FAKE NEWS DETECTION USING NLP

912421104019:A.Maheswari

phase 4 development part 2

Project: To get the accurately classified collection of news as realor fake we have to build a machine learning

content for project phase 4:

1.Data Preprocessing:

.Text Cleaning : Just like in the first part, you need to preprocess the text data. This includes tasks such as lowercasing, removing punctuation, and handling special characters.

.Tokenization: Break the text into words or subword tokens. You can use libraries like NLTK, spaCy, or Hugging Face's Transformers for tokenization.

2.Feature Extraction:

.Word Embeddings: Convert the tokenized text into numerical vectors using word embeddings like Word2Vec, GloVe, or FastText.

Type your text

.TF-IDF (Term Frequency-Inverse Document Frequency): Calculate the TF-IDF scores for words in the corpus.

.Other Features: You can also extract other features, such as sentiment analysis scores, named entity recognition (NER), and syntactic features**.**

3.Model Selection:

.Choose an appropriate machine learning or deep learning model for your task. Common choices include:

- **.Logistic Regression**

  .Random Forest

  .Support Vector Machine (SVM)

  .Recurrent Neural Networks (RNN)

  .Convolutional Neural Networks (CNN)

  .Transformers like BERT, RoBERTa, or GPT-3.

4.Data Splitting:

.Split your dataset into training, validation, and testing sets to evaluate the model's performance accurately. The usual split is 70-80% for training, 10-15% for validation, and 10-15% for testing.

5.Model Training:

.Train your selected model on the training data. Ensure that you tune hyperparameters for optimal performance. You can use techniques like grid search or random search for hyperparameter tuning.

6.Model Evaluation:

.Use the validation set to assess the model's performance using metrics like accuracy, precision, recall, F1-score, and ROC-AUC. Tune the model further if necessary.

7.Model Testing:

.you are satisfied with the model's performance, evaluate it on the test set to get a realistic assessment of how it will perform in real-world situations.

8.Post-processing:

.Depending on the model's output, you can implement post-processing techniques. For instance, you might use thresholding or ensemble methods to improve accuracy.

9.Interpretability:

•Make your model interpretable by using techniques like LIME (Local Interpretable Model-agnostic Explanations) or SHAP (SHapley Additive exPlanations). This helps users understand why a particular decision was made.

10.Deployment:

•Deploy your model as a web application, API, or integrate it into a larger system for real-world use. Tools like Flask, Django, or cloud-based solutions (AWS, GCP, Azure) can be used for deployment.

11.Continuous Monitoring and Updates:

•Regularly monitor the system for false positives and false negatives. Improve the model and retrain it as new data becomes available

12.User Feedback:

•Incorporate user feedback to enhance the system's accuracy and adapt to evolving misinformation tactics.

13.Ethical Considerations:

•Ensure that your fake news detection system respects ethical guidelines and doesn't infringe on privacy or bias.

Text Data Preprocessing:

.Cleaning: For text-based data, perform the following: ⊕ Remove special characters, numbers, and punctuation.

⊕ Convert text to lowercase to ensure consistency. ⊕ Remove HTML tags, if applicable.

⊕ Tokenization: Split text into individual words or tokens. ⊕ Stemming or Lemmatization: Reduce words to their base or root forms.

. ⊕ Encoding Categorical Data: If your dataset contains categorical variables

(e.g., message type, sender's location), you may need to encode them into

numerical form. Use techniques like one-hot encoding or label encoding as

appropriate. .

Datasource:

DatasetLink: https://www.kaggle.com/datasets/clmentbisaillon/fake-and-real-news-dataset

v2 Go until jurong point, crazy.. Available only in bugis n great world la e buffet... Cine

ham: egot amore wat... ham ar... Joking wif u oni... Free entry in 2 a wkly comp to win FA Cup final tkts 21st May 2005. Text FA to 87121 to

spam: receive entry question(std txt rate)T&C's apply 08452810075over18's

ham :U dun say so early hor... U c already then say...

 ham: Nah I don't think he goes to usf, he lives around here though

FreeMsg Hey there darling it's been 3 week's now and no word back! I'd like some fun

spam:you up for it still? Tb ok! XxX std chgs to send, 螢 1.50 to rcv

ham: Even my brother is not like to speak with me. They treat me like aids patent. As per your request 'Melle Melle (Oru Minnaminunginte Nurungu Vettam)' has been set

ham:as your callertune for all Callers. Press *9 to copy your friends Callertune

spam:as your callertune for all Callers. Press *9 to copy your friends Callertune

spam:as your callertune for all Callers. Press *9 to copy your friends Callertune

ham:WINNER!! As a valued network customer you have been selected to receivea 螢 900 priz

spam:e reward! To claim call 09061701461. Claim code KL341. Valid 12 hours only. Had your mobile 11 months or more? U R entitled to Update to the latest colour mobile

spam:s with camera for Free! Call The Mobile Update Co FREE on 08002986030

ham:I'm gonna be home soon and i don't want to talk about this stuff anymore tonight, k? I've

spam:ost 150p/day, 6days, 16+ TsandCs apply Reply HL 4 info

URGENT! You have won a 1 week FREE membership in our 螢 100,000

ham:Prize Jackpot!

Txt the word: CLAIM to No: 81010 T&C www.dbuk.net LCCLTD POBOX

4403LDNW1A7RW18

sapm:I've been searching for the right words to thank you for this breather. I promise i wont

take your help for granted and will fulfil my promise. You have been wonderful and a

blessing at all times.

Program:

1. Import the required packages:

import numpy as np

import pandas as pd

from sklearn.model_selection import train_test_split

from sklearn.feature_extraction.text import TfidfVectorizer

from sklearn.linear_model import LogisticRegression

from sklearn.metrics import accuracy_score

2. Loading the dataset:

df=pd.read_csv('fake-news/train.csv')

df.head()

output:-

```
df.head()
executed in 16ms, finished 09:37:16 2021-06-07
```

	id	title	author	text	label
0	0	House Dem Aide: We Didn't Even See Comey's Let...	Darrell Lucus	House Dem Aide: We Didn't Even See Comey's Let...	1
1	1	FLYNN: Hillary Clinton, Big Woman on Campus - ...	Daniel J. Flynn	Ever get the feeling your life circles the rou...	0
2	2	Why the Truth Might Get You Fired	Consortiumnews.com	Why the Truth Might Get You Fired October 29, ...	1
3	3	15 Civilians Killed In Single US Airstrike Hav...	Jessica Purkiss	Videos 15 Civilians Killed In Single US Airstr...	1
4	4	Iranian woman jailed for fictional unpublished...	Howard Portnoy	Print \nAn Iranian woman has been sentenced to...	1

3.Removing the unwanted colomns:

raw_fake.rename(columns = {'v1':'class_label', 'v2':'message'}, inplace = True)

raw_fake.drop(['Unnamed: 2', 'Unnamed: 3', 'Unnamed: 4'], axis = 1, inplace = True)

raw_fake[1990:2000]

Output:

class_label message

1990 harm HI DARLIN IVE JUST GOT BACK AND I HAD A REALLY...

1991 harm No other Valentines huh? The proof is on your ...

1992 fake Free tones Hope you enjoyed your new content. ...

1993 harm Eh den sat u book e kb liao huh...

1994 harm Have you been practising your curtsey?

1996 harm Lol boo I was hoping for a laugh...

4.Exploring the dataset:

mail_data.shape

Output:raw_spam['class_label'].value_counts()

Output:

harm 4825

fake 747

5.Converting Labels:- df. label = df.label.astype(str)

df. label = df.label.str.strip()

ct = { 'REAL' : '1' , 'FAKE' : '0'}

['label'] = df['label'].map(dict)df.head() o proceed further, we separate our

dataset into features(x_df) and targets(y_df). x_ df = df['total']

y_ df = df['label']

4.Exploring the dataset:

mail_data.shape

Output:raw_spam['class_label'].value_counts()

Output:

harm 4825

fake 747

5.Converting Labels:- df. label = df.label.astype(str)

df. label = df.label.str.strip()

ct = { 'REAL' : '1' , 'FAKE' : '0'}

['label'] = df['label'].map(dict)df.head() o proceed further, we separate our

dataset into features(x_df) and targets(y_df). x_ df = df['total']

y_ df = df['label']

Output:

Accuracy: 82.32 %

Project Conclusion and future work (phase3):

. In conclusion, data loading and data processing are

fundamental stages in the data analysis and machine learning

. The passive-aggressive classifier performed the best here and

gave an accuracy of 93.12%.

. We can print a confusion matrix to gain insight into the number

of false and true negatives and positives

. Fake news detection techniques can be divided into those based

on style and those based on content, or fact-checking. Too often it is

assumed that bad style (bad spelling, bad punctuation, limited

vocabulary, using terms of abuse, ungrammaticality, etc.) is a safe

indicator of fake news.

. More than ever, this is a case where the machine's opinion must

be backed up by clear and fully verifiable indications for the basis

of its decision, in terms of the facts checked and the authority by which

the truth of each fact was determined.

. Collecting the data once isn't going to cut it given how quickly

information spreads in today's connected world and the number of article