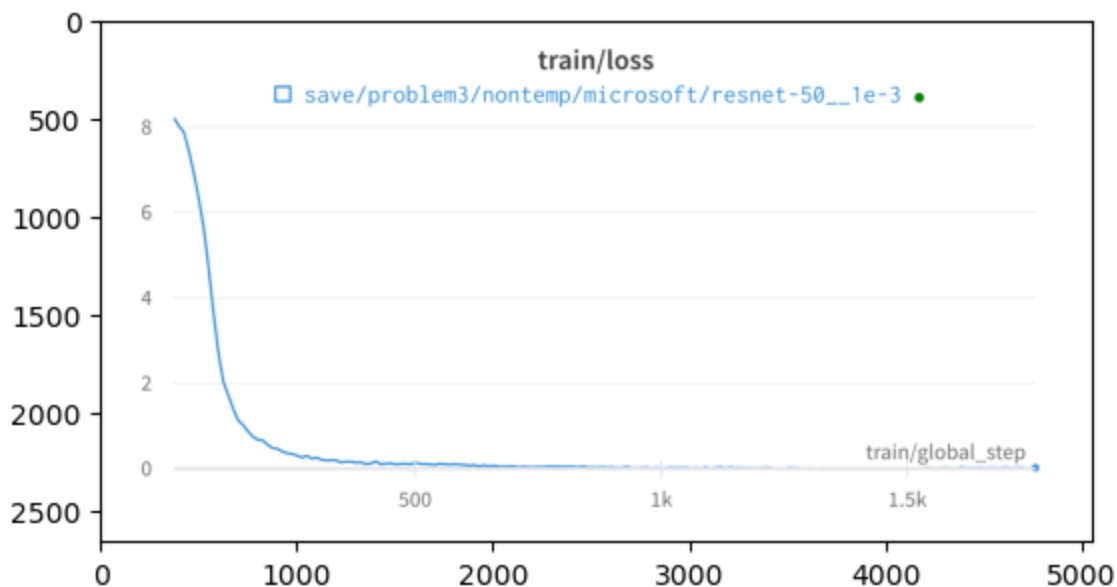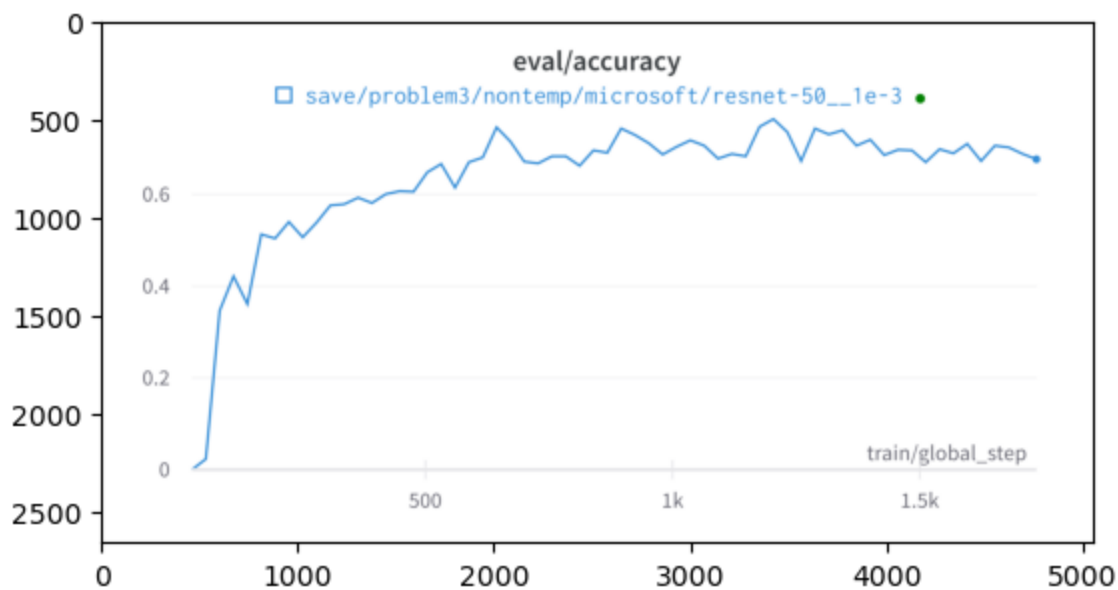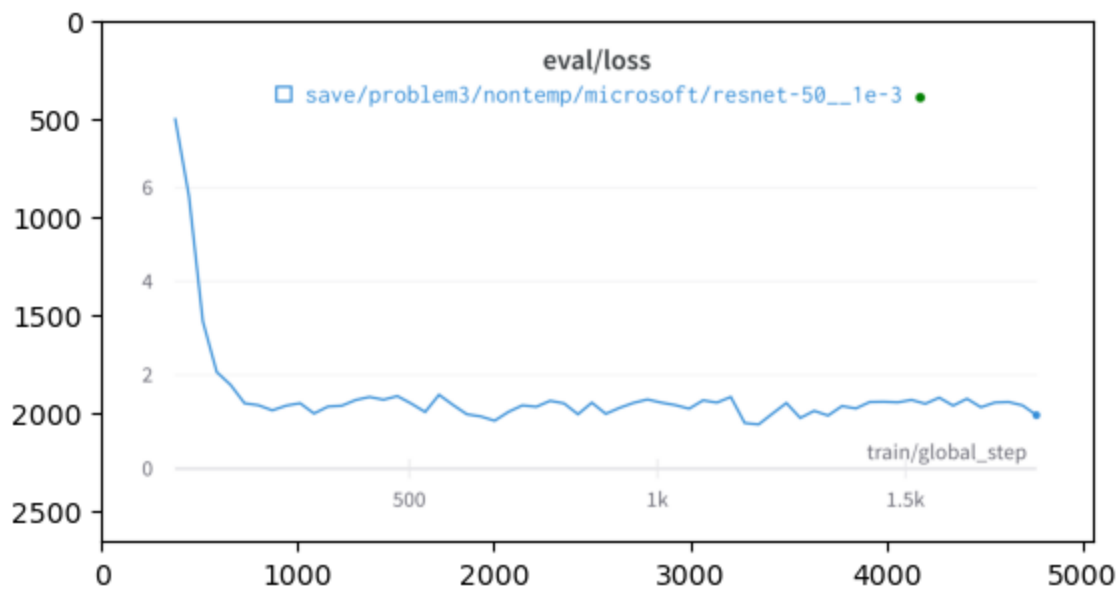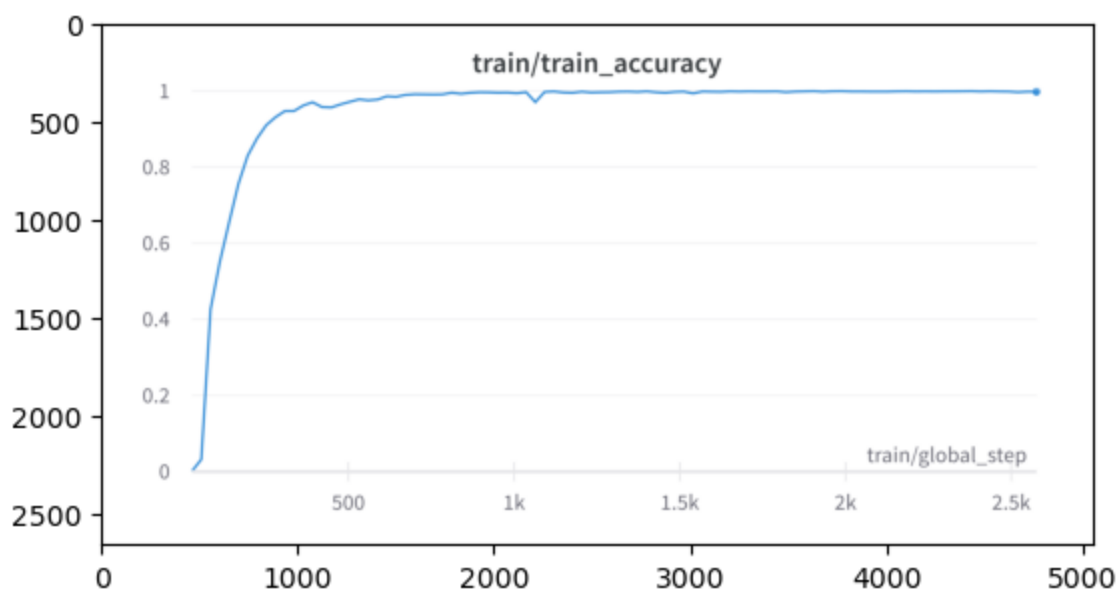
In [3]:
```python
plt.figure()
img = mpimg.imread("./log/problem3/exp1/exp1_train_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp1/exp1_train_acc.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp1/exp1_valid_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp1/exp1_valid_acc.png")
plt.imshow(img)
```

Out[3]: `<matplotlib.image.AxesImage at 0x7febfb44ff10>`

train/train_accuracy

eval/loss

☐ save/problem3/nontemp/microsoft/resnet-50__1e-3 ●

eval/accuracy

☐ save/problem3/nontemp/microsoft/resnet-50__1e-3 ●

Experiment 2: Weighted Non-Temporal Surgical Phase Recognition

Function declarations

Modified Trainer.

Use the pre-computed `train_class_weights` to adjust the cross entropy loss.

In [19]:
```python
class WeightedNonTemporalTrainer(Trainer):
    def compute_loss(self, model, inputs, return_outputs=False):
        labels = inputs.get("labels").to("cuda")
        # forward pass
        outputs = model(**inputs)
        logits = outputs.get("logits").to("cuda")
        # compute weighted cross entropy loss
        loss_fct = nn.CrossEntropyLoss(weight=torch.tensor(train_class_weights + [0 for
        loss = loss_fct(logits.view(-1, self.model.config.num_labels), labels.view(-1))
        return (loss, outputs) if return_outputs else loss
```

Function utilization

In [20]:
```python
exp2_model = AutoModelForImageClassification.from_pretrained(model_name_or_path)
```

In [21]:
```python
trainer = training(
    exp2_model,
    output_dir=f"save/problem3/nontemp/{model_name_or_path}__1e-3__weighted",
    train_dataset=proc_datasets["train"],
    eval_dataset=proc_datasets["valid"],
    trainer_class=WeightedNonTemporalTrainer)
```

```
Using cuda_amp half precision backend
/home/holy/anaconda3/envs/health/lib/python3.10/site-packages/transformers/optimization.
py:306: FutureWarning: This implementation of AdamW is deprecated and will be removed in
a future version. Use the PyTorch implementation torch.optim.AdamW instead, or set `no_d
eprecation_warning=True` to disable this warning
  warnings.warn(
***** Running training *****
  Num examples = 3570
  Num Epochs = 200
  Instantaneous batch size per device = 32
  Total train batch size (w. parallel, distributed & accumulation) = 128
  Gradient Accumulation steps = 4
  Total optimization steps = 5600
Automatic Weights & Biases logging enabled, to disable set os.environ["WANDB_DISABLED"]
= "true"
wandb: Currently logged in as: holylovenia. Use `wandb login --relogin` to force relogin
```

Tracking run with wandb version 0.13.4

Run data is saved locally in /home/holy/projects/ai-healthcare/assignment1/wandb/run-20221017_092007-tev8wm5i

Syncing run **save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted** to Weights & Biases (docs)

[1764/5600 44:18 < 1:36:26, 0.66 it/s, Epoch 63/200]

Epoch	Training Loss	Validation Loss	Accuracy
1	8.117000	7.594343	0.000000
2	7.107200	6.239693	0.014175
3	5.191800	4.093779	0.182990
4	2.958700	2.652359	0.273196
5	1.531300	2.164495	0.317010
6	1.072200	1.797656	0.396907
7	0.838600	1.555815	0.436856
8	0.679300	1.590227	0.452320

9	0.478800	1.621724	0.471649
10	0.482500	1.660609	0.496134
11	0.375400	1.790921	0.452320
12	0.340900	1.540550	0.512887
13	0.253800	1.238655	0.592784
14	0.308000	1.205093	0.574742
15	0.183400	1.323344	0.606959
16	0.194100	1.460441	0.567010
17	0.180600	1.341915	0.606959
18	0.235900	1.174975	0.617268
19	0.204600	1.320966	0.653351
20	0.194700	1.529542	0.583763
21	0.142500	1.449718	0.623711
22	0.152100	1.279704	0.658505
23	0.101200	1.269209	0.637887
24	0.136600	1.513585	0.591495
25	0.085900	1.617057	0.599227
26	0.083600	1.503736	0.582474
27	0.076900	1.179001	0.666237
28	0.058100	1.359149	0.668814
29	0.083900	1.383552	0.635309
30	0.041700	1.562068	0.635309
31	0.031100	1.808826	0.618557
32	0.028000	1.547502	0.640464
33	0.024100	1.702445	0.609536
34	0.024200	1.692340	0.630155
35	0.022400	1.894743	0.605670
36	0.058500	1.353316	0.684278
37	0.031500	1.849803	0.617268
38	0.035400	1.836778	0.579897
39	0.052300	1.373135	0.663660
40	0.033400	1.773355	0.561856
41	0.027100	1.491002	0.630155
42	0.030200	1.609811	0.676546
43	0.017600	1.262341	0.726804
44	0.020600	1.559357	0.654639
45	0.034900	1.322778	0.706186
46	0.022300	1.525396	0.662371
47	0.015300	1.397988	0.697165
48	0.020700	1.435195	0.706186

49	0.019600	1.271425	0.703608
50	0.029100	1.291654	0.676546
51	0.015700	1.416511	0.680412
52	0.023800	1.554667	0.680412
53	0.012600	1.525676	0.694588
54	0.012900	1.707852	0.701031
55	0.021900	1.554909	0.703608
56	0.037000	1.495705	0.720361
57	0.019700	1.537382	0.688144
58	0.021900	1.309726	0.708763
59	0.041900	1.271845	0.695876
60	0.016200	1.620538	0.668814
61	0.007700	1.763006	0.632732
62	0.008400	1.534836	0.657216
63	0.014900	1.416337	0.721649

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-28
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-28/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-28/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-28/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-56
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-56/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-56/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-56/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-28] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-84
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-84/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-84/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-84/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-56] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
```

Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-112
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-112/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-112/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-112/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-84] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-140
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-140/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-140/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-140/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-112] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-168
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-168/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-168/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-168/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-140] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-196
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-196/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-196/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-196/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-168] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-224
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-224/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-224/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-224/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-196] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che

ckpoint-252
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-252/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-252/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-252/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-224] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-280
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-280/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-280/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-280/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-252] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-308
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-308/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-308/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-308/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-336
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-336/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-336/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-336/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-280] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-308] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-364
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-364/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-364/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-364/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-336] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-392

Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-392/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-392/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-392/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-420
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-420/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-420/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-420/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-364] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-392] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-448
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-448/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-448/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-448/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-476
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-476/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-476/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-476/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-448] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-504
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-504/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-504/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-504/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-420] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-476] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpoint-532
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo

```
int-532/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-532/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-532/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-504] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-560
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-560/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-560/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-560/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-588
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-588/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-588/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-588/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-560] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-616
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-616/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-616/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-616/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-532] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-588] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-644
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-644/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-644/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-644/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-672
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-672/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-672/pytorch_model.bin
```

Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-672/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-644] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-700
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-700/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-700/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-700/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-672] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-728
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-728/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-728/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-728/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-700] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-756
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-756/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-756/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-756/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-616] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-728] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-784
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-784/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-784/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-784/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-756] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-812
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-812/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo

int-812/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-812/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-840
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-840/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-840/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-840/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-812] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-868
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-868/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-868/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-868/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-840] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-896
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-896/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-896/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-896/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-868] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-924
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-924/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-924/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-924/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-896] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-952
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-952/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-952/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-952/preprocessor_config.json

```
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-924] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-980
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-980/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-980/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-980/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-952] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1008
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1008/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1008/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1008/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-784] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-980] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1036
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1036/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1036/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1036/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1064
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1064/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1064/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1064/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1036] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1092
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1092/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1092/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1092/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
```

ckpoint-1064] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1120
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1120/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1120/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1120/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1092] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1148
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1148/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1148/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1148/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1120] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1176
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1176/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1176/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1176/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1148] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1204
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1204/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1204/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1204/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1008] due to args.save_total_limit
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1176] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1232
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1232/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1232/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1232/preprocessor_config.json

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1260
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1260/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1260/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1260/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1232] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1288
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1288/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1288/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1288/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1260] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1316
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1316/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1316/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1316/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1288] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1344
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1344/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1344/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1344/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1316] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1372
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1372/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1372/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1372/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1344] due to args.save_total_limit
***** Running Evaluation *****
```

  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1400
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1400/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1400/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1400/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1372] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1428
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1428/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1428/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1428/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1400] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1456
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1456/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1456/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1456/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1428] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1484
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1484/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1484/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1484/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1456] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1512
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1512/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1512/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1512/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1484] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776

```
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1540
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1540/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1540/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1540/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1512] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1568
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1568/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1568/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1568/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1540] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1596
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1596/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1596/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1596/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1568] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1624
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1624/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1624/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1624/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1596] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1652
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1652/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1652/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1652/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1624] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
```

Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1680
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1680/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1680/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1680/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1652] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1708
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1708/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1708/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1708/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1680] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1736
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1736/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1736/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1736/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1708] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1764
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1764/config.json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkpo
int-1764/pytorch_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1764/preprocessor_config.json
Deleting older checkpoint [save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/che
ckpoint-1736] due to args.save_total_limit

Training completed. Do not forget to share your model on huggingface.co/models =)

Loading best model from save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/checkp
oint-1204 (score: 0.7268041237113402).
Saving model checkpoint to save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted
Configuration saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/config.
json
Model weights saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/pytorch
_model.bin
Feature extractor saved in save/problem3/nontemp/microsoft/resnet-50__1e-3__weighted/pre
processor_config.json

In [22]:
```
evaluation(
    trainer,
```

```
        datasets=[proc_datasets["valid"]],
        eval_names=["problem3_datas__valid"]
)
```

***** Running Evaluation *****
  Num examples = 776
  Batch size = 32
```
[25/25 00:04]
```
***** problem3_datas__valid metrics *****
  epoch   =   63.0
  eval_accuracy   =   0.7268
 eval_loss   =   1.2623
  eval_runtime   = 0:00:05.72
 eval_samples_per_second   =   135.476
  eval_steps_per_second   =   4.365

In [4]:
```python
plt.figure()
img = mpimg.imread("./log/problem3/exp2/exp2_train_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp2/exp2_train_acc.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp2/exp2_valid_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp2/exp2_valid_acc.png")
plt.imshow(img)
```

Out[4]:
```
<matplotlib.image.AxesImage at 0x7febee5a1750>
```

train/train_accuracy

eval/loss

eval/accuracy
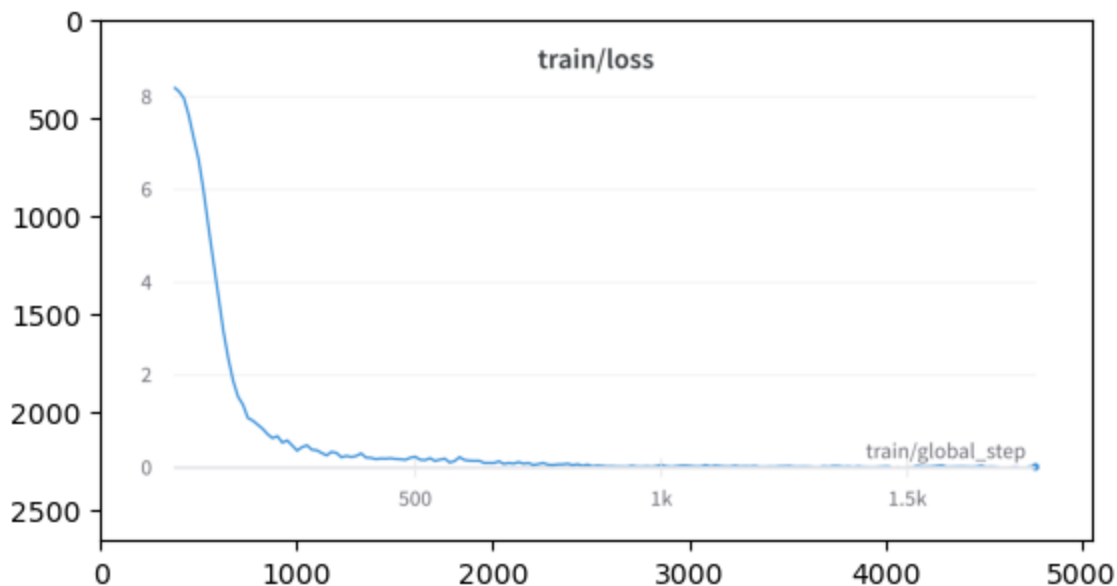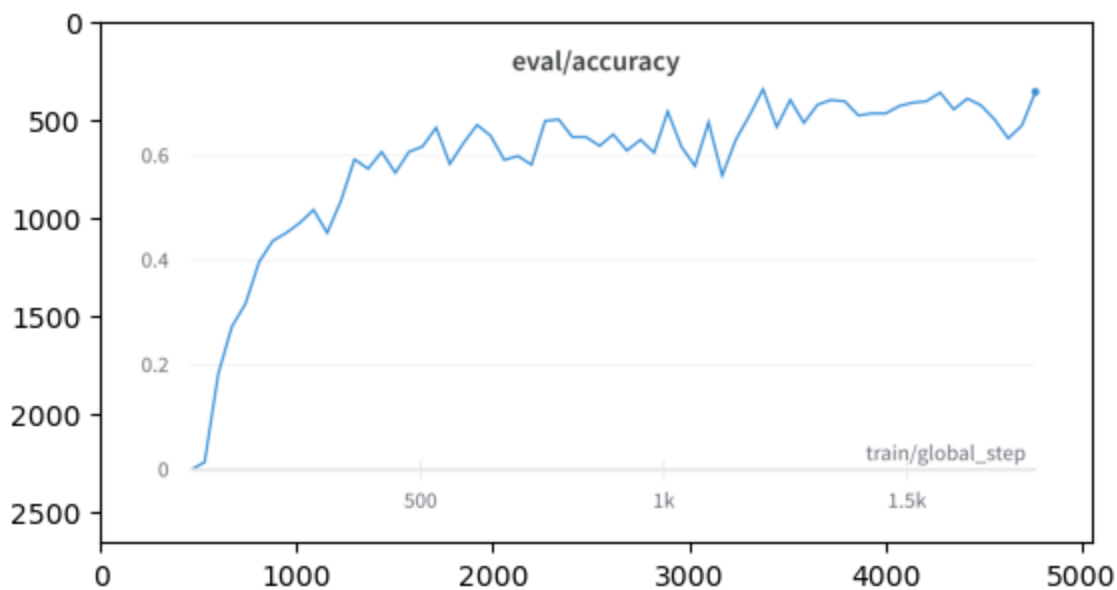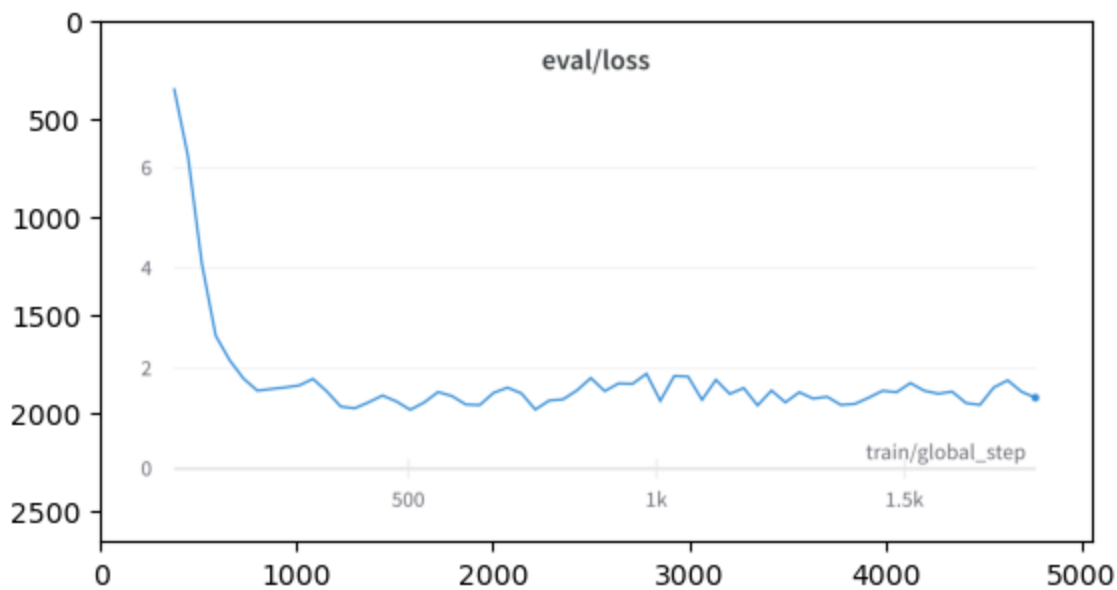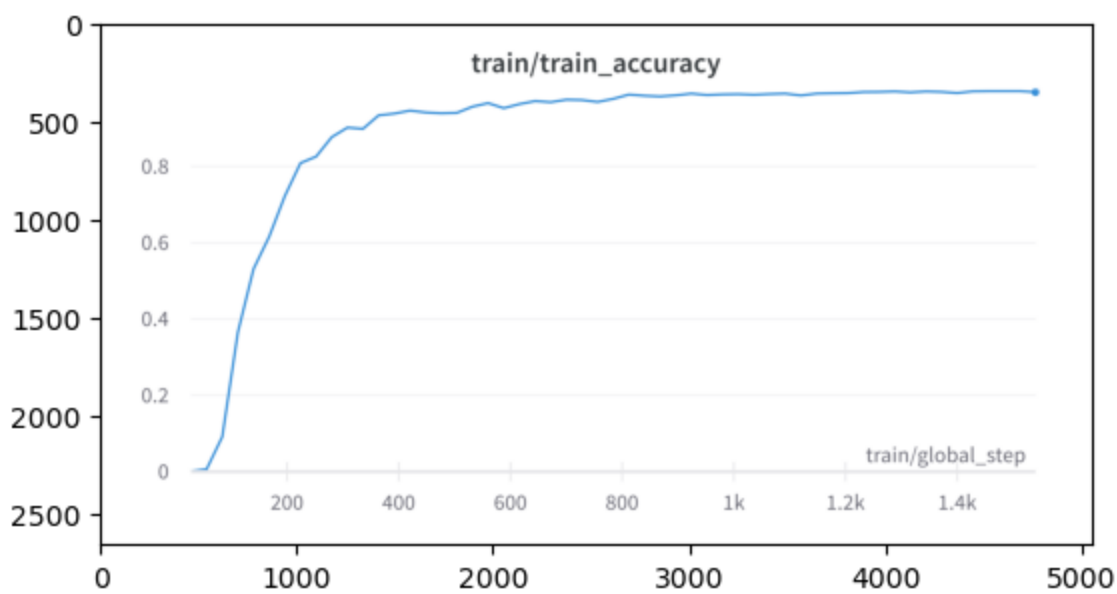
Experiment 3: Temporal Surgical Phase Recognition (Non-Weighted)

```
In [19]:  exp3_img_enc = AutoModelForImageClassification.from_pretrained(f"save/problem3/nontemp/{
```

Function declarations

```
In [19]: def temporal_collate_fn(examples):
             pixel_values = torch.stack([example["pixel_values"] for example in examples])
             labels = torch.tensor([example["label"] for example in examples])

             all_pixel_values = [pixel_values]

             for i in range(NUM_PREV_FRAMES):
                 prev_pixel_values = torch.stack([example[f"pixel_values_prev_frame_{i}"] for exa
                 all_pixel_values.append(prev_pixel_values)
             all_pixel_values = torch.stack(all_pixel_values)

             # (NUM_PREV_FRAMES + 1) x BATCH_SIZE x DIM
             return {"pixel_values": all_pixel_values, "labels": labels}
```

```
In [20]: class TemporalNetwork(nn.Module):

             def __init__(self, img_enc, temporal_lstm):
                 super().__init__()
                 self.img_enc = img_enc
                 self.temporal_lstm = temporal_lstm

             def forward(self, pixel_values, labels=None):
                 img_features = []
                 for frame_i in range(pixel_values.shape[0]):
                     img_enc_results = self.img_enc(pixel_values[frame_i], output_hidden_states=T
                     img_features.append(img_enc_results.hidden_states[-1])
                 img_features = torch.stack(img_features)
                 img_features = torch.swapaxes(img_features, 0, 1) # Swap axes so batch axis is t
                 logits = self.temporal_lstm.forward(img_features, labels=labels)
                 return logits
```

```
In [21]: class TemporalLSTM(nn.Module):

             def __init__(self, input_size=2048*7*7, hidden_size=512, num_layers=1, bidirectional
                 super().__init__()
                 self.input_size = input_size
                 self.hidden_size = hidden_size
                 self.num_layers = num_layers
                 self.bidirectional = bidirectional
                 self.num_labels = num_labels

                 self.lstm = nn.LSTM(
                     self.input_size, self.hidden_size, self.num_layers,
                     batch_first=True, bidirectional=self.bidirectional, dropout=1)
                 nn.init.xavier_normal_(self.lstm.all_weights[0][0])
                 nn.init.xavier_normal_(self.lstm.all_weights[0][1])
                 self.classifier = nn.Linear(self.hidden_size * (2 if self.bidirectional else 1),

             def forward(self, x, labels=None):
                 x = x.reshape(x.shape[0], x.shape[1], -1)
                 self.lstm.flatten_parameters()
                 y, _ = self.lstm(x)
                 logits = self.classifier(y)
                 loss = None
                 if labels is not None:
                     logits = logits[:, 0, :]
                     loss_fct = F.cross_entropy
                     loss = loss_fct(logits.view(-1, self.num_labels), labels.view(-1))
                 return loss, logits
```

```
In [22]: class TemporalTrainer(Trainer):
             pass
```

```python
In [23]: def temporal_training(
             model,
             output_dir=f"save/problem3/temp/{model_name_or_path}__5e-6",
             train_dataset=proc_datasets["train"],
             eval_dataset=proc_datasets["valid"],
             trainer_class=TemporalTrainer,
         ):
             args = TrainingArguments(
                 output_dir,
                 remove_unused_columns=False,
                 evaluation_strategy = "epoch",
                 save_strategy = "epoch",
                 learning_rate=5e-6,
                 per_device_train_batch_size=8,
                 gradient_accumulation_steps=4,
                 per_device_eval_batch_size=8,
                 num_train_epochs=200,
                 warmup_ratio=0.1,
                 logging_steps=10,
                 load_best_model_at_end=True,
                 metric_for_best_model="eval_accuracy",
                 gradient_checkpointing=False,
                 save_total_limit=1,
                 seed=RANDOM_SEED,
                 data_seed=RANDOM_SEED,
                 dataloader_num_workers=4,
                 lr_scheduler_type="cosine",
                 fp16=True,
                 report_to="wandb",
                 run_name=output_dir,
             )

             trainer = trainer_class(
                 model,
                 args,
                 train_dataset=train_dataset,
                 eval_dataset=eval_dataset,
                 tokenizer=feature_extractor,
                 compute_metrics=compute_metrics,
                 data_collator=temporal_collate_fn,
                 callbacks=[EarlyStoppingCallback(early_stopping_patience=20)],
             )
             trainer.add_callback(TrainAccuracyCallback(trainer))

             train_results = trainer.train()
             trainer.save_model()

             return trainer
```

Function utilization

```python
In [25]: exp3_temporal_lstm = TemporalLSTM()
```

```
/home/holy/anaconda3/envs/health/lib/python3.10/site-packages/torch/nn/modules/rnn.py:6
2: UserWarning: dropout option adds dropout after all but last recurrent layer, so non-z
ero dropout expects num_layers greater than 1, but got dropout=1 and num_layers=1
  warnings.warn("dropout option adds dropout after all but last "
```

```python
In [26]: exp3_temporal_network = TemporalNetwork(exp3_img_enc, exp3_temporal_lstm)
```

```python
In [27]: temporal_trainer = temporal_training(
             exp3_temporal_network,
             output_dir=f"save/problem3/temp/{model_name_or_path}__5e-6__submitted",
```

```
    train_dataset=proc_datasets["train"],
    eval_dataset=proc_datasets["valid"],
    trainer_class=TemporalTrainer)
```

Tracking run with wandb version 0.13.4

Run data is saved locally in /home/holy/projects/ai-healthcare/assignment1/wandb/run-
20221017_002848-3ngpbswm

Syncing run **save/problem3/temp/microsoft/resnet-50__5e-6__submitted** to Weights & Biases (docs)

[3330/22200 1:13:43 < 6:58:04, 0.75 it/s, Epoch 29/200]

Epoch	Training Loss	Validation Loss	Accuracy
0	1.834800	1.874263	0.400773
1	1.602500	1.741627	0.403351
2	1.303600	1.512423	0.402062
3	1.127600	1.371974	0.474227
4	0.907600	1.217528	0.648196
5	0.620500	1.203499	0.597938
6	0.482500	1.072084	0.652062
7	0.358500	0.915036	0.716495
8	0.283100	0.806252	0.744845
9	0.245200	0.705146	0.771907
10	0.188800	0.903102	0.685567
11	0.184300	0.817190	0.738402
12	0.151500	0.759587	0.730670
13	0.132200	1.060012	0.649485
14	0.175100	1.044899	0.650773
15	0.097600	0.961159	0.694588
16	0.078100	1.333524	0.576031
17	0.062200	0.843753	0.713918
18	0.067600	0.761735	0.762887
19	0.056900	0.896792	0.712629
20	0.083600	1.133797	0.668814
21	0.064600	0.974416	0.702320
22	0.060700	1.119182	0.658505

23	0.054400	0.996483	0.712629
24	0.039200	1.016416	0.697165
25	0.054500	0.942935	0.722938
26	0.046900	1.450825	0.554124
27	0.073700	1.099505	0.672680
28	0.031500	1.058852	0.685567
29	0.027800	1.195361	0.662371

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-111
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-111/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-555] due to args.save_total_limit
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-666] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-222
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-222/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-111] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-333
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-333/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-444
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-444/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-222] due to args.save_total_limit
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-333] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-555
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-555/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-444] due to args.save_total_limit
***** Running Evaluation *****
```

  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-666
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-666/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-777
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-777/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-555] due to args.save_total_limit
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-666] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-888
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-888/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-777] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-999
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-999/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-888] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1110
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1110/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-999] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1221
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1221/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1332
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1332/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check

point-1221] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1443
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1443/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1332] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1554
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1554/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1443] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1665
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1665/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1554] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1776
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1776/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1665] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1887
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1887/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1776] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1998
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1998/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1887] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2109

Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2109/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-1998] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2220
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2220/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2109] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2331
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2331/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2220] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2442
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2442/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2331] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2553
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2553/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2442] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2664
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2664/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2553] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2775
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2775/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2664] due to args.save_total_limit
***** Running Evaluation *****

  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2886
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2886/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2775] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2997
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2997/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2886] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3108
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3108/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-2997] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3219
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3219/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3108] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3330
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3330/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__submitted/check
point-3219] due to args.save_total_limit

Training completed. Do not forget to share your model on huggingface.co/models =)

Loading best model from save/problem3/temp/microsoft/resnet-50__5e-6__submitted/checkpoi
nt-1110 (score: 0.7719072164948454).
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__submitted
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__submitted/prepr
ocessor_config.json

```
In [28]: evaluation(
             temporal_trainer,
             datasets=[proc_datasets["valid"]],
```

```
        eval_names=["problem3_datas__valid"]
)
```

***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
```
                                                [97/97 00:07]
```
***** problem3_datas__valid metrics *****
  epoch   =   29.99
  eval_accuracy   =   0.7719
  eval_loss   =   0.7051
 eval_runtime   =   0:00:08.24
  eval_samples_per_second   =   94.152
  eval_steps_per_second   =   11.769

In [5]:
```python
plt.figure()
img = mpimg.imread("./log/problem3/exp3/exp3_train_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp3/exp3_train_acc.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp3/exp3_valid_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp3/exp3_valid_acc.png")
plt.imshow(img)
```

Out[5]:
```
<matplotlib.image.AxesImage at 0x7febee3d44c0>
```

train/train_accuracy

eval/loss

eval/accuracy
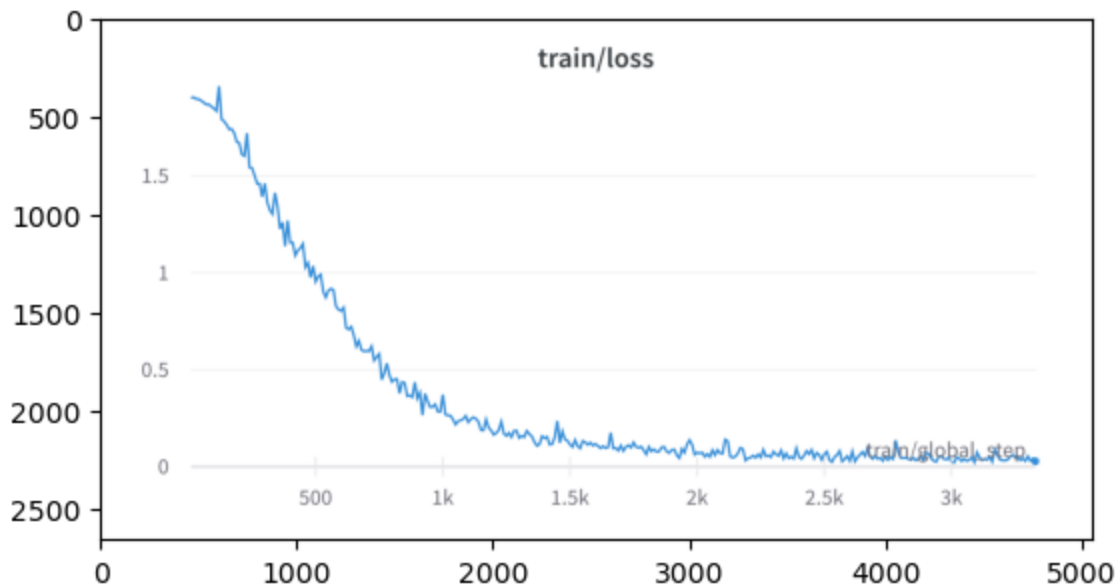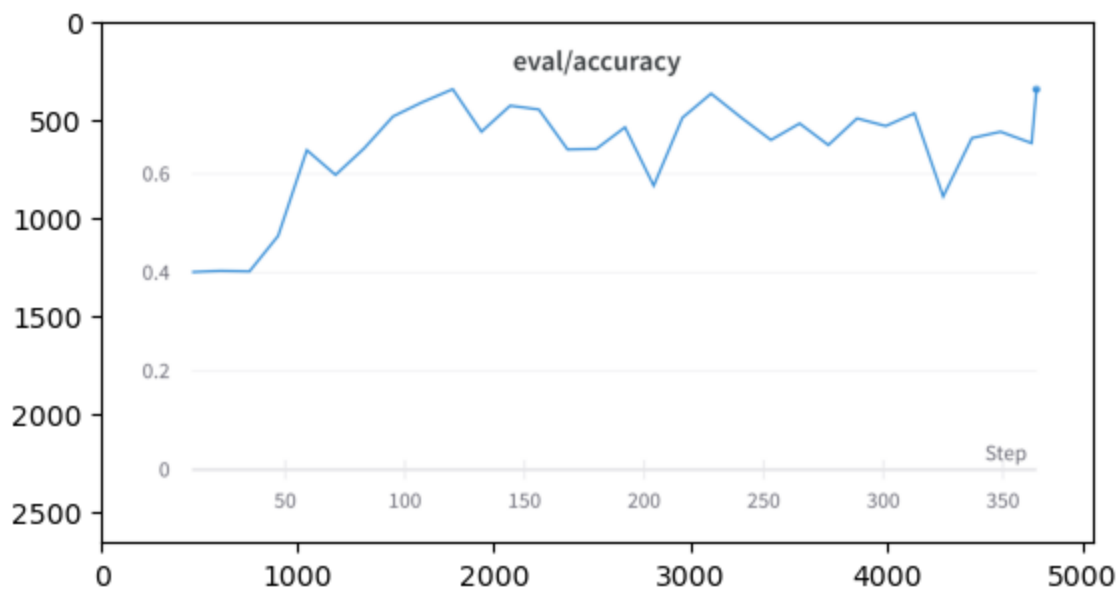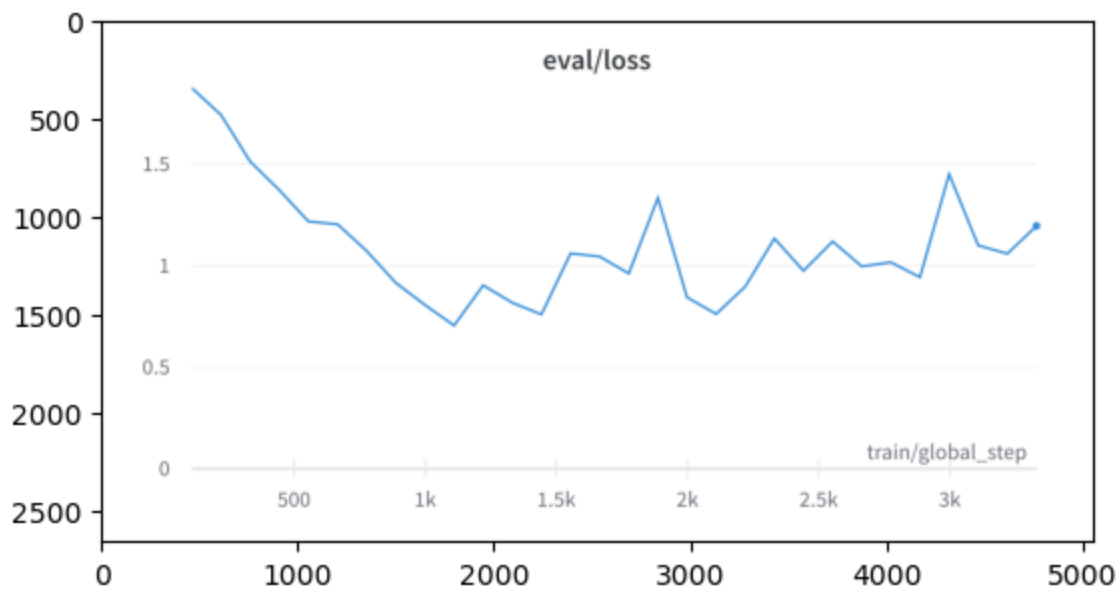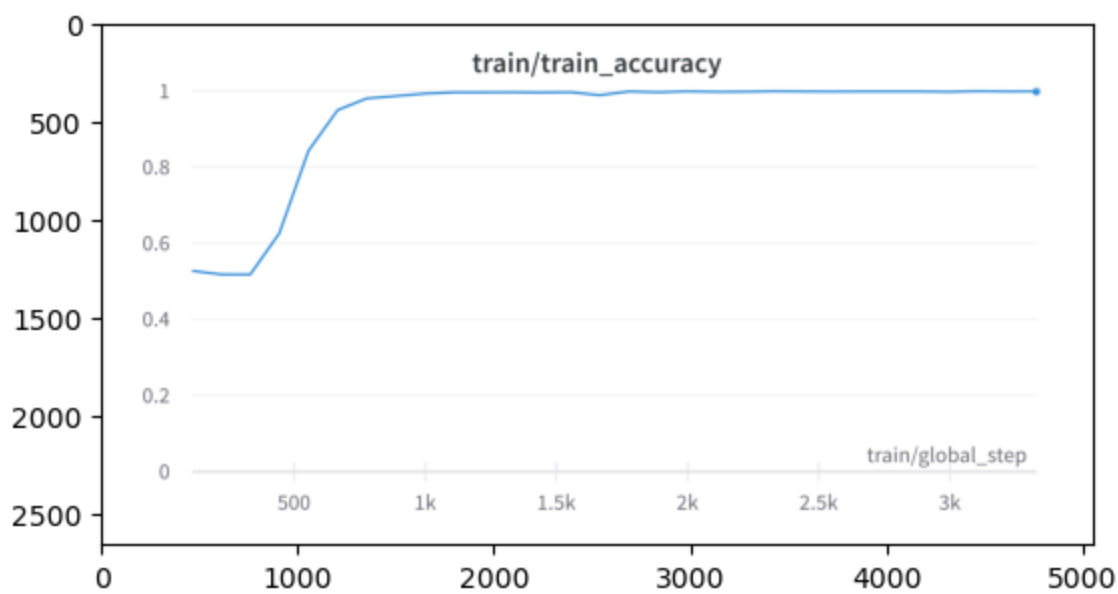
Experiment 4: Temporal Surgical Phase Recognition (Bidirectional)

```
In [25]: exp4_img_enc = AutoModelForImageClassification.from_pretrained(f"save/problem3/nontemp/{
```

```
In [26]:  exp4_temporal_lstm = TemporalLSTM(bidirectional=True)
```

```
/home/holy/anaconda3/envs/health/lib/python3.10/site-packages/torch/nn/modules/rnn.py:6
2: UserWarning: dropout option adds dropout after all but last recurrent layer, so non-z
ero dropout expects num_layers greater than 1, but got dropout=1 and num_layers=1
  warnings.warn("dropout option adds dropout after all but last "
```

```
In [27]:  exp4_temporal_network = TemporalNetwork(exp4_img_enc, exp4_temporal_lstm)
```

```
In [29]:  temporal_trainer = temporal_training(
              exp4_temporal_network,
              output_dir=f"save/problem3/temp/{model_name_or_path}__5e-6__bidir__submitted",
              train_dataset=proc_datasets["train"],
              eval_dataset=proc_datasets["valid"],
              trainer_class=TemporalTrainer)
```

```
Using cuda_amp half precision backend
/home/holy/anaconda3/envs/health/lib/python3.10/site-packages/transformers/optimization.
py:306: FutureWarning: This implementation of AdamW is deprecated and will be removed in
a future version. Use the PyTorch implementation torch.optim.AdamW instead, or set `no_d
eprecation_warning=True` to disable this warning
  warnings.warn(
***** Running training *****
  Num examples = 3570
  Num Epochs = 200
  Instantaneous batch size per device = 8
  Total train batch size (w. parallel, distributed & accumulation) = 32
  Gradient Accumulation steps = 4
  Total optimization steps = 22200
Automatic Weights & Biases logging enabled, to disable set os.environ["WANDB_DISABLED"]
= "true"
wandb: Currently logged in as: holylovenia. Use `wandb login --relogin` to force relogin
```

Tracking run with wandb version 0.13.4

Run data is saved locally in /home/holy/projects/ai-healthcare/assignment1/wandb/run-
20221017_195405-6zfhrsrd

Syncing run **save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitted** to Weights & Biases
(docs)

[4329/22200 1:50:13 < 7:35:14, 0.65 it/s, Epoch 38/200]

Epoch	Training Loss	Validation Loss	Accuracy
0	1.922700	1.952911	0.145619
1	1.709200	1.806201	0.400773
2	1.400100	1.586491	0.402062
3	1.186300	1.428943	0.429124
4	0.992100	1.280210	0.632732
5	0.693000	1.237411	0.622423
6	0.562800	1.104077	0.699742
7	0.419200	0.956506	0.730670
8	0.330700	0.843106	0.742268
9	0.295200	0.731348	0.748711
10	0.226100	0.917398	0.697165
11	0.209400	0.799662	0.738402
12	0.174200	0.738602	0.755155
13	0.145300	1.032150	0.668814

14	0.186900	0.986800	0.663660
15	0.108500	0.913568	0.699742
16	0.086300	1.230696	0.596649
17	0.069000	0.796499	0.722938
18	0.068900	0.684021	0.773196
19	0.059000	0.832868	0.722938
20	0.082500	1.019022	0.682990
21	0.064200	0.885326	0.707474
22	0.057900	1.017704	0.671392
23	0.050000	0.900107	0.719072
24	0.036700	0.916763	0.695876
25	0.046200	0.841077	0.733247
26	0.041300	1.319202	0.581186
27	0.070600	0.961975	0.703608
28	0.025700	0.944233	0.699742
29	0.023800	1.086383	0.672680
30	0.033100	1.021702	0.685567
31	0.036400	0.928667	0.728093
32	0.020100	1.155258	0.664948
33	0.029800	0.929399	0.711340
34	0.019700	1.548784	0.506443
35	0.036900	0.896597	0.731959
36	0.022800	0.977328	0.693299
37	0.030800	1.023089	0.701031
38	0.016400	1.035421	0.692010

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-111
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-111/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-222
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-222/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-111] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-333
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
```

Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-333/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-222] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-444
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-444/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-333] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-555
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-555/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-444] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-666
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-666/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-777
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-777/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-555] due to args.save_total_limit
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-666] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-888
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-888/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-777] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-999
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-999/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-888] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776

```
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1110
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1110/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-999] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1221
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1221/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1332
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1332/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1221] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1443
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1443/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1110] due to args.save_total_limit
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1332] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1554
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1554/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1665
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1665/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1554] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1776
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1776/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1665] due to args.save_total_limit
```

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1887
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1887/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1776] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1998
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1998/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1887] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2109
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2109/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1443] due to args.save_total_limit
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-1998] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2220
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2220/preprocessor_config.json
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2331
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2331/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2220] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2442
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2442/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2331] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2553
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
```

```
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2553/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2442] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2664
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2664/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2553] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2775
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2775/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2664] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2886
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2886/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2775] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2997
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2997/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2886] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3108
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3108/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-2997] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3219
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3219/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3108] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
```

```
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3330
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3330/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3219] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3441
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3441/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3330] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3552
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3552/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3441] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3663
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3663/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3552] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3774
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3774/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3663] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3885
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3885/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3774] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3996
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3996/preprocessor_config.json
```

```
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3885] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4107
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4107/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-3996] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4218
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4218/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4107] due to args.save_total_limit
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4329
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4329/preprocessor_config.json
Deleting older checkpoint [save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/checkpoint-4218] due to args.save_total_limit


Training completed. Do not forget to share your model on huggingface.co/models =)


Loading best model from save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitted/c
heckpoint-2109 (score: 0.7731958762886598).
Saving model checkpoint to save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d
Trainer.model is not a `PreTrainedModel`, only saving its state dict.
Feature extractor saved in save/problem3/temp/microsoft/resnet-50__5e-6__bidir__submitte
d/preprocessor_config.json
```

In [31]:
```python
evaluation(
    temporal_trainer,
    datasets=[proc_datasets["valid"]],
    eval_names=["problem3_datas__valid"]
)
```

```
***** Running Evaluation *****
  Num examples = 776
  Batch size = 8
***** problem3_datas__valid metrics *****
  epoch                    =      38.99
  eval_accuracy            =     0.7706
  eval_loss                =     0.6863
  eval_runtime             = 0:00:09.06
  eval_samples_per_second  =     85.628
  eval_steps_per_second    =     10.704
```

In [6]:
```python
plt.figure()
img = mpimg.imread("./log/problem3/exp4/exp4_train_loss.png")
plt.imshow(img)
```
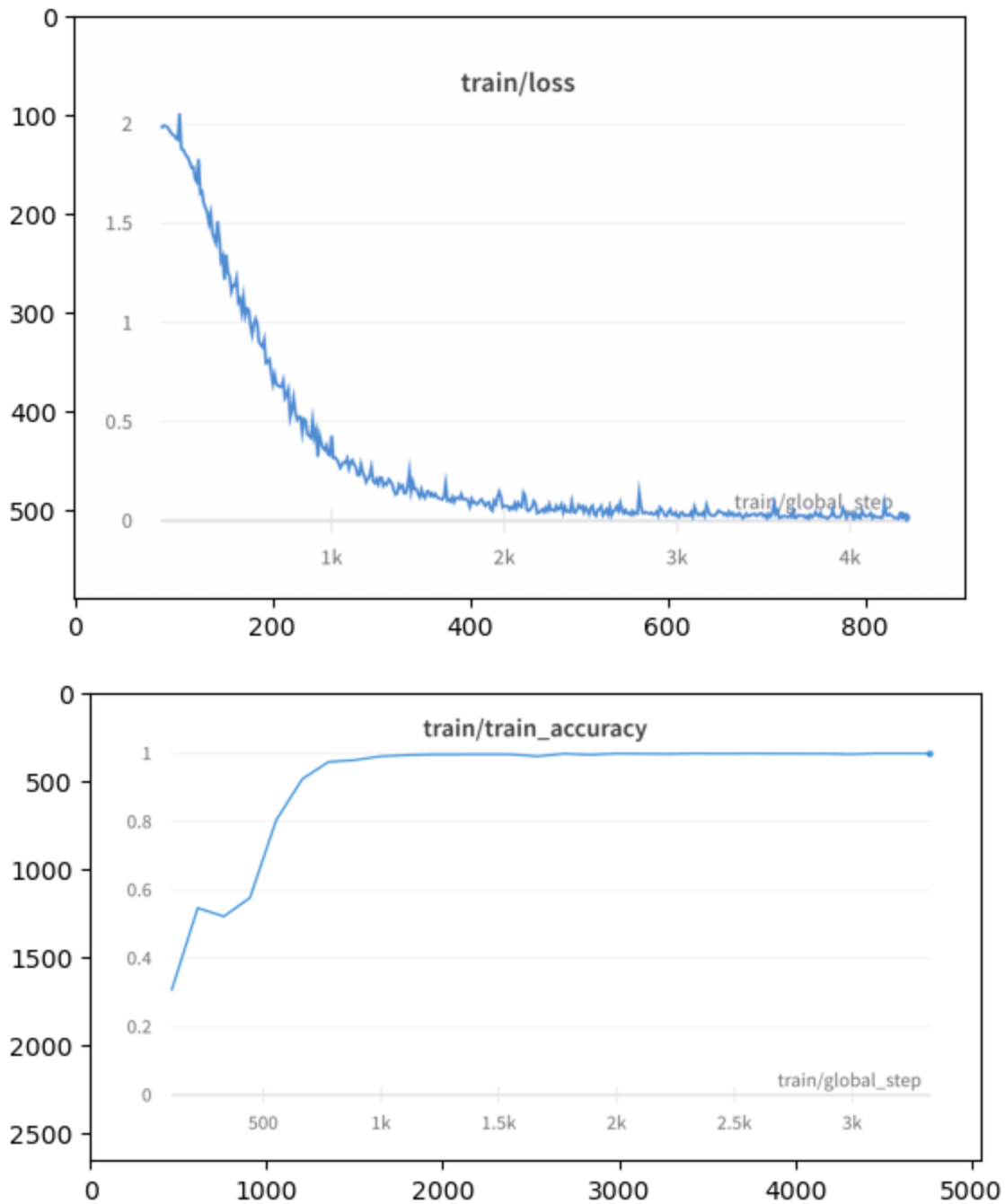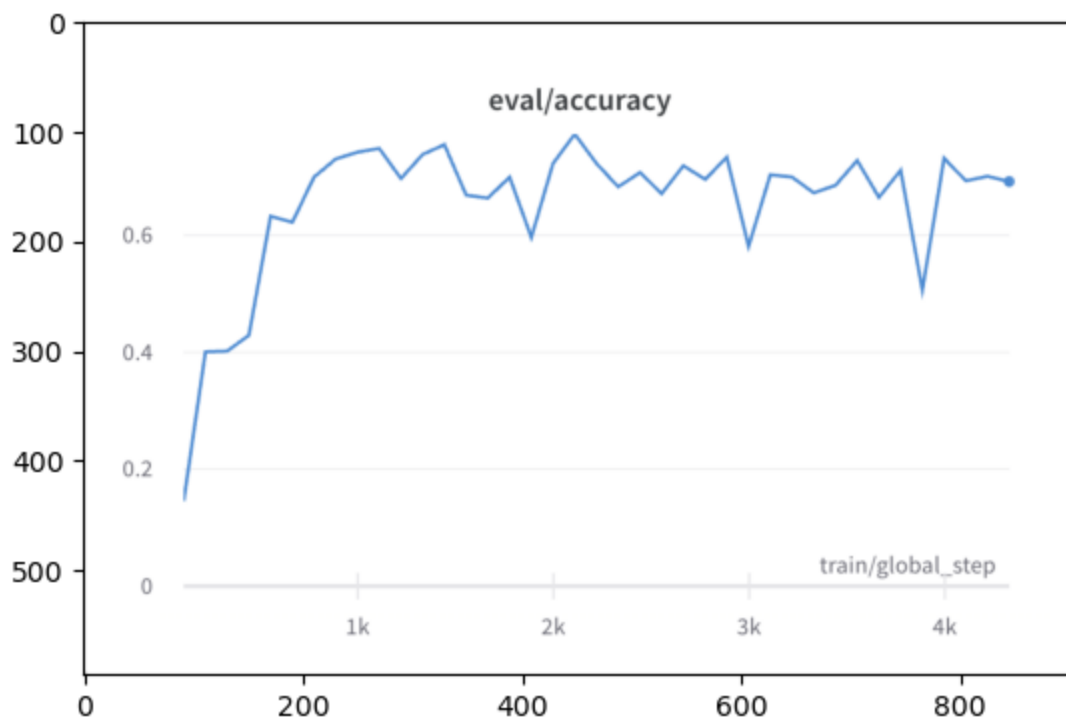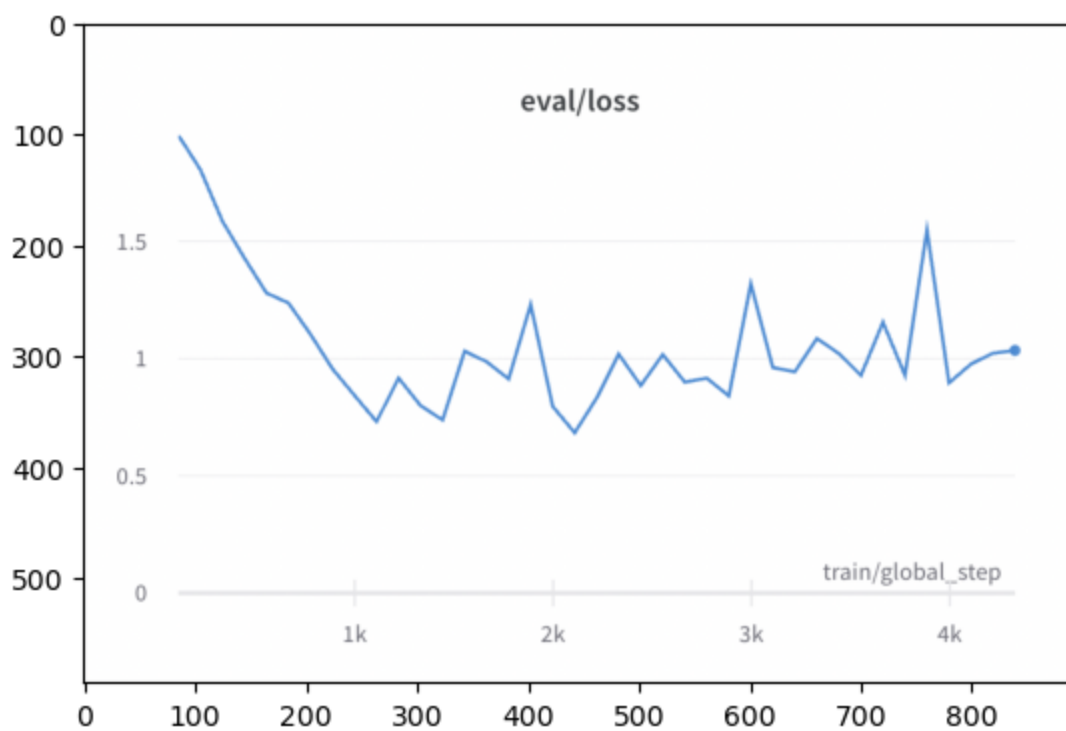
```
plt.figure()
img = mpimg.imread("./log/problem3/exp4/exp4_train_acc.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp4/exp4_valid_loss.png")
plt.imshow(img)

plt.figure()
img = mpimg.imread("./log/problem3/exp4/exp4_valid_acc.png")
plt.imshow(img)
```

Out[6]: `<matplotlib.image.AxesImage at 0x7febee45b4f0>`

eval/loss

eval/accuracy

Conclusion

Exp. ID	Exp. Setting	Eval. Acc.
1	Non-Temporal Surgical Phase Recognition (Non-Weighted, LSTM)	76.42%
2	Non-Temporal Surgical Phase Recognition (Weighted, LSTM)	72.68%
3	Temporal Surgical Phase Recognition (Non-Weighted, LSTM)	**77.19%**
4	Temporal Surgical Phase Recognition (Non-Weighted, Bidirectional LSTM)	77.06%

In this notebook, I have:

1) tried out 4 different experiment configurations (including non-temporal and temporal recognition);

2) reported the results (i.e., train loss, eval loss, and eval accuracy); and

3) achieved a best performance of 77.06% using ResNet-50 + LSTM (through Experiment 4) for surgical phase recognition.