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CSC 583

FinalProject

```
!pip install transformers datasets simpletransformers
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: transformers in /usr/local/lib/python3.10/dist-packages (4.31.0.dev0)
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Requirement already satisfied: blinker<2,>=1.0.0 in /usr/local/lib/python3.10/dist-packages (from streamlit->simplet
```

```
import pandas as pd
import numpy as np
from sklearn.model_selection import train_test_split
from datasets import Dataset
```

```
# mount the drive
from google.colab import drive
drive.mount('gdrive')
```

```
Drive already mounted at gdrive; to attempt to forcibly remount, call drive.mount("gdrive", force_remount=True).
```

```
# change the drive to my working directory
```

```
%cd gdrive/MyDrive/CSC583
```

```
/content/gdrive/MyDrive/CSC583
```

Load the data

```
df_raw = pd.read_csv('data/FakeCovid_July2020.csv', encoding='utf-8', sep=',')
df_raw.head()
```

	ID	ref_category_title	ref_url	pageid	verifiedby	country	class	title
0	FC1	FALSE: The coronavirus is an amplified bacteri...	https://www.poynter.org/?ifcn_misinformation=t...	https://www.poynter.org/ifcn-covid-19-misinfor...	La Silla Vacía	Colombia	FALSE	The coronavirus is an amplified bacteria

```
# filter out the entries that are in the English language
cond = df_raw['lang'] == 'en'
df_raw = df_raw[cond]
```

			ifcn_misinformation=a...	covid-19-misinfor...				

```
df_raw.head(3)
```

	ID	ref_category_title	ref_url	pageid	verifiedby	country	class	
2	FC3	False: Chinese converting to Islam after reali...	https://www.poynter.org/?ifcn_misinformation=c...	https://www.poynter.org/ifcn-covid-19-misinfor...	FactCrescendo	India	False	C conv to realiz
6	FC7	MISLEADING: Captions on a reuploaded video abo...	https://www.poynter.org/?ifcn_misinformation=c...	https://www.poynter.org/ifcn-covid-19-misinfor...	VERA Files	Philippines	MISLEADING	Capti reupl video the
8	FC9	Mostly True: Ghana has 307 ambulances with mob...	https://www.poynter.org/?ifcn_misinformation=g...	https://www.poynter.org/ifcn-covid-19-misinfor...	GhanaFact	Ghana	Mostly True	Ghai ambu with ve

```
df_raw.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 2845 entries, 2 to 7621
Data columns (total 19 columns):
 #   Column              Non-Null Count  Dtype 
---  ------              --------------  ----- 
 0   ID                  2845 non-null   object
 1   ref_category_title  2580 non-null   object
 2   ref_url             2845 non-null   object
 3   pageid              2580 non-null   object
 4   verifiedby          2845 non-null   object
 5   country             2580 non-null   object
 6   class               2845 non-null   object
 7   title               2845 non-null   object
 8   published_date      2845 non-null   object
 9   country1            2580 non-null   object
 10  country2            119 non-null    object
 11  country3            24 non-null     object
 12  country4            2 non-null      object
 13  article_source      2845 non-null   object
 14  ref_source          2845 non-null   object
 15  source_title        2809 non-null   object
 16  content_text        2845 non-null   object
 17  category            265 non-null    object
 18  lang                2845 non-null   object
dtypes: object(19)
memory usage: 444.5+ KB
```

```
df_raw['class'] = df_raw['class'].str.lower()
```

```
df_raw['class'].value_counts()
```

```
false                          2266
misleading                      233
mostly false                    117
mixture                          41
true                             34
partly false                     26
news                             23
mostly true                      15
correct attribution              12
```

```
half true                      11
miscaptioned                   10
unproven                       10
no evidence                     9
misattributed                   7
(org. doesn't apply rating)     7
labeled satire                  5
two pinocchios                  3
scam                            3
partly true                     2
not true                        2
partially false                 1
fake                            1
pants on fire                   1
in dispute                      1
partially correct               1
unlikely                        1
collections                     1
mixed                           1
partially true                  1
Name: class, dtype: int64
```

```
conditions = [ df_raw['class'] == 'false', df_raw['class'] == 'true', \
               df_raw['class'] == 'mostly true', df_raw['class'] == 'mostly false', \
               df_raw['class'] == 'partly true', df_raw['class'] == 'partly false', \
               df_raw['class'] == 'half true', df_raw['class'] == 'partially false', \
               df_raw['class'] == 'partially true', df_raw['class'] == 'partially correct',\
               df_raw['class'] == 'mixed', \
               df_raw['class'] != 'true', df_raw['class'] != 'false'\
             ]

choices = ['FALSE','TRUE', 'TRUE', 'FALSE', 'TRUE','FALSE','TRUE' ,'FALSE', 'TRUE', 'TRUE', 'TRUE','UNKNOWN', 'UNKNOWN']
df_raw['class'] =np.select(conditions, choices, default=np.nan)
```

```
df_raw['class'].value_counts()
```

```
FALSE      2410
UNKNOWN     370
```

```
TRUE         65
Name: class, dtype: int64
```

```
df_raw.shape
```

```
(2845, 19)
```

```
# manual one hot encoding of the class values into 0, 1 and 2
cond_label = [df_raw['class'] == 'FALSE', \
              df_raw['class'] == 'TRUE', \
              df_raw['class'] == 'UNKNOWN'
              ]

choices_label = [0, 1, 2]
df_raw['label'] =np.select(cond_label, choices_label, default=np.nan)
# change the type of the label column to an integer
df_raw['label'] = df_raw['label'].astype('int')


# let's extract out the attributes of interest
df_raw_ds = df_raw[['ID', 'label', 'class', 'content_text']]


df_raw_ds['label'].value_counts()
```

```
0    2410
2     370
1      65
Name: label, dtype: int64
```

```
df_raw_ds.head()
```

	ID	label	class	content_text
2	FC3	0	FALSE	The fact behind every news!, Ever since the Wo...

```
# separate the class from the data frame columns
labels_np = df_raw['class'].values
```

```
# apply one hot encoding
labels_one_hot_enc = pd.get_dummies(labels_np)
labels_one_hot_enc.shape
```

```
(2845, 3)
```

```
# convert the one encoded labels into a nump array
labels_one_hot_np = labels_one_hot_enc.to_numpy()
print('Shape of the numpy array: %s'%str(labels_one_hot_np.shape))
labels_one_hot_np
```

```
Shape of the numpy array: (2845, 3)
array([[1, 0, 0],
       [0, 0, 1],
       [0, 1, 0],
       ...,
       [1, 0, 0],
       [1, 0, 0],
       [1, 0, 0]], dtype=uint8)
```

```
# drop the class column since it is now encoded
df_raw.drop('class', axis=1, inplace = True)
```

```
# seperate the contex_text from the data frame
content_texts = df_raw['content_text'].values
type(content_texts)
```

```
numpy.ndarray
```

```
# lets extract the labels and text separately
label = df_raw_ds['label']
content_texts = df_raw_ds['content_text']
```

```
label.shape
```

```
(2845,)
```

```
content_texts.shape
```

```
(2845,)
```

Stratified Sampling

```
X_train, X_test, y_train, y_test = train_test_split(content_texts, label, test_size=0.5, random_state=1, stratify=label)
```

```
y_train.value_counts(normalize=True) * 100
```

```
0    84.739803
2    13.009845
1     2.250352
Name: label, dtype: float64
```

```
y_test.value_counts(normalize=True) * 100
```

```
0    84.680253
2    13.000703
1     2.319044
Name: label, dtype: float64
```

Both our target values of 2 (Unknown)and 1 (True) of the train and test sets balance out.

```
# convert the series into a list
```

```
X_train_L = X_train.tolist()
X_test_L = X_test.tolist()
y_train_L = y_train.tolist()
y_test_L = y_test.tolist()
```

Convert the list into a list of dictionary types

```
# convert the training list into a list of dictionary type
X_train_List_of_dict = []
for key, value in zip(y_train_L, X_train_L):
  data = {
      "label" : key,
      "text" : value
  }
  #print(type(key), type(value))
  X_train_List_of_dict.append(data)

# convert the test list into a list of dictionary type
X_test_List_of_dict = []
for key, value in zip(y_test_L, X_test_L):
  data = {
      "label" : key,
      "text" : value
  }
  X_test_List_of_dict.append(data)
```

let's load a data set into a format that suits our model

verification of the list of dictionaries

```
for i in range(len(X_train_List_of_dict) - 1420):
```

```
  print(X_train_List_of_dict[i])
```

```
{'label': 0, 'text': ', A MESSAGE IS being shared across Facebook and WhatsApp claiming that criminals are handing out
{'label': 1, 'text': 'Speak Now, The Covid-19 pandemic has claimed the lives of several health workers across the world
```

```
X_train_set = Dataset.from_list(X_train_List_of_dict)
X_test_set = Dataset.from_list(X_test_List_of_dict)


# convert both the training and test set into torch format
X_train_set = X_train_set.with_format('torch')
X_test_set = X_test_set.with_format('torch')


# look at the 100th element from the training data set
print(X_train_set[100])
```

```
{'label': tensor(0), 'text': '"The post’s caption reads: “Good News! Wuhans CORONA VIRUS can be cured By one bowl of fr
```

```
# look at the 100th element from the test data set
print(X_test_set[100])
```

```
{'label': tensor(0), 'text': 'According to News NT, microbiologist Elisa Granato died two days after she was administer
```

```
from datasets import DatasetDict


datasets = DatasetDict(
    {
        'train' : X_train_set, \
        'test' : X_test_set
     }
                    )
```

```
print(datasets['train'][100])
```

```
{'label': tensor(0), 'text': '"The post’s caption reads: “Good News! Wuhans CORONA VIRUS can be cured By one bowl of fr
```

```
from datasets import ClassLabel
import random
from IPython.display import display, HTML
```

Disclaimer: I borrowed this line of code from Prof. Noriko

```
def show_random_elements(dataset, num_examples=10):
  assert num_examples <= len(dataset), "Can't pick more elements than there are in the dataset."
  picks = []
  for _ in range(num_examples):
    pick = random.randint(0, len(dataset)-1)
    while pick in picks: # to avoid duplicates
      pick = random.randint(0, len(dataset)-1)
    picks.append(pick)

  df = pd.DataFrame(dataset[picks])

  for column, typ in dataset.features.items():
    print("column={}, type={}".format(column, typ))
    if isinstance(typ, ClassLabel):
      df[column] = df[column].transform(lambda i: typ.names[i])
  display(HTML(df.to_html()))


show_random_elements(datasets["train"])
```

```
column=label, type=Value(dtype='int64', id=None)
column=text, type=Value(dtype='string', id=None)
```

	label	text
0	2	It features one photo of\xa0an individual wearing a white gown administering an injection into the arm of another person dressed in military fatigues. It also features a\xa0second image of\xa0seven people dressed in\xa0military fatigues\xa0and masks., Below is a screenshot of the misleading post on Facebook:, The English and Chinese text in the image reads: “First shot of Covid-19 vaccine developed by China. The postgraduate research team leader took the first shot. The world’s first new coronavirus vaccine was injected into the left arm of the lead researcher, Dr Chen Wei, today. Seven medical volunteers, all members of the Communist Party also received the new Coronavirus vaccine. State Council Vice Premier Sun Chunlan visited Chen Wei and the expertise team members.”, COVID-19 was first detected\xa0in the Chinese city of Wuhan in December 2019. It has since spread worldwide, killing at least 13,000 and infecting 300,000 others, according to this AFP report dated March 22, 2020., , The image was also shared here, here, here, here and here on Facebook, here, here, here and here on Twitter and here on Instagram, alongside a similar claim., The\xa0claim is misleading., Chinese state media organisation The People’s Daily published this tweet on March 5, 2020 which labels the claim “FAKENEWS”, alongside a link to this post on its Facebook page., Did Chinese PLA medics test a coronavirus vaccine on themselves? #FAKENEWS. Clinical trials remain underway and this is what the real story is: https://t.co/IxrdGlerZt pic.twitter.com/G9BwnEHsvD, , The Facebook post reads, in part: “PLA medics are not testing #COVID19 vaccines on themselves, as some would have you believe., “Photos of a female PLA medic getting a shot have gone viral on the Internet and have made many people wonder if the Chinese PLA is testing a coronavirus vaccine on themselves... the human clinical trial assumption is simply fake news.”, "The post was published alongside a photo identical to that seen in the misleading image. The People’s Daily states the photo shows Chen Wei, an academician at China’s Peoples Liberation Army, receiving a shot for “strengthening immunity” before her departure to Wuhan to join the aid effort.", Below is a screenshot of the Facebook post:, Below is screenshot comparison of the photo from the misleading Facebook post (L) and the photo from the People’s Daily Facebook post (R):, This Global Times report dated March 4, 2020 states Chen was sent to\xa0Wuhan, and “achieved a major breakthrough in developing a vaccine to the novel coronavirus”., "The report states, in part: “The military medical expert team has worked in Wuhan, the coronavirus epicenter, for more than a month, and the team led by Chen Wei, academician at the Peoples Liberation Army (PLA) Academy of Military Medical Sciences, is seizing every minute and second and focusing all efforts on this emergency scientific research”.", China announced on March 17, 2020 that it will start human trials for a COVID-19 vaccine manufactured by Chen’s team., "This Global Times report published on the same date reads\xa0in part: “The coronavirus vaccine developed by Chens team passed the registration review of clinical research and was approved for clinical trial on Monday night.”", “After arriving at Wuhan, Chen Wei, a Chinese military major general, and her team launched pharmacy, pharmaceutical and toxicological research on COVID-19 vaccine in cooperation with local companies, based on their previous successful experiences in developing Ebola vaccine.”, , “Chen, the military scientist, was quoted as saying in the report that the vaccine has been tested on safety, effectiveness and quality control and is prepared for massive production. And the biotechnology firm has started to recruit volunteers for the vaccine.”, The World Health Organization (WHO) has said there is currently no medicine that can prevent or treat COVID-19., The Q&A section of its website reads, in part: “To date, there is no vaccine and no specific antiviral medicine to prevent or treat COVID-2019… Possible vaccines and some specific drug treatments are under investigation. They are being tested through clinical trials. WHO is coordinating efforts to develop vaccines and medicines to prevent and treat COVID-19.”, , Copyright © AFP 2017-2020. All rights reserved. Users can access and consult this website and use the share features available for personal, private, and non-commercial purposes. Any other use, in particular any reproduction, communication to the public or distribution of the content of this website, in whole or in part, for any other purpose and/or by any other means, without a specific licence agreement signed with AFP, is strictly

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Read more, Both senators have responded to the coronavirus crisis by doing their jobs as legislators and by providing assistance to frontliners, , , Claim: Senators Grace Poe and Risa Hontiveros have been silent over the coronavirus crisis, but were very vocal about the closure of ABS-CBN., A video posted by YouTube channel Boknoy D Great contained this claim. It was posted on May 14., “Kapag COVID ang pinaguusapan kung saan nakasalalay ang buhay ng mga Pilipino, mga kababayan, ay tila walang pakialam ang mga senador na ito, mga kababayan. Pero ‘pag ABS-CBN na ang pinag-uusapan, ay sumusulpot na

create a tokenizer for the whole dataset

halambay na mabuti o mga solusyong dapat gawin maliban sa pambibira sa administrasyong duterte. At ni minsan mga

```
from transformers import AutoTokenizer
tokenizer = AutoTokenizer.from_pretrained('bert-base-cased')
```

platform, flagged the video for fact checkers to verify. It had 7,645 views as of writing., Rating: FALSE, The facts: Both Poe and

```
def tokenize_function(examples):
  """Function that tokenizes text"""
  return tokenizer(examples['text'], padding='max_length', truncation=True)
```

on April 27, which seeks to create a Center for Disease Control., While Hontiveros voted against RA 11469, she filed Senate Bill

```
# tokenize the whole data set.
tokenized_datasets = datasets.map(tokenize_function, batched=True)
```

create the train/test datasets and model, and train the model using Trainer

"ripple" (to make waves). Read more. Email: Password: Thank You \n\nView your profile page\nhere OR\nClick close to

```
train_dataset = tokenized_datasets["train"].shuffle(seed=42)
test_dataset = tokenized_datasets["test"].shuffle(seed=42)
```

```
print(f'Train shape: {train_dataset.shape}, Test shape: {test_dataset.shape}')
```

```
Train shape: (1422, 5), Test shape: (1423, 5)
```

dogs and things like that, these viruses are transmitted from the animal to the people and that\s why China has been the source

```
!pip install --upgrade accelerate
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Requirement already satisfied: accelerate in /usr/local/lib/python3.10/dist-packages (0.20.3)
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.10/dist-packages (from accelerate) (1.22.4)
Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.10/dist-packages (from accelerate) (23.1)
Requirement already satisfied: psutil in /usr/local/lib/python3.10/dist-packages (from accelerate) (5.9.5)
Requirement already satisfied: pyyaml in /usr/local/lib/python3.10/dist-packages (from accelerate) (6.0)
Requirement already satisfied: torch>=1.6.0 in /usr/local/lib/python3.10/dist-packages (from accelerate) (2.0.1+cu118)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from torch>=1.6.0->accelerate) (3.1
Requirement already satisfied: typing-extensions in /usr/local/lib/python3.10/dist-packages (from torch>=1.6.0->acceler
Requirement already satisfied: sympy in /usr/local/lib/python3.10/dist-packages (from torch>=1.6.0->accelerate) (1.11.1
Requirement already satisfied: networkx in /usr/local/lib/python3.10/dist-packages (from torch>=1.6.0->accelerate) (3.1
Requirement already satisfied: jinja2 in /usr/local/lib/python3.10/dist-packages (from torch>=1.6.0->accelerate) (3.1.2
Requirement already satisfied: triton==2.0.0 in /usr/local/lib/python3.10/dist-packages (from torch>=1.6.0->accelerate)
Requirement already satisfied: cmake in /usr/local/lib/python3.10/dist-packages (from triton==2.0.0->torch>=1.6.0->acce
Requirement already satisfied: lit in /usr/local/lib/python3.10/dist-packages (from triton==2.0.0->torch>=1.6.0->accele
Requirement already satisfied: MarkupSafe>=2.0 in /usr/local/lib/python3.10/dist-packages (from jinja2->torch>=1.6.0->a
Requirement already satisfied: mpmath>=0.19 in /usr/local/lib/python3.10/dist-packages (from sympy->torch>=1.6.0->accel
```

markets permit," he said in an email. "Having said this, we have yet to identify the host animal for the COVID-19 virus. … It has

We load the model and specify the number of expected labels

cases in China "had some link" to the market, as did numerous news articles highlighted by Brandewie in response to PolitiFact's

```
from transformers import AutoModelForSequenceClassification

model = AutoModelForSequenceClassification.from_pretrained("bert-base-cased", num_labels=3)
```

```
Some weights of the model checkpoint at bert-base-cased were not used when initializing BertForSequenceClassification:
- This IS expected if you are initializing BertForSequenceClassification from the checkpoint of a model trained on anot
- This IS NOT expected if you are initializing BertForSequenceClassification from the checkpoint of a model that you ex
Some weights of BertForSequenceClassification were not initialized from the model checkpoint at bert-base-cased and are
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
```

possible that the current outbreak was caused by a person in rural China who came into contact with a bat or bat guano and then

we create a TrainingArguments class which contains all the hyperparameters you can tune as well as flags for activating different training options. So, first we specify where to save the checkpoints from our training.

of viruses to be transmitted from animals to humans, but experts said this risk exists across the globe and is not unique to

```
!pip install -q git+https://github.com/huggingface/peft.git git+https://github.com/huggingface/transformers.git
```

```
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
  Installing build dependencies ... done
  Getting requirements to build wheel ... done
  Preparing metadata (pyproject.toml) ... done
```

our ecological footprint brings us closer to wildlife in remote areas and the wildlife trade brings these animals into urban centers.

```
from transformers import TrainingArguments, Trainer

training_args = TrainingArguments(output_dir="test_trainer", evaluation_strategy='epoch')
```

transporting wildlife around the world. We're raising a lot of domestic livestock that become exposed to viruses through wildlife

Since Trainer doesn't automatically evaluate model performance during training, we a pass Trainer a function to compute metrics. The Evaluaate library provides a simple accuracy function you can load with the evaluate.load function.

because the culture where people eat bats and snakes and dogs and things like that, these viruses are transmitted from the

```
!pip install evaluate
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting evaluate
  Downloading evaluate-0.4.0-py3-none-any.whl (81 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 81.4/81.4 kB 10.1 MB/s eta 0:00:00
Requirement already satisfied: datasets>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from evaluate) (2.12.0)
Requirement already satisfied: numpy>=1.17 in /usr/local/lib/python3.10/dist-packages (from evaluate) (1.22.4)
Requirement already satisfied: dill in /usr/local/lib/python3.10/dist-packages (from evaluate) (0.3.6)
Requirement already satisfied: pandas in /usr/local/lib/python3.10/dist-packages (from evaluate) (1.5.3)
Requirement already satisfied: requests>=2.19.0 in /usr/local/lib/python3.10/dist-packages (from evaluate) (2.27.1)
Requirement already satisfied: tqdm>=4.62.1 in /usr/local/lib/python3.10/dist-packages (from evaluate) (4.65.0)
Requirement already satisfied: xxhash in /usr/local/lib/python3.10/dist-packages (from evaluate) (3.2.0)
Requirement already satisfied: multiprocess in /usr/local/lib/python3.10/dist-packages (from evaluate) (0.70.14)
Requirement already satisfied: fsspec[http]>=2021.05.0 in /usr/local/lib/python3.10/dist-packages (from evaluate) (2023
Requirement already satisfied: huggingface-hub>=0.7.0 in /usr/local/lib/python3.10/dist-packages (from evaluate) (0.15.
Requirement already satisfied: packaging in /usr/local/lib/python3.10/dist-packages (from evaluate) (23.1)
Requirement already satisfied: responses<0.19 in /usr/local/lib/python3.10/dist-packages (from evaluate) (0.18.0)
Requirement already satisfied: pyarrow>=8.0.0 in /usr/local/lib/python3.10/dist-packages (from datasets>=2.0.0->evaluat
Requirement already satisfied: aiohttp in /usr/local/lib/python3.10/dist-packages (from datasets>=2.0.0->evaluate) (3.8
Requirement already satisfied: pyyaml>=5.1 in /usr/local/lib/python3.10/dist-packages (from datasets>=2.0.0->evaluate)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from huggingface-hub>=0.7.0->evalua
```

```
Requirement already satisfied: typing-extensions>=3.7.4.3 in /usr/local/lib/python3.10/dist-packages (from huggingface-
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.19.0-
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.19.0->ev
Requirement already satisfied: charset-normalizer~=2.0.0 in /usr/local/lib/python3.10/dist-packages (from requests>=2.1
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.19.0->evaluate
Requirement already satisfied: python-dateutil>=2.8.1 in /usr/local/lib/python3.10/dist-packages (from pandas->evaluate
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas->evaluate) (2022.7.
Requirement already satisfied: attrs>=17.3.0 in /usr/local/lib/python3.10/dist-packages (from aiohttp->datasets>=2.0.0-
Requirement already satisfied: multidict<7.0,>=4.5 in /usr/local/lib/python3.10/dist-packages (from aiohttp->datasets>=
Requirement already satisfied: async-timeout<5.0,>=4.0.0a3 in /usr/local/lib/python3.10/dist-packages (from aiohttp->da
Requirement already satisfied: yarl<2.0,>=1.0 in /usr/local/lib/python3.10/dist-packages (from aiohttp->datasets>=2.0.0
Requirement already satisfied: frozenlist>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from aiohttp->datasets>=2.
Requirement already satisfied: aiosignal>=1.1.2 in /usr/local/lib/python3.10/dist-packages (from aiohttp->datasets>=2.0
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.1->pandas
Installing collected packages: evaluate
Successfully installed evaluate-0.4.0
```

health agency is yet to find a definite cure for COVID-19., Here is the\xa0WHO\xa0guide on preventing novel coronavirus., ",

```
import evaluate

metric = evaluate.load("accuracy")
```

Downloading builder script: 100% 4.20k/4.20k [00:00<00:00, 281kB/s]

We define a function compute_metrics that calls Compute on metric to calculate the accuracy of your predictions. We convert the predictions to logits before passing them to compute.

India. Each news story on FACTLY is backed by factual evidence/data from official sources that is either available in the public

```
def compute_metrics(eval_pred):
    logits, labels = eval_pred
    predictions = np.argmax(logits, axis=-1)
    return metric.compute(predictions=predictions, references=labels)
```

known for his anti-vaccination stance, spoke about the "danger" of developing a coronavirus vaccine, particularly an skipping

We create a Trainer object with our model, training arguments, training and test datasets and evaluation function.

"criminally prosecuted" for the deaths of children using the dengue vaccine. FACTS. It was not an NIH-made dengue vaccine

```
trainer = Trainer(model=model, \
```

```
        args = training_args, \
        train_dataset=train_dataset, \
        eval_dataset = test_dataset, \
        compute_metrics = compute_metrics
        )
```

tested on human subjects in the Philippines to date, based on the records of the U.S. Clinical Trials registry. "Meanwhile

We then fine-tune the model by calling train()

(Metro Manila), where dengue cases were highest that year.". The Philippines, Mexico, Brazil, and El Salvador were so far the

```
trainer.train()
```

```
/usr/local/lib/python3.10/dist-packages/transformers/optimization.py:411: FutureWarning: This implementation of AdamW i
  warnings.warn(
wandb: Logging into wandb.ai. (Learn how to deploy a W&B server locally: https://wandb.me/wandb-server)
wandb: You can find your API key in your browser here: https://wandb.ai/authorize
wandb: Paste an API key from your profile and hit enter, or press ctrl+c to quit: ··········
wandb: Appending key for api.wandb.ai to your netrc file: /root/.netrc
```

Tracking run with wandb version 0.15.4
Run data is saved locally in /content/gdrive/MyDrive/CSC583/wandb/run-20230611_030305-zogrlfh3
Syncing run **major-snowball-8** to Weights & Biases (docs)
View project at https://wandb.ai/nlp_ron/huggingface
View run at https://wandb.ai/nlp_ron/huggingface/runs/zogrlfh3

[534/534 09:13, Epoch 3/3]

Epoch	Training Loss	Validation Loss	Accuracy
1	No log	0.479695	0.846803
2	No log	0.495386	0.846803
3	0.510600	0.500322	0.846803

```
TrainOutput(global_step=534, training_loss=0.5079256586367717, metrics={'train_runtime': 682.9406,
'train_samples_per_second': 6.247, 'train_steps_per_second': 0.782, 'total_flos': 1122441840027648.0, 'train_loss':
0.5079256586367717, 'epoch': 3.0})
```

2020. Official Gazette. President Aquino speaks at the launching of dengue vaccine school-based immunization in Region III |

```
# generate predictions for the test set
predictions = trainer.predict(test_dataset)
```

information on dengue vaccine, Nov. 29, 20, Doctor, an alleged victim of Dengvaxia, Senate of the Philippines Press Release -

```
preds = np.array([np.argmax(entry, axis=-1) for entry in predictions[0]])
print(preds)
```

```
[0 0 0 ... 0 0 0]
```

evidence. Find out more about this initiative and our methodology.), TAGS, FOR FURTHER READING, Fact Check Filipino, Jun

```
f1_metric = evaluate.load('f1')

results = f1_metric.compute(predictions=preds, references=predictions[1], average='macro')
print(round(results['f1'], 3))
```

```
Downloading builder script: 100%  6.77k/6.77k [00:00<00:00, 505kB/s]
0.306
```

died, and his wife was hospitalized, after the couple ingested the fish tank cleaner to avoid contracting the coronavirus. The

The macro-average treats all classes equally.

same active ingredient found in anti-malarial drugs that President Donald Trump has hailed as a possible treatment for the novel

```
results = f1_metric.compute(predictions=preds, references=predictions[1], average='micro')
print(round(results['f1'], 3))
```

```
0.847
```

from mainstream news outlets, did not make it clear that the couple ingested fish-tank cleaner, rather than the drug form of

```
# save the model
saved_dir = '/content/gdrive/MyDrive/CSC583/data/saved_results'

tokenizer.save_pretrained(saved_dir)
model.save_pretrained(saved_dir)
```

for comment by deadline., Officials from Banner Health, the Phoenix hospital system that treated the husband and wife, warned

```
%ls -l /content/gdrive/MyDrive/CSC583/data/saved_results
```

```
total 424032
-rw------- 1 root root       884 Jun 11 03:13 config.json
-rw------- 1 root root 433323125 Jun 11 03:13 pytorch_model.bin
-rw------- 1 root root       125 Jun 11 03:13 special_tokens_map.json
-rw------- 1 root root       315 Jun 11 03:13 tokenizer_config.json
```

```
-rw------- 1 root root    669188 Jun 11 03:13 tokenizer.json
-rw------- 1 root root    213450 Jun 11 03:13 vocab.txt
```

hydroxychloroquine as potential coronavirus treatments, and he tweeted that hydroxychloroquine, combined with an antibiotic

```
from sklearn.metrics import classification_report
print(classification_report(predictions[1], preds))
```

```
              precision    recall  f1-score   support

           0       0.85      1.00      0.92      1205
           1       0.00      0.00      0.00        33
           2       0.00      0.00      0.00       185

    accuracy                           0.85      1423
   macro avg       0.28      0.33      0.31      1423
weighted avg       0.72      0.85      0.78      1423

/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision and
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision and
  _warn_prf(average, modifier, msg_start, len(result))
/usr/local/lib/python3.10/dist-packages/sklearn/metrics/_classification.py:1344: UndefinedMetricWarning: Precision and
  _warn_prf(average, modifier, msg_start, len(result))
```

additive may treat coronavirus." March 20, 2020, Banner Health, "Banner Health experts warn against self-medicating to prevent

Since our data set is imbalanced, the weighted average score is 0.78

```
from sklearn.metrics import confusion_matrix
confusion_matrix(predictions[1], preds)
```

```
array([[1205,    0,    0],
       [  33,    0,    0],
       [ 185,    0,    0]])
```

Write the results to a file

```
outfile = open('true_positives.csv', 'w')
```

```
for target, output, data in zip(predictions[1], preds, test_dataset['text']):
  if target == output:
    outfile.write(f'{output}, {data}')
outfile.close()
```

Data Augmentation

```
!pip install nlpaug
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting nlpaug
  Downloading nlpaug-1.1.11-py3-none-any.whl (410 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 410.5/410.5 kB 30.5 MB/s eta 0:00:00
Requirement already satisfied: numpy>=1.16.2 in /usr/local/lib/python3.10/dist-packages (from nlpaug) (1.22.4)
Requirement already satisfied: pandas>=1.2.0 in /usr/local/lib/python3.10/dist-packages (from nlpaug) (1.5.3)
Requirement already satisfied: requests>=2.22.0 in /usr/local/lib/python3.10/dist-packages (from nlpaug) (2.27.1)
Requirement already satisfied: gdown>=4.0.0 in /usr/local/lib/python3.10/dist-packages (from nlpaug) (4.6.6)
Requirement already satisfied: filelock in /usr/local/lib/python3.10/dist-packages (from gdown>=4.0.0->nlpaug) (3.12.0)
Requirement already satisfied: six in /usr/local/lib/python3.10/dist-packages (from gdown>=4.0.0->nlpaug) (1.16.0)
Requirement already satisfied: tqdm in /usr/local/lib/python3.10/dist-packages (from gdown>=4.0.0->nlpaug) (4.65.0)
Requirement already satisfied: beautifulsoup4 in /usr/local/lib/python3.10/dist-packages (from gdown>=4.0.0->nlpaug) (4
Requirement already satisfied: python-dateutil>=2.8.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.2.0->n
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.2.0->nlpaug) (20
Requirement already satisfied: urllib3<1.27,>=1.21.1 in /usr/local/lib/python3.10/dist-packages (from requests>=2.22.0-
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.10/dist-packages (from requests>=2.22.0->nl
Requirement already satisfied: charset-normalizer~=2.0.0 in /usr/local/lib/python3.10/dist-packages (from requests>=2.2
Requirement already satisfied: idna<4,>=2.5 in /usr/local/lib/python3.10/dist-packages (from requests>=2.22.0->nlpaug)
Requirement already satisfied: soupsieve>1.2 in /usr/local/lib/python3.10/dist-packages (from beautifulsoup4->gdown>=4.
Requirement already satisfied: PySocks!=1.5.7,>=1.5.6 in /usr/local/lib/python3.10/dist-packages (from requests>=2.22.0
Installing collected packages: nlpaug
Successfully installed nlpaug-1.1.11
```

```
from tqdm import tqdm
import nlpaug.augmenter.char as nac
import nlpaug.augmenter.word as naw
```

```
import nlpaug.augmenter.sentence as nas
import nlpaug.flow as naf

from nlpaug.util import Action
from sklearn.utils import shuffle

aug = naw.ContextualWordEmbsAug(
    model_path='bert-base-uncased', action="insert")
#augmented_text = aug.augment(text)
```

```
Downloading (…)okenizer_config.json: 100%  28.0/28.0 [00:00<00:00, 2.06kB/s]
Downloading (…)lve/main/config.json: 100%  570/570 [00:00<00:00, 46.4kB/s]
Downloading (…)solve/main/vocab.txt: 100%  232k/232k [00:00<00:00, 548kB/s]
Downloading (…)/main/tokenizer.json: 100%  466k/466k [00:00<00:00, 734kB/s]
Downloading model.safetensors: 100%  440M/440M [00:01<00:00, 417MB/s]
```

```
def augment_text(df,samples=300,pr=0.2):
    aug.aug_p=pr
    new_text=[]

    ##selecting the minority class samples
    df_n=df[df.label==1].reset_index(drop=True)

    ## data augmentation loop
    for i in tqdm(np.random.randint(0,len(df_n),samples)):

            text = df_n.iloc[i]['text']
            augmented_text = aug.augment(text)
            new_text.append(augmented_text)


    ## dataframe
    new=pd.DataFrame({'text':new_text,'label':1})
```

```
    df=shuffle(df.append(new).reset_index(drop=True))
```

```
# create a dictionary by passing series as values
dict_f = {'text': X_train, \
          'label': y_train \
          }
# create a train dataframe
df_train = pd.DataFrame(dict_f)
```

```
df_train.shape
```

```
(1422, 2)
```

```
df_train.head(4)
```

	text	label
4537	, A MESSAGE IS being shared across Facebook an...	0
6334	Speak Now, The Covid-19 pandemic has claimed t...	1
318	Responding to comments on his own post, the au...	0
5280	Read more, The quotes in these graphics featur...	0

```
## change samples to 0 for no augmentation
train = augment_text(df_train,samples=1000)   # before it was 400
```

```
100%|██████████| 1000/1000 [10:05<00:00,  1.65it/s]
<ipython-input-68-a526a80b7e7f>:18: FutureWarning: The frame.append method is deprecated and will be removed from panda
  df=shuffle(df.append(new).reset_index(drop=True))
```

```
train['label'].value_counts()
```

```
0    1205
```

```
1    1032
2     185
Name: label, dtype: int64
```

```
y_test.value_counts()
```

```
0    1205
2     185
1      33
Name: label, dtype: int64
```

Separate the labels from text

```
X_train_L = train['text'].tolist()
y_train_L = train['label'].tolist()
```

```
len(X_train_L)
```

```
2422
```

```
len(y_train_L)
```

```
2422
```

Convert the list into a list of dictinary types

```
# convert the training list into a list of dictionary type
X_train_List_of_dict = []
for key, value in zip(y_train_L, X_train_L):
  data = {
      "label" : key,
      "text" : str(value)
```

```
  }
  X_train_List_of_dict.append(data)
```

let's load the trainind data set into a format that suits our model

```
X_train_set = Dataset.from_list(X_train_List_of_dict)
len(X_train_set)
```

```
2422
```

```
# convert the training data set into torch format
X_train_set = X_train_set.with_format('torch')
```

```
# look at the 318th element from the training data set
print(X_train_set[318])
```

```
{'label': tensor(0), 'text': 'The post claims that USAID and Uganda Red Cross Society are undertaking research to ascer
```

```
datasets = DatasetDict(
    {
        'train' : X_train_set, \
        'test'  : X_test_set
    }
                    )
```

```
# print the 318th element
print(datasets['train'][318])
```

```
{'label': tensor(0), 'text': 'The post claims that USAID and Uganda Red Cross Society are undertaking research to ascer
```

```
# let's tokenize the whole data set
```

```
tokenized_datasets = datasets.map(tokenize_function, batched=True)
```

```
# create the train/test datasets and model, and train the model using the Trainer
train_dataset = tokenized_datasets["train"].shuffle(seed=42)
test_dataset = tokenized_datasets["test"].shuffle(seed=42)
```

```
model = AutoModelForSequenceClassification.from_pretrained("bert-base-cased", num_labels=3)
#  let's try freezing lower layers
for name, param in model.named_parameters():
  if name.startswith("bert.encoder.layer.0."):
    param.requires_grad = False
```

```
Some weights of the model checkpoint at bert-base-cased were not used when initializing BertForSequenceClassification:
- This IS expected if you are initializing BertForSequenceClassification from the checkpoint of a model trained on anot
- This IS NOT expected if you are initializing BertForSequenceClassification from the checkpoint of a model that you ex
Some weights of BertForSequenceClassification were not initialized from the model checkpoint at bert-base-cased and are
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
```

```
training_args = TrainingArguments(output_dir="test_trainer", \
                                  evaluation_strategy='epoch', \
                                  learning_rate=1e-5, \
                                  num_train_epochs=5, \
                                  per_device_train_batch_size=16, \
                                  per_device_eval_batch_size=16 \
                                  #weight_decay=4e-5,\
                                  #max_grad_norm=0.5
                                  )
```

We create a Trainer object with our model, training arguments, training and test_datasets and evaluation function.

```
trainer = Trainer(model=model, \
                  args = training_args, \
```

```
                    train_dataset=train_dataset, \
                    eval_dataset = test_dataset, \
                    compute_metrics = compute_metrics
                    )
```

Let's compute the class weights

```
from sklearn.utils.class_weight import compute_class_weight

#compute the class weights
class_wts = compute_class_weight(class_weight='balanced', classes=np.unique(y_train), y=y_train.to_numpy())
class_wts
```

```
     array([ 0.393361  , 14.8125    ,  2.56216216])
```

```
from torch import nn
import torch

class CustomTrainer(Trainer):
    def compute_loss(self, model, inputs, return_outputs=False):
        labels = inputs.get("labels")
        # forward pass
        outputs = model(**inputs)
        logits = outputs.get("logits")
        # compute custom loss (suppose one has 3 labels with different weights)
        loss_fct = nn.CrossEntropyLoss(weight=torch.tensor([ 0.393361  , 14.8125    ,  2.56216216], device=model.device))
        loss = loss_fct(logits.view(-1, self.model.config.num_labels), labels.view(-1))
        return (loss, outputs) if return_outputs else loss


trainer = CustomTrainer(model=model, \
                    args = training_args, \
                    train_dataset=train_dataset, \
                    eval_dataset = test_dataset, \
```

```
                    compute_metrics = compute_metrics
                    )
```

Fine-tune the model by calling train()

```
trainer.train()
```

```
/usr/local/lib/python3.10/dist-packages/transformers/optimization.py:411: FutureWarning: This implementation of AdamW i
  warnings.warn(
```

[760/760 22:19, Epoch 5/5]

Epoch	Training Loss	Validation Loss	Accuracy
1	No log	1.060997	0.846803
2	No log	1.136609	0.179902
3	No log	1.040141	0.843289
4	0.127600	0.941651	0.839775
5	0.127600	0.923681	0.749824

```
TrainOutput(global_step=760, training_loss=0.10901455628244501, metrics={'train_runtime': 1340.8226,
'train_samples_per_second': 9.032, 'train_steps_per_second': 0.567, 'total_flos': 3186303488686080.0, 'train_loss':
```

```
# generate predictions for the test set
predictions = trainer.predict(test_dataset)
```

```
preds = np.array([np.argmax(entry, axis=-1) for entry in predictions[0]])
```

```
f1_metric = evaluate.load('f1')

results = f1_metric.compute(predictions=preds, references=predictions[1], average='macro')
print(round(results['f1'], 3))
```

```
0.533
```

```
f1_metric = evaluate.load('f1')

results = f1_metric.compute(predictions=preds, references=predictions[1], average='micro')
print(round(results['f1'], 3))
```

```
0.75
```

```
print(classification_report(predictions[1], preds))
```

```
                  precision    recall  f1-score   support

               0       0.93      0.77      0.85      1205
               1       0.50      0.24      0.33        33
               2       0.31      0.68      0.43       185

        accuracy                           0.75      1423
       macro avg       0.58      0.57      0.53      1423
    weighted avg       0.84      0.75      0.78      1423
```

```
# derive a confusion matrix
confusion_matrix(predictions[1], preds)
```

```
array([[933,   5, 267],
       [ 12,   8,  13],
       [ 56,   3, 126]])
```

Since we have an imbalanced data set, we use the weighted average score of 0.78

Generate explanations of the predictions made by the model using XAI techniques that apply to text.

```
!pip install shap
```

```
Looking in indexes: https://pypi.org/simple, https://us-python.pkg.dev/colab-wheels/public/simple/
Collecting shap
  Downloading shap-0.41.0-cp310-cp310-manylinux_2_12_x86_64.manylinux2010_x86_64.whl (572 kB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 572.6/572.6 kB 37.2 MB/s eta 0:00:00
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (from shap) (1.22.4)
Requirement already satisfied: scipy in /usr/local/lib/python3.10/dist-packages (from shap) (1.10.1)
Requirement already satisfied: scikit-learn in /usr/local/lib/python3.10/dist-packages (from shap) (1.2.2)
Requirement already satisfied: pandas in /usr/local/lib/python3.10/dist-packages (from shap) (1.5.3)
Requirement already satisfied: tqdm>4.25.0 in /usr/local/lib/python3.10/dist-packages (from shap) (4.65.0)
Requirement already satisfied: packaging>20.9 in /usr/local/lib/python3.10/dist-packages (from shap) (23.1)
Collecting slicer==0.0.7 (from shap)
  Downloading slicer-0.0.7-py3-none-any.whl (14 kB)
Requirement already satisfied: numba in /usr/local/lib/python3.10/dist-packages (from shap) (0.56.4)
Requirement already satisfied: cloudpickle in /usr/local/lib/python3.10/dist-packages (from shap) (2.2.1)
Requirement already satisfied: llvmlite<0.40,>=0.39.0dev0 in /usr/local/lib/python3.10/dist-packages (from numba->shap)
Requirement already satisfied: setuptools in /usr/local/lib/python3.10/dist-packages (from numba->shap) (67.7.2)
Requirement already satisfied: python-dateutil>=2.8.1 in /usr/local/lib/python3.10/dist-packages (from pandas->shap) (2
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas->shap) (2022.7.1)
Requirement already satisfied: joblib>=1.1.1 in /usr/local/lib/python3.10/dist-packages (from scikit-learn->shap) (1.2.
Requirement already satisfied: threadpoolctl>=2.0.0 in /usr/local/lib/python3.10/dist-packages (from scikit-learn->shap
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.1->pandas
Installing collected packages: slicer, shap
Successfully installed shap-0.41.0 slicer-0.0.7
```

```
import shap
import transformers
```

Prepare the data set.

```
data = pd.DataFrame({'text':X_train_set['text'],'label':X_train_set['label']})
data.head(3)
```

	text	label
0	CLAIM, An image of hundreds of people cramped ...	0
1	["more info, as more people are infected with	1

load the model, tokenizer and build a pipeline

```
# load the model and tokenizer
tokenizer = transformers.AutoTokenizer.from_pretrained("bert-base-cased", use_fast=True)
model = transformers.AutoModelForSequenceClassification.from_pretrained("bert-base-cased").cuda()

# build a pipeline object to do predictions
pred = transformers.pipeline("text-classification", model=model, tokenizer=tokenizer, device=0, return_all_scores=True, trun
```

```
Some weights of the model checkpoint at bert-base-cased were not used when initializing BertForSequenceClassification:
- This IS expected if you are initializing BertForSequenceClassification from the checkpoint of a model trained on anot
- This IS NOT expected if you are initializing BertForSequenceClassification from the checkpoint of a model that you ex
Some weights of BertForSequenceClassification were not initialized from the model checkpoint at bert-base-cased and are
You should probably TRAIN this model on a down-stream task to be able to use it for predictions and inference.
`return_all_scores` is now deprecated,  if want a similar funcionality use `top_k=None` instead of `return_all_scores=T
Xformers is not installed correctly. If you want to use memory_efficient_attention to accelerate training use the follc
pip install xformers.
```

Create an explainer object for the pipeline.

```
explainer = shap.Explainer(pred)
```

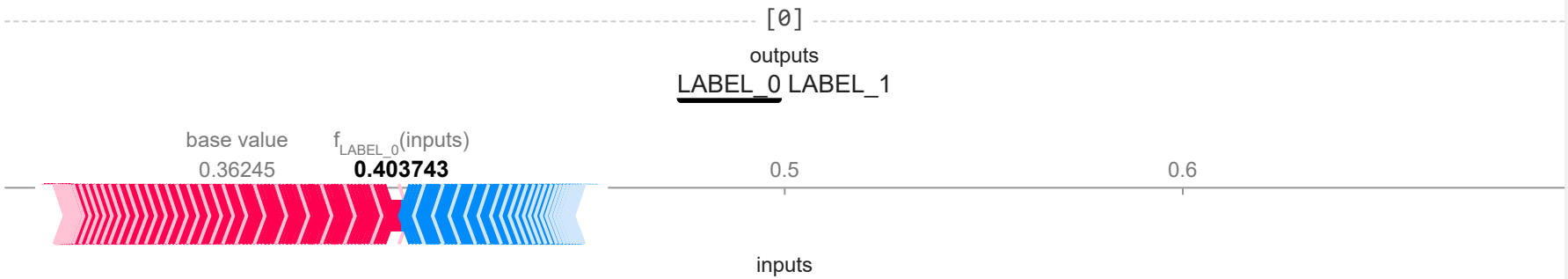
Compute the Shap values

```
shap_values = explainer(data['text'][:3])
```

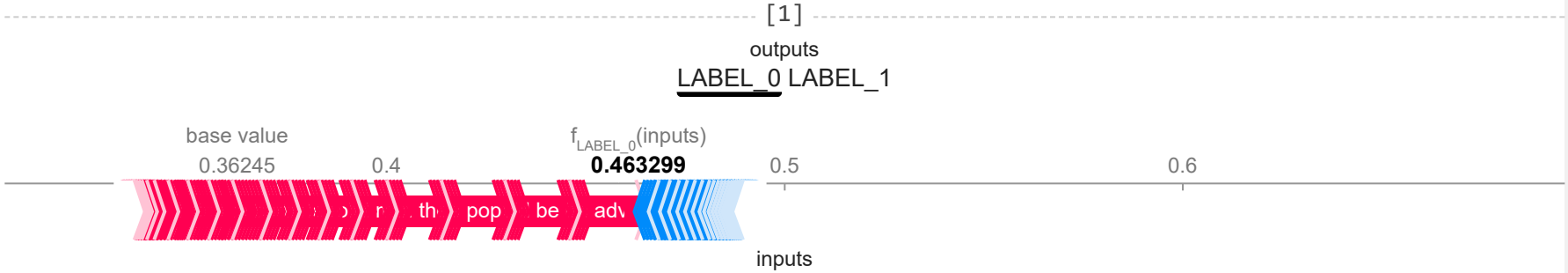
```
Token indices sequence length is longer than the specified maximum sequence length for this model (696 > 512). Running
You seem to be using the pipelines sequentially on GPU. In order to maximize efficiency please use a dataset
```

Visualizing the impact on the output classes:

```
shap.plots.text(shap_values)
```



CLAIM, An image of hundreds of people cramped in an alley is being circulated to claim that it shows lockdown violation in Gujarat. The image is being used to insinuate that these are migrant workers and homeless people who have nowhere to go., The claim reads: “ये फोटो #गुजरात कᳩा बताया जा रहा है। इनको भुल जाओ और जमाती में फंसे रहे? इसको कहते है राजनीतᳩि असल मुद्दा से नजर हटाना और धर्म और जात पात मेᳩं उलझा देना हाय रे हमारे भारत वासियों।” Translation: This is from Gujarat. Should we ignore and only talk about the Jamaatis? This is called the politics of diverting from real issues and fooling people in the name of caste and religion., As on 16 April, Gujarat has 695 coronavirus cases with 30 recorded deaths., (Click here for live updates on COVID-19. Also visit Quint Fit for comprehensive coverage on the impact of the coronavirus pandemic.), The image is also being circulated on Twitter with the same claim., TRUE OR FALSE?, The image is being circulated with a misleading claim. It does not show the plight of migrant workers or homeless people in Gujarat but shows Bangladeshi refugees in Malaysia waiting to go back home., WHAT WE FOUND, We conducted a Google reverse image search and found a report dated 25 December 2019 by a Bangladesh based news website, Daily Fulki which carried the same image., "As per the report, thousands of immigrants crowded at Malaysia’s immigration office after the country announced to facilitate the Back for Good program for repatriation of illegal foreigners.", Another report by JagoNews24 corroborated the details. “The migrants from different countries have been waiting a long time before opening the counter at 9 am, early or before midnight. Thousands of immigrants are waiting in line, but on an average, 8 special passes are being issued every day from an immigration office. The rest have to be in line in anticipation of the next day,” the report stated., Hence, an old image of Bangladeshi immigrants in Malaysia is being shared to claim that it shows a violation of COVID-19 lockdown in Gujarat., You can read all our fact-checked stories here., "(Not convinced of a post or information you came across online and want it verified? Send us the details on WhatsApp at 9643651818, or e-mail it to us at webqoof@thequint.com and well fact-check it for you. You can also read all our fact-checked stories here.)", "Well get through this! Meanwhile, heres all you need to know about the Coronavirus outbreak to keep yourself safe, informed, and updated.", The Quint is now available on Telegram & WhatsApp too, Click here to join., Stay tuned with our weekly recap of what’s hot & cool by The Quint.



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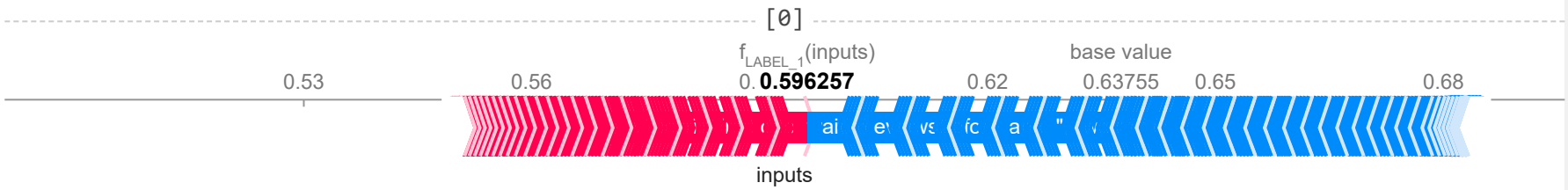
odds may not be in our favor, according to a recent facebook post., " harvard scientists just predicted that it may take many months to find cure for coronavirus, " the march 10 post says. " according to them, virus is spreading so fast that it will infect 70 % of humanity this year. ", this post was flagged as part of facebook ' s efforts to combat false news and misinformation on its news feed. (read more about our partnership with facebook.), spokespeople for harvard university did not immediately reply to politifact ' s emails asking about the post., but news stories lend some credence to the facebook post ' s claims — and provide more information that the post fails to mention., on march 11, the world health organization declared covid - 19 a pandemic that has infected nearly 120, 000 people worldwide. more than 4, 000 people have died and eight countries, including the united states, are currently each reporting more than 1, 000 cases., mark lipsitch, an epidemiologist at harvard ' s center for communicable disease dynamics and an expert on viruses, told cbs news, among other news outlets, that 40 % to 70 % of the world ' s adult population could be infected in the coming year., there are an estimated 7. 6 billion people in the world, and an estimated 329 million in the united states, according to the u. s. census bureau. adults make up about three - quarters of the u. s. population., " that is a projection, " lipsitch said during the march 2 interview, " so we will find out if that ' s accurate as things go on. it is the best estimate that i ' ve been able to make based on a combination of the mathematical models that we use to track and predict epidemics. ", other estimates are similar. the

Visualizing the impact on a single class.

researchers need more data to get a better idea of how far the coronavirus could spread. " the models will be refined as more information

```
# visualizing the impact of class 1
shap.plots.text(shap_values[:, :, 1])
```

```
Creating an ndarray from ragged nested sequences (which is a list-or-tuple of lists-or-tuples-or ndarrays with diffe
```



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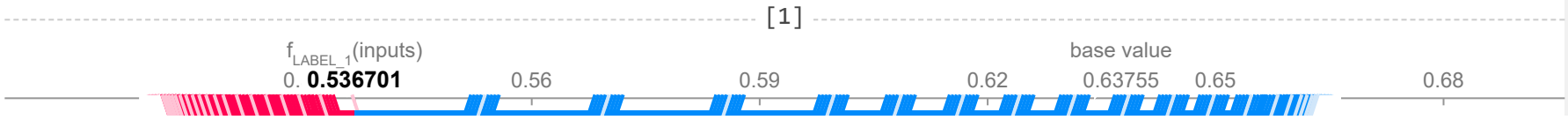
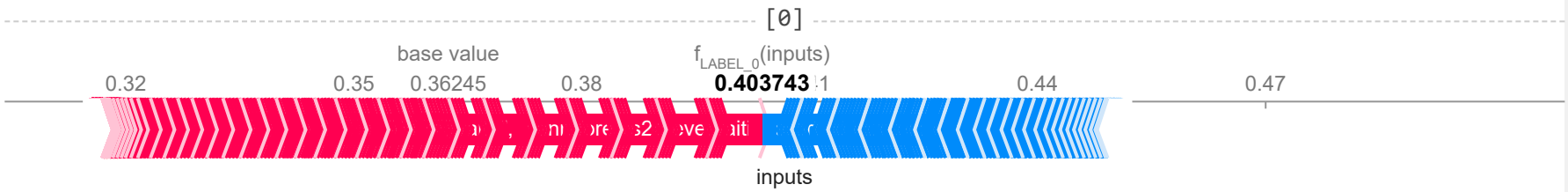



```
# visualizing the impact of class 0
shap.plots.text(shap_values[:, :, 0])
```



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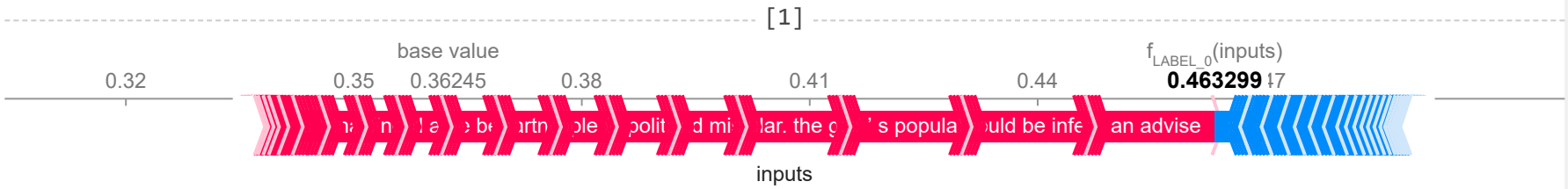

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Plotting the words that impact class 0

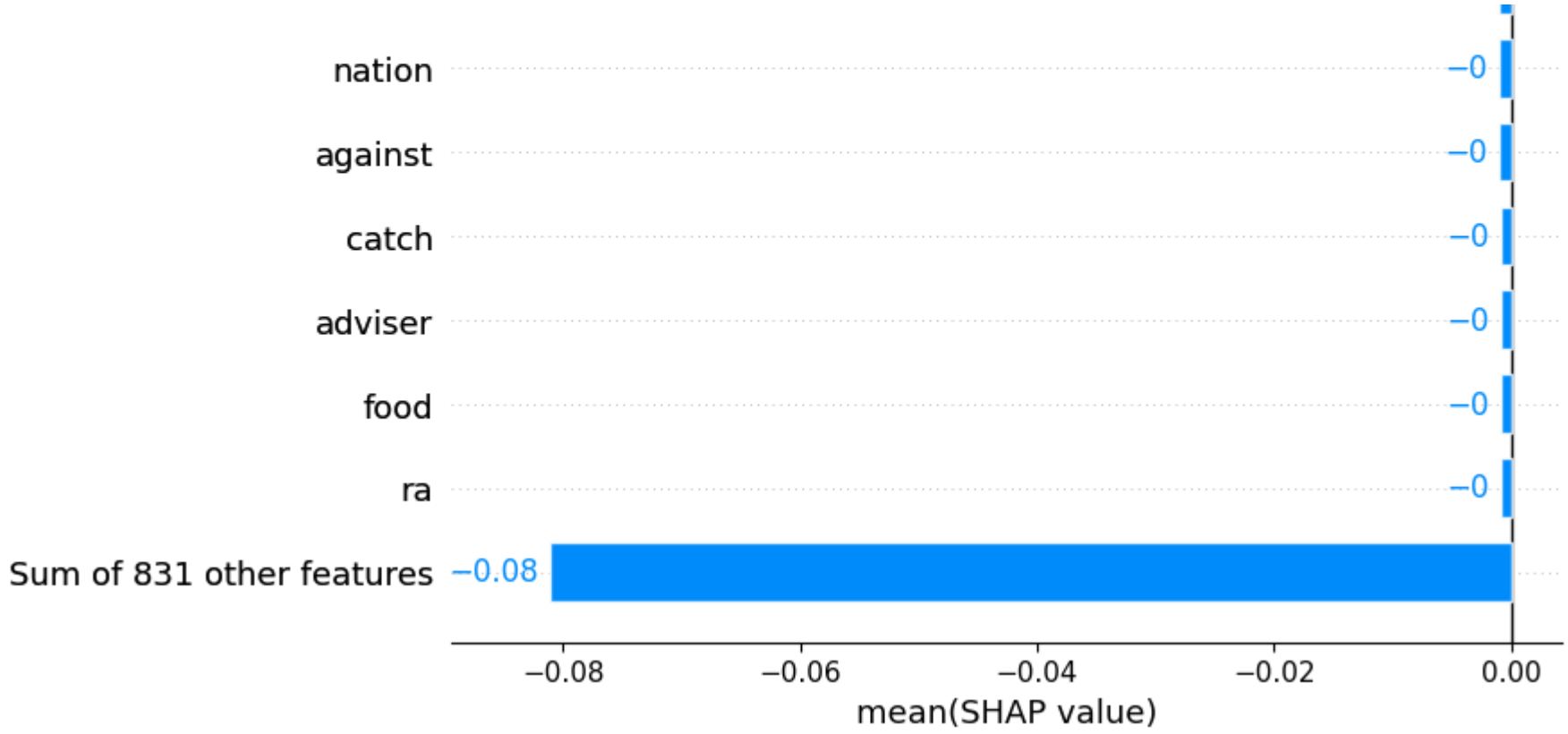
coronavirus may infect up to 70 % of world ' s population, expert warns, march 2, 2020, the hill, harvard scientist : coronavirus pandemic likely

```
shap.plots.bar(shap_values[:,:,0].mean(0))
```

Plotting the words that impact class 1

```
shap.plots.bar(shap_values[:,:,1].mean(0))
```

Ensembles



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