Artificial Intelligence

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Detecting Fake News

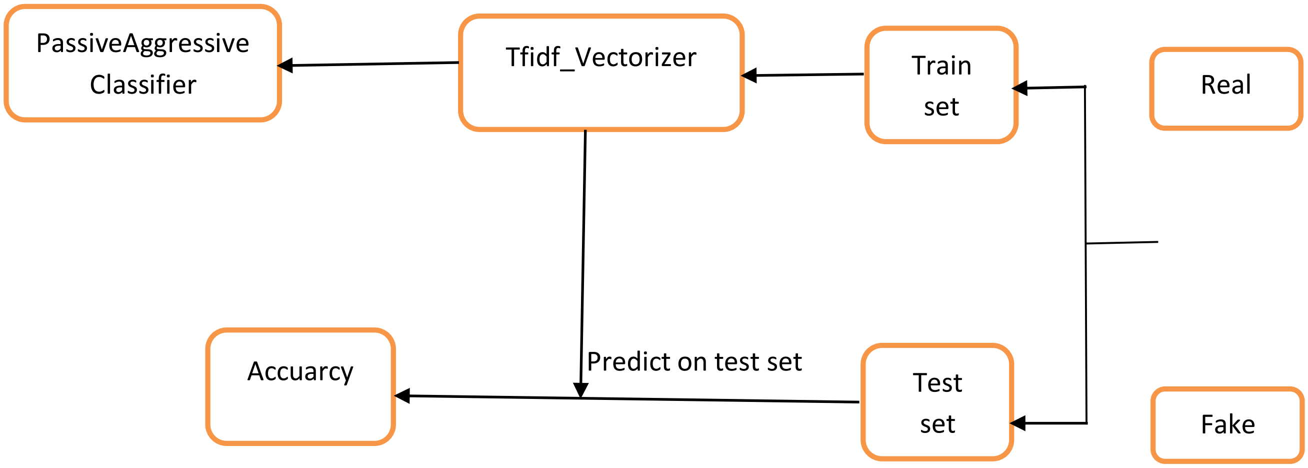
Building a model to accurately classify a piece of news as REAL or FAKE. This python project for identifying fake news is concerned with the distinction between fake and true news. On our dataset, we create a TfidfVectorizer with sklearn. Then, we initialise a PassiveAggressive Classifier and fit the model. The accuracy score and the confusion matrix, in the end, tell us how well our model performs.

TfidfVectorizer: The TfidfVectorizer converts a collection of raw documents into a matrix of TF-IDF features.

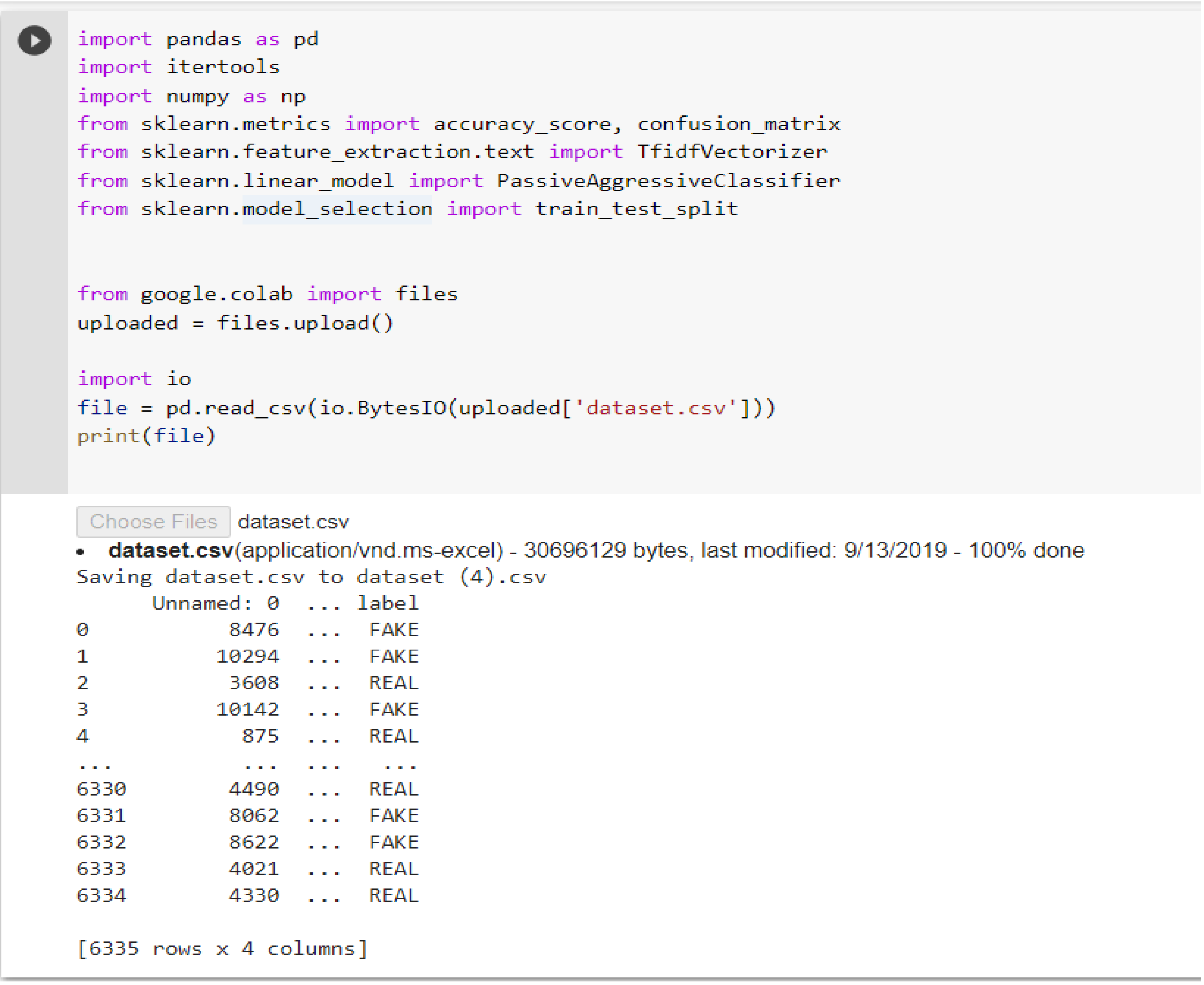
TF (Term Frequency): The Term Frequency of a word is the number of times it appears in a document. When a term appears more frequently than others, a greater score indicates that the document is a good match when the term is part of the search keywords.

IDF (Inverse Document Frequency): Words that occur many times a document, but also occur many times in many others, may be irrelevant. IDF is a measure of how significant a term is in the entire corpus.

PassiveAggressiveClassifier: Passive Aggressive algorithms are online learning algorithms. Such an algorithm remains passive for a correct classification outcome, and turns aggressive in the event of a miscalculation, updating and adjusting.



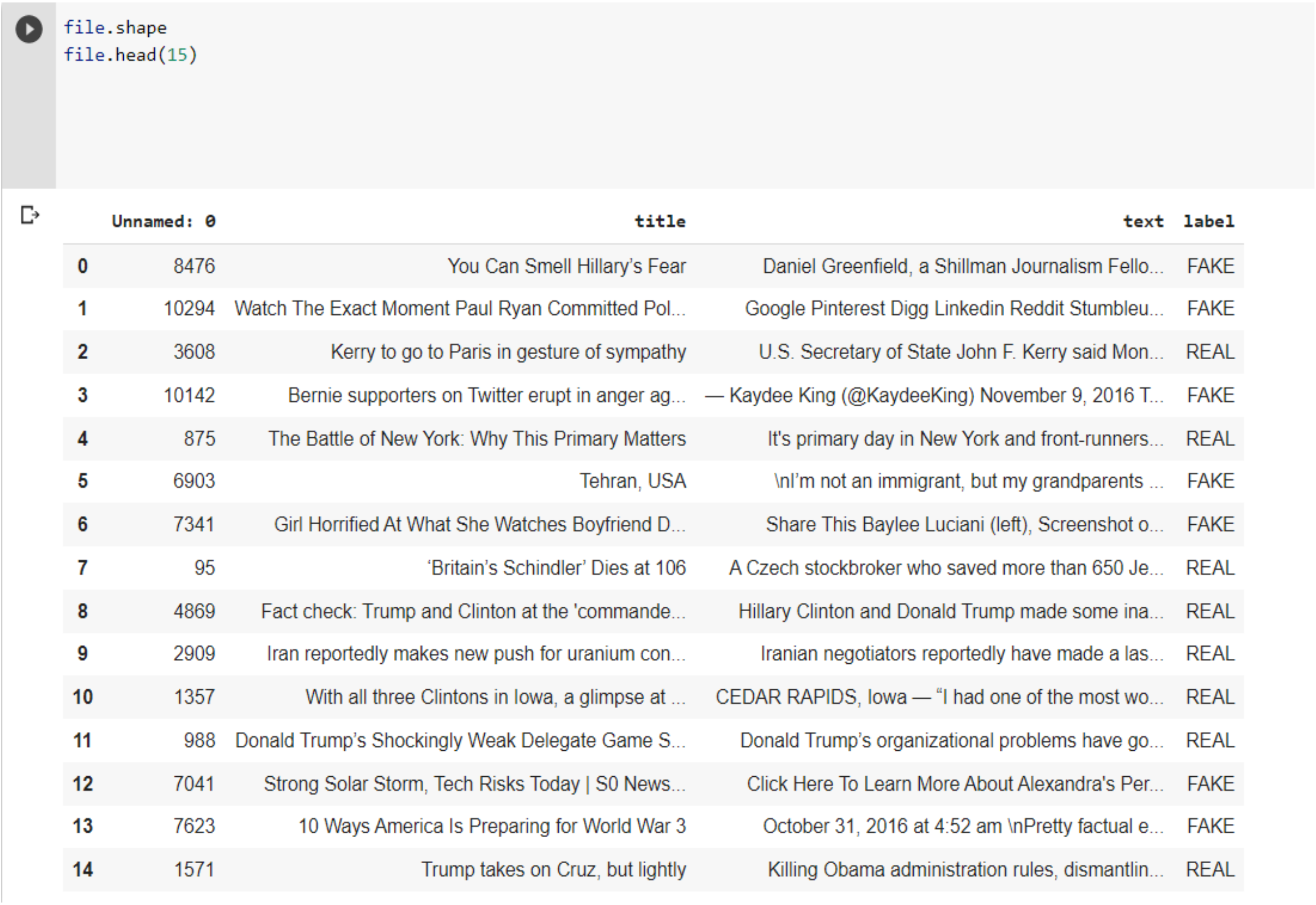
Step1: some imports and read the data file (dataset.csv)



```
import pandas as pd
import itertools
import numpy as np
from sklearn.metrics import accuracy_score, confusion_matrix
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.linear_model import PassiveAggressiveClassifier
from sklearn.model_selection import train_test_split


from google.colab import files
uploaded = files.upload()

import io
file = pd.read_csv(io.BytesIO(uploaded['dataset.csv']))
print(file)
```

```
dataset.csv
• dataset.csv(application/vnd.ms-excel) - 30696129 bytes, last modified: 9/13/2019 - 100% done
Saving dataset.csv to dataset (4).csv
      Unnamed: 0  ... label
0           8476  ...  FAKE
1          10294  ...  FAKE
2           3608  ...  REAL
3          10142  ...  FAKE
4            875  ...  REAL
...          ...  ...   ...
6330        4490  ...  REAL
6331        8062  ...  FAKE
6332        8622  ...  FAKE
6333        4021  ...  REAL
6334        4330  ...  REAL

[6335 rows x 4 columns]
```

Step2: data shape in the file



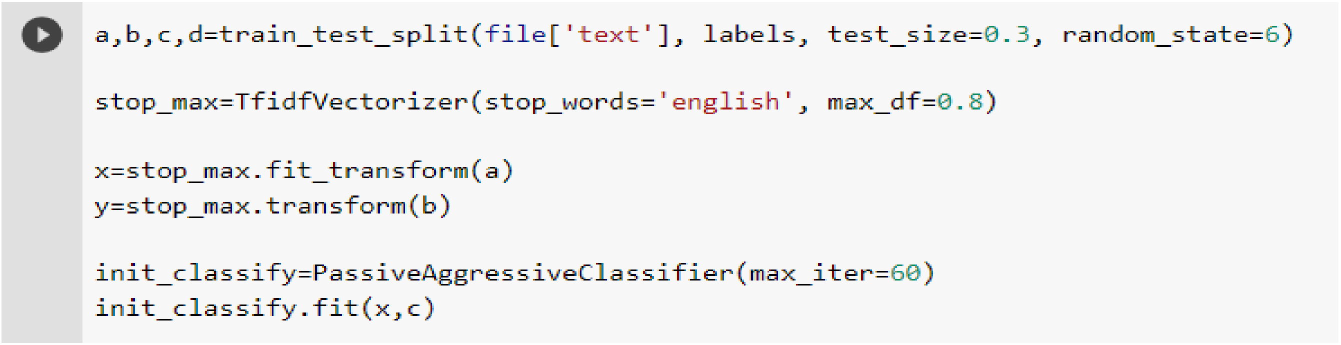
```
file.shape
file.head(15)
```

	Unnamed: 0	title	text	label
0	8476	You Can Smell Hillary's Fear	Daniel Greenfield, a Shillman Journalism Fello...	FAKE
1	10294	Watch The Exact Moment Paul Ryan Committed Pol...	Google Pinterest Digg Linkedin Reddit Stumbleu...	FAKE
2	3608	Kerry to go to Paris in gesture of sympathy	U.S. Secretary of State John F. Kerry said Mon...	REAL
3	10142	Bernie supporters on Twitter erupt in anger ag...	— Kaydee King (@KaydeeKing) November 9, 2016 T...	FAKE
4	875	The Battle of New York: Why This Primary Matters	It's primary day in New York and front-runners...	REAL
5	6903	Tehran, USA	\nI'm not an immigrant, but my grandparents ...	FAKE
6	7341	Girl Horrified At What She Watches Boyfriend D...	Share This Baylee Luciani (left), Screenshot o...	FAKE
7	95	'Britain's Schindler' Dies at 106	A Czech stockbroker who saved more than 650 Je...	REAL
8	4869	Fact check: Trump and Clinton at the 'commande...	Hillary Clinton and Donald Trump made some ina...	REAL
9	2909	Iran reportedly makes new push for uranium con...	Iranian negotiators reportedly have made a las...	REAL
10	1357	With all three Clintons in Iowa, a glimpse at ...	CEDAR RAPIDS, Iowa — "I had one of the most wo...	REAL
11	988	Donald Trump's Shockingly Weak Delegate Game S...	Donald Trump's organizational problems have go...	REAL
12	7041	Strong Solar Storm, Tech Risks Today | S0 News...	Click Here To Learn More About Alexandra's Per...	FAKE
13	7623	10 Ways America Is Preparing for World War 3	October 31, 2016 at 4:52 am \nPretty factual e...	FAKE
14	1571	Trump takes on Cruz, but lightly	Killing Obama administration rules, dismantlin...	REAL

Step3: Split dataset into training and testing

step4: Initialize TfidfVectorizer with stop words from the English language and a maximum document frequency of 0.8

step5: Initialize PassiveAggressiveClassifier. Unlike most other algorithms, it does not converge. Its purpose is to make updates that correct the loss, causing very little change in the norm of the weight vector.

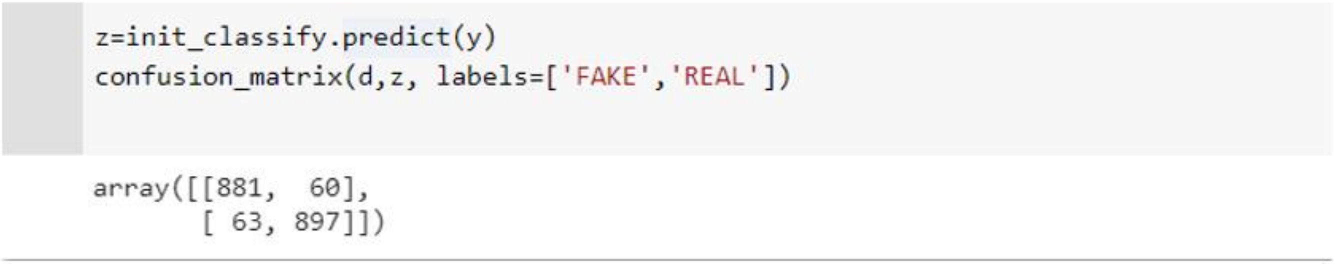


```
a,b,c,d=train_test_split(file['text'], labels, test_size=0.3, random_state=6)

stop_max=TfidfVectorizer(stop_words='english', max_df=0.8)

x=stop_max.fit_transform(a)
y=stop_max.transform(b)

init_classify=PassiveAggressiveClassifier(max_iter=60)
init_classify.fit(x,c)
```

Output:

Step6: Predict on the test set

Step7: Build confusion matrix to gain insight into the number of false and true negatives and positives

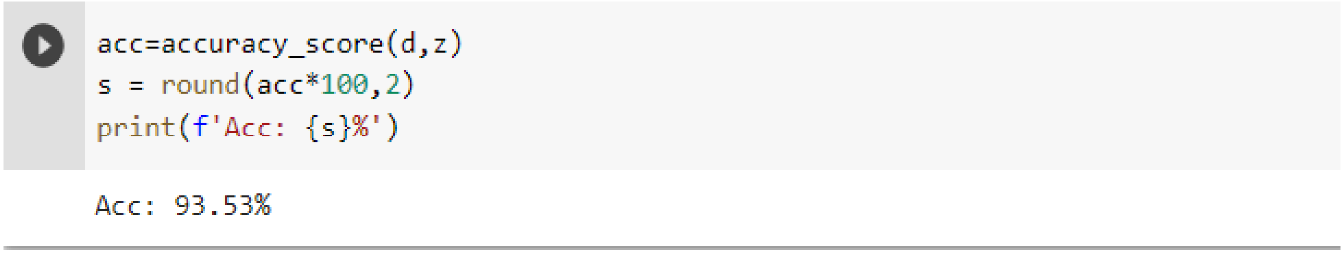


```
z=init_classify.predict(y)
confusion_matrix(d,z, labels=['FAKE','REAL'])
```

```
array([[881,  60],
       [ 63, 897]])
```

we have 881 true positives, 897 true negatives, 63 false positives, and 60 false negatives.

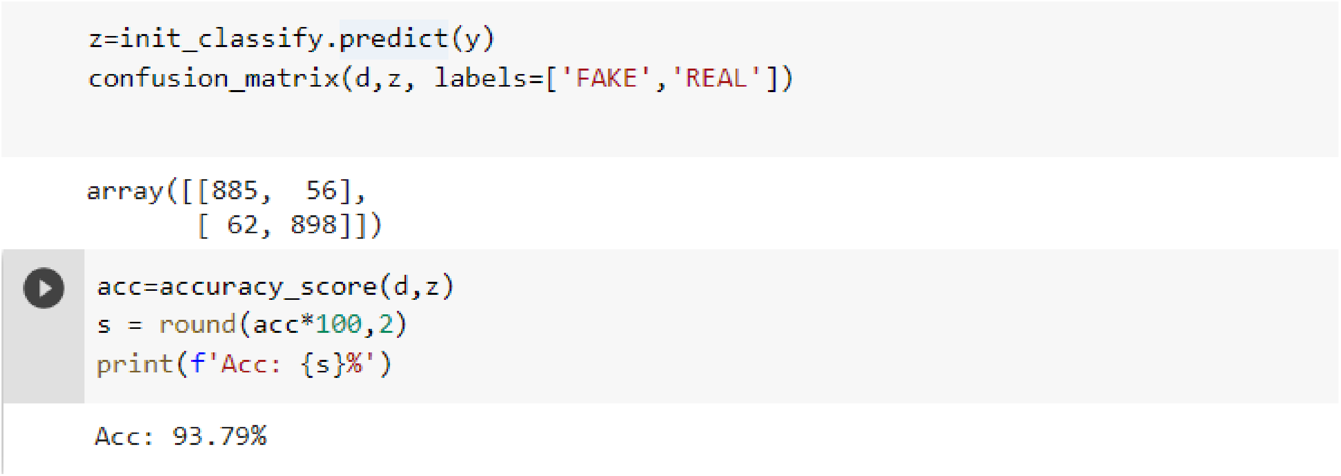
Step8: calculate accuracy



```
acc=accuracy_score(d,z)
s = round(acc*100,2)
print(f'Acc: {s}%')
```

```
Acc: 93.53%
```

Output 2:



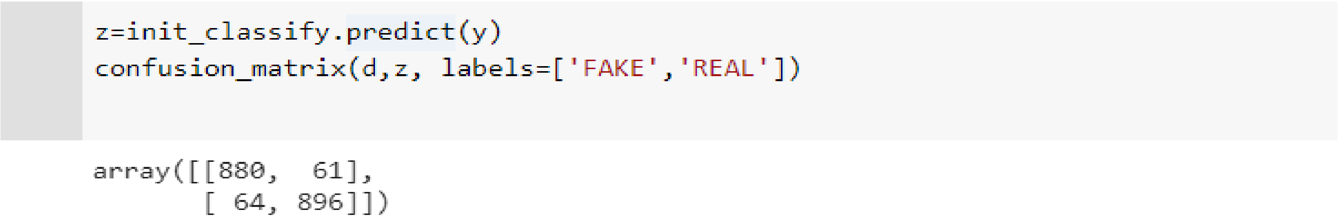
```
z=init_classify.predict(y)
confusion_matrix(d,z, labels=['FAKE','REAL'])
```

```
array([[885,  56],
       [ 62, 898]])
```

```
acc=accuracy_score(d,z)
s = round(acc*100,2)
print(f'Acc: {s}%')
```

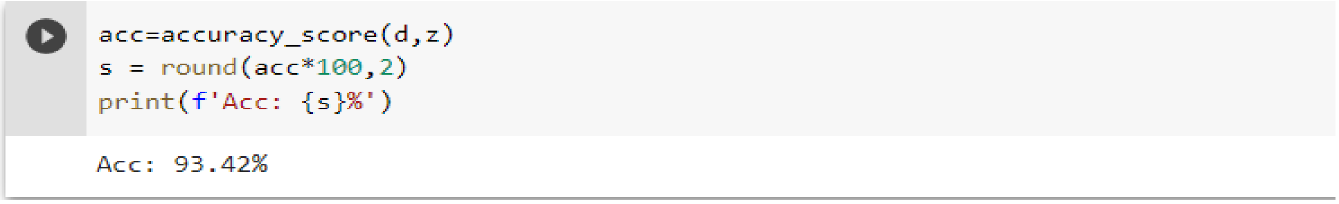
```
Acc: 93.79%
```

Output 3:



```
z=init_classify.predict(y)
confusion_matrix(d,z, labels=['FAKE','REAL'])
```

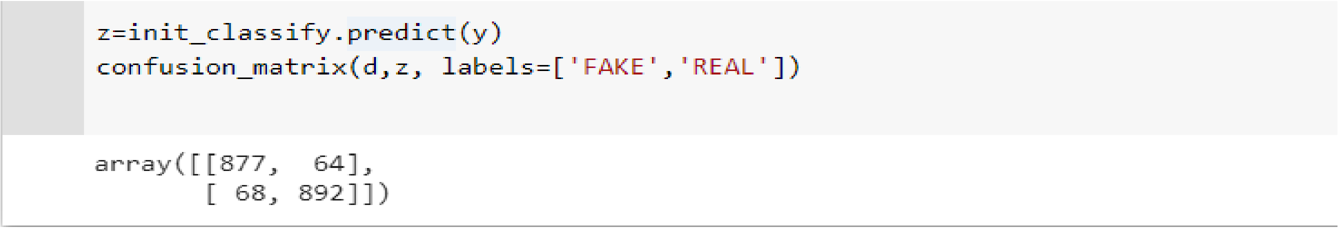
```
array([[880,  61],
       [ 64, 896]])
```



```
acc=accuracy_score(d,z)
s = round(acc*100,2)
print(f'Acc: {s}%')
```

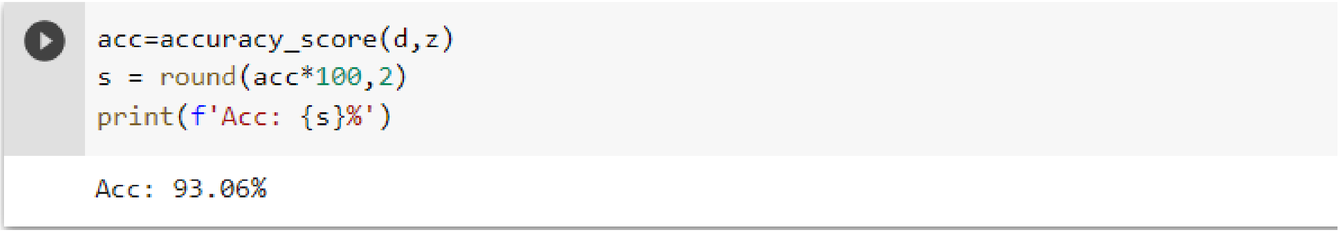
```
Acc: 93.42%
```

Output 4:



```
z=init_classify.predict(y)
confusion_matrix(d,z, labels=['FAKE','REAL'])
```

```
array([[877,  64],
       [ 68, 892]])
```



```
acc=accuracy_score(d,z)
s = round(acc*100,2)
print(f'Acc: {s}%')
```

```
Acc: 93.06%
```

You can easily open the code through this link and show the outputs.

https://colab.research.google.com/drive/1rzAbnCCArTYsTM515pji-k7_NaBB2RdM?usp=sharing