VISVESVARAYA TECHNOLOGICAL UNIVERSITY

Jnana Sangama, Belagavi, Karnataka – 590018

**An Internship Report
On**

FAKE NEWS DETECTION
USING MACHINE LEARNING WITH PYTHON

SUBMITTED BY:

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**Internship carried out
At**

"ParvaM ConsulTech Pvt. Ltd."

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In partial fulfillment for the award of degree in

Bachelor of Engineering in Information Science & Engineering

DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING
R.R. INSTITUTE OF TECHNOLOGY

(Accredited by NAAC B+) Chikkabanavara,, Bangalore-560090
Academic Year 2022-23

R R INSTITUTE OF TECHNOLOGY

CHIKKABANAVARA, BENGALURU – 560090

DEPARTMENT OF INFORMATION SCIENCE ENGINEERING

CERTIFICATE

This is to certify that the Internship entitled **"Fake News Detection Using Machine Learning with Python"** is a bonafide work carried out by **ABHINAV** bearing USN: **1RI18IS001** in partial fulfillment forthe award of degree in Bachelor of Engineering in **Information Science and Engineering** from **Visvesvaraya Technological University**, Belagavi during the academic year 2022-23. Itis certified that all the corrections/suggestions indicated for internal Assessment have been incorporated in the report submitted in the company. This Internship report has been approved as itSatisfies the academic requirements in respect of Internship / professional Practice (18CSI85) report prescribed for award of said degree.

………………………..	...……………………....	………………………
Signature of Internal Guide	Signature of HOD	Signature of Principal
Prof.Manjula R C	**Dr. Erappa G**	**Dr. Mahendra K**
Assistant Professor	Prof. and HOD	Principal
Dept. of ISE, RRIT	Dept. of ISE, RRIT	RRIT, Bangalore

External Examination

Examiners Name   Signature with Date

1………………………..

2……………………….

DECLARATION

I, **ABHINAV**, student of 8th semester in Information Science and Engineering,R R Institute of Technology, Bengaluru, hereby declare that the mini project entitled **"FAKE NEWS DETECTION USING MACHINE LEARNING WITH PYTHON"** has been carried out by me under the super vision of our guide **Mr. Rakesh HG**, project Manager at **ParvaM ConsulTech Pvt. Ltd** company and submitted in partial fulfillment of the source requirements for the award of degree in Bachelor of Engineering in **Information Science and Engineering** of **Visvesvaraya Technological University**, Belagavi during the academic year 2022 - 2023.

Place: Bangalore   **ABHINAV**

Date: **(1RI18IS001)**

ACKNOWLEDGEMENT

This satisfaction and euphoria that accompany the successful completion of any task wouldbe but incomplete without the mention of the people who made it with constant guidance and encouragement and crowned our efforts with success.

We would like to express our gratitude to our Principal **Dr. Mahendra K V**, R R institute of Technology, Bangalore for providing congenial environment and surroundings to work in during our entire course.

A heartly thanks to our beloved HOD, **Dr. Erappa G,** Department of Information Science & Engineering, for valuable support and Guidance.

We express our sincere thanks to our beloved Project Guide **Prof.Manjula R C,** Department of Information Science & Engineering, for his constant encouragement and support throughout our course, especially for the useful suggestions given during the project period.

We also thank all the staff members of Department of Information Science & Engineering, and all those who have directly or indirectly helped us with valuable suggestions in the successfulcompletion of this project.

Last but not the least we would like to thank our beloved parents and our friends for their blessings, love and encouragement to successfully complete the task by meeting all the requirements.

Project Associates
ABHINAV (1RI18IS001)

ABSTRACT

Since fake news tends to spread fast than the real news there a need to classify news as fake or not. In the project the dataset used is from Kaggle website where real news and fake news are in two separate datasets we combined both the datasets into one and trained with different machine learning classification algorithms to classify the news as fake or not.

In this project different feature engineering methods for text data has been used like Bag of words model and word embedding model which is going to convert the text data into feature vectors which is sent into machine learning algorithms to classify the news as fake or not.

With different features and classification algorithms we are going to classify the news as fake or real and the algorithm with the feature which gives us the best result with that feature extraction method and that algorithm, we are going to predict the news as fake or real.
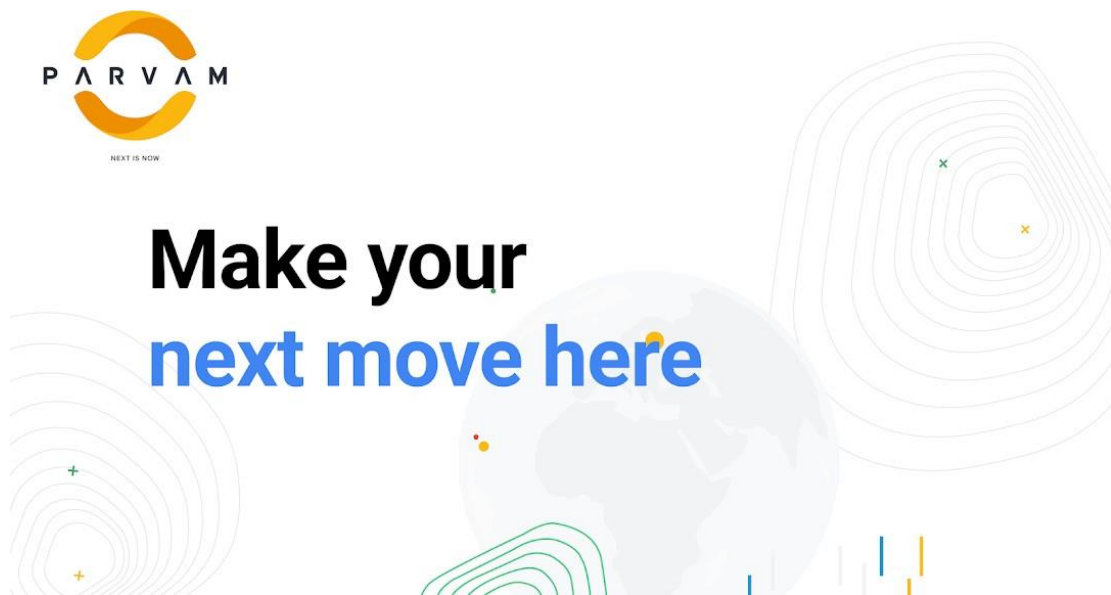
CONTENTS

CHAPTER 1

COMPANY INFORMATION

This chapter gives brief introduction about company its vision, mission values and inspirer of the company. This also highlights the services offered, products developed by the company.

1.1 Overview of the Company

ParvaM was founded by a team of passionate folks from diverse platforms with the intent of delivering the valued services to keep the future ready with various software solutions with cutting edge technologies in the market.We are here to deliver Quality Technical Products, Development & Services for all your Current and Future software requirements. We are also committed to providing Quality Staffing and Consulting services.

ParvaM has served the customers with a delighting experience with our expert services on a competitive edge in delivering the unique experiences on technology, consulting and software solutions in the areas of implementing enterprise applications, professional web sites, customized applications and technology workshops on a different trending technology

1.2 Vision and Goals

Vision

- To serve a world-class customer experience while delivering the unique software solutions and grow as a leading consulting and staffing solutions provider.
- To emerge as a world class incubation center for Research & Development being a platform for innovations.

Mission

- Customer Delight: by providing the highest degree of excellence to support the customer and value to their business
- Superior returns to shareholders: Being a valued business partner
- Excellence at Knowledge Delivery: Providing the best class training for the resources.
- Engineering Excellence: Accomplishing the innovative software solutions driven with the competitive engineering and planning.

Values

- We work with Customer First Focus and value, Challenge and Reward our People. Strategy
- Our Strategy is built on the foundation of our corporate values and will drive our successful development in the coming years to achieve our long-term vision for PARVAM Consul-tech.
- In order to steer the focus of the entire organization towards our strategy and ensure in successful implementation, we have defined four strategic priorities- Outperform, Globalize, Simplify, Inspire.

Services

- Software Solutions
- IT Consulting/Staffing Solutions
- Technology Workshops
- Research and Development

CHAPTER 2

INTRODUCTION

Data or information is the most valuable asset. The most important problem to be solved is to evaluate whether the data is relevant or irrelevant. Fake data has a huge impact onlot of people and organizations.

Since fake news tends to spread fast than the real news there a need to classify news as fake or not. In the project the dataset used is from Kaggle website where real news and fake news are in two separate datasets we combined both the datasets into one and trained with different machine learning classification algorithms to classify the news as fake or not.

In this project different feature engineering methods for text data has been used like Bag of words model and word embedding model which is going to convert the text data into feature vectors which is sent into machine learning algorithms to classify the news as fake or not.

With different features and classification algorithms we are going to classify the news as fake or real and the algorithm with the feature which gives us the best result with that feature extraction method and that algorithm we are going to predict the news as fake or real.

In this project we will be ignoring attributes like the source of the news, whether it was reported online or in print, etc. and instead focus only the content matter being reported. We aim to use different machine learning algorithms and determine the best way to classify news.

2.1 Problem Statement

Our main aim of the project is to make a machine learning model, with the help of which news can be classified as fake or real with help of different machine learning classification algorithms, deep learning methods and text feature extraction methods for classifying news.

2.2 Objective

To achieve our goal of developing machine learning model to classify news as fake or real, we need perform following tasks in the same order as stated.

-Data Collection and Analysis

-Preprocessing the data

-Text feature extraction

-Using different classification algorithms

-Taking the best classification algorithm and feature extraction method

-Classifying the news as fake or real.

-Deploying the model.

2.3 Scope of the project

In future works, we intend to use highly sophisticated classifying approach, like deep learning with sentiment analysis also and consider many text features like publisher, urls etc., which may increase the accuracy of the classification of news as fake or real. Automatic fake news detection may be done using the latest news and training the model regularly to get the best results. So this can be used as a filter to upload the news.

CHAPTER 3

INTRODUCTION TO MACHINE LEARNING

Machine learning: It is the field of study that gives computers the capability to learn without being explicitly programmed.ML is one of the most exciting technologies that one would have ever come across.

Types of Machine Learning

i. Supervised Learning
ii. Unsupervised Learning
iii. Semi supervised Learning
iv. Reinforcement Learning

Supervised Learning:

☐ Basically supervised learning is a learning in which we can teach or train the machine using data which is well labelled that means some data is already tagged with the correct answer.

Supervised learning classified into two categories:

☐ **Classification**: A classification problem is when the output variable is category, such as "Red" or "Blue" and "disease" or "no disease".

☐ **Regression**: A regression problem is when the output variable is real value, such as "dollars" or "weight". We train the computer with historical market data and ask the computer to predict the new price in the future.

Unsupervised Learning:

☐ It is the training of machine using information that is neither classified or labelled and allowing the algorithm to act on that information without guidance. Unlike supervised learning no training will be given to the machine.

Unsupervised learning is classified into two categories

☐ **Clustering**: A clustering problem is where you want to discover the inherent groupings in the data, such as grouping customers by purchasing behaviour It is a common technique for statistical data analysis used in many fields. k-means clustering: It is an algorithm to classify or to group your objects based on attributes into K number of group. K is positive integer number.

☐ **Hierarchical Clustering**: It is an algorithm that groups similar objects into groups called clusters. It starts by treating each observation as a separate cluster. Then it repeatedly executes. The main output of hierarchical clustering is a dendogram which shows the hierarchical relationship between the clusters.

Semi supervised learning:

☐ Problems where you have a large amount of input data and only some of the data is labelled are called semi-supervised learning problems. These problems sit in between both supervised and unsupervised learning.

Reinforcement learning:

☐ A computer program interacts with a dynamic environment in which it must perform a certain goal. Such as playing a game against an opponent. The program is provided feedback in terms of rewards and punishments as it navigates its problem space.

CHAPTER 4

ALGORITHM INTRODUCTION

4.1 Introduction to Logistic Regression

- Logistic regression is one of the most popular Machine Learning algorithms, which comes under the Supervised Learning technique. It is used for predicting the categorical dependent variable using a given set of independent variables.

- Logistic regression predicts the output of a categorical dependent variable. Therefore the outcome must be a categorical or discrete value. It can be either Yes or No, 0 or 1, true or False, etc. but instead of giving the exact value as 0 and 1, it gives the probabilistic values which lie between 0 and 1.

- In Logistic regression, instead of fitting a regression line, we fit an "S" shaped logistic function, which predicts two maximum values (0 or 1).

- The curve from the logistic function indicates the likelihood of something such as whether the cells are cancerous or not, a mouse is obese or not based on its weight, etc.

- Logistic Regression can be used to classify the observations using different types of data and can easily determine the most effective variables used for the classification. The below image is showing the logistic function:
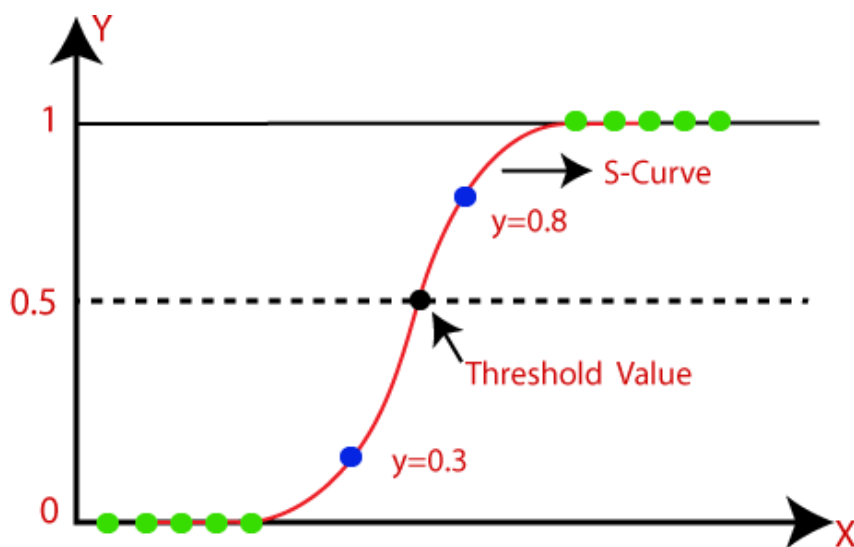

Fig 4.1

4.2 Flow of Logistic Regression

Fig 4.2: Flow of Logistic Regression

4.3 steps in Logistic Regression

1. Import the required libraries

2. Read and understand the data

3. Exploratory Data Analysis

4. Data Preparation

5. Building Logistic Regression Model

6. Making Detections on Test Set

7. Assigning Scores as per predicted probability values

CHAPTER 5

IMPLEMENTATION

5.1 The Dataset

	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
5	5	Jackie Mason: Hollywood Would Love Trump if He...	Daniel Nussbaum	In these trying times, Jackie Mason is the Voi...	0
6	6	Life: Life Of Luxury: Elton John's 6 Favorite ...	NaN	Ever wonder how Britain's most iconic pop pian...	1
7	7	Benoît Hamon Wins French Socialist Party's Pre...	Alissa J. Rubin	PARIS — France chose an idealistic, traditi...	0
8	8	Excerpts From a Draft Script for Donald Trump'...	NaN	Donald J. Trump is scheduled to make a highly ...	0
9	9	A Back-Channel Plan for Ukraine and Russia, Co...	Megan Twohey and Scott Shane	A week before Michael T. Flynn resigned as nat...	0
10	10	Obama's Organizing for Action Partners with So...	Aaron Klein	Organizing for Action, the activist group that...	0
11	11	BBC Comedy Sketch "Real Housewives of ISIS" Ca...	Chris Tomlinson	The BBC produced spoof on the "Real Housewives...	0
12	12	Russian Researchers Discover Secret Nazi Milit...	Amando Flavio	The mystery surrounding The Third Reich and Na...	1
13	13	US Officials See No Link Between Trump and Russia	Jason Ditz	Clinton Campaign Demands FBI Affirm Trump's Ru...	1

Fig 5: Dataset

The dataset is simple. It contains the title of the news, the author, the body text and a label field, which, if the news is authentic, shows 1 and if inauthentic, shows 0

5.2 The Machine Learning Model

1. **Data Loading**: We are loading a CSV file for the data sorting and training-testing part of the model. The CSV file is turned into an array for easier work purpose.

2. **Vectorization**: Vectorization is needed for determining the frequency of the words present in a passage. This is needed to determine which words are used often.

3. **Classifier**: Passive-aggressive algorithms are a family of great learning algorithms. They are similar to Perceptron because it does not require a reading scale. However, unlike Perceptron, they include parameter correction. Passive is used when the

Detection is correct and there is no change in the model. But if there is any kind of change in the model, that is if the Detection is not correct then the aggressive part is called, which changes the model accordingly. The aggressive part of the modelchanges the model according to its wish on the backend.

4. **Model Building**: The model is built through the train and test of the dataset, by ensuring that the training is done for 80% of the dataset and testing is done in the rest of the 20% of the dataset.

5.3 The Web Interface

This was the simplest part.

1. **HTML for building the basic skeleton:** HTML makes the structure of the web application and also there are some of the functions that can be achieved best with HTML only.

2. **CSS for design:** The CSS part is for designing only. Because it will give a more beautiful aspect to the website.

5.4 Common Platform: Flask

This acts as a common platform and takes the input with the pickle module and passes it to the machine learning model afterwards the Detection is shown on the screen with the HTML and CSS website.

1. Building functions for taking input.

2. Passing input values through the ML model.

3. Using the Pickle module for serializing and de-serializing the dataset.

4. Providing output.

5.5 The Interface

This is what you see when you go to the web interface. You are supposed to enter username and password and click on login button as shown in fig 5.1
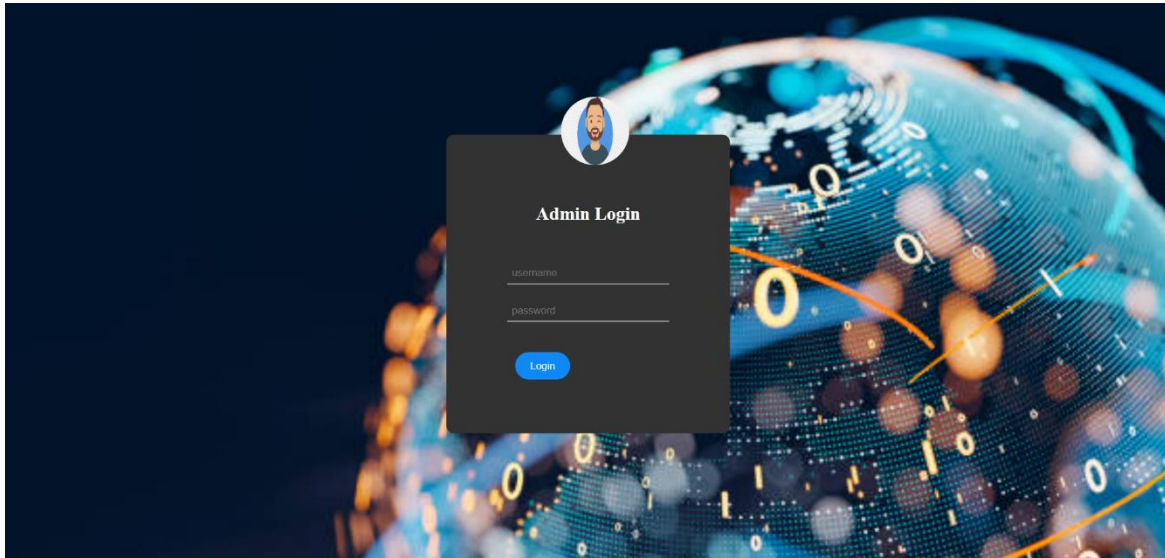

Fig 5.1: Login Page

If incase the username and password is incorrect, the page shows a text message saying that "Login unsuccessful please enter correct details".

Fig 5.2: Interface of Front Page

When the user login by using right credentials, then another page opens as shown in fig 5.2, Where user is suppose to give news as input in text field and click on submit button, then our model will detect weather the news is REAL or FAKE.
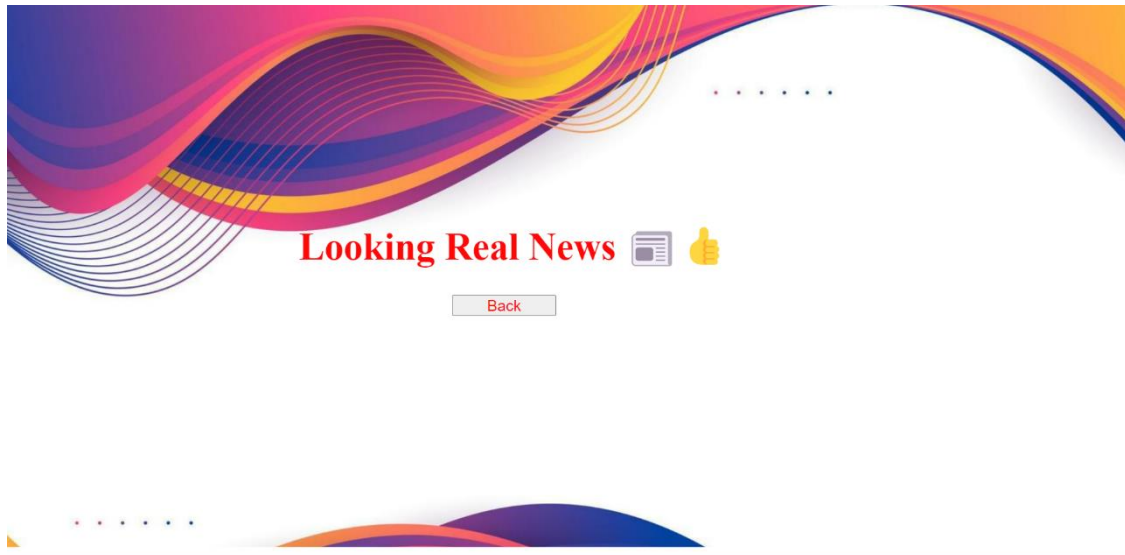

Fig 5.3: Interface of Real News

If the news is REAL then the model says "Looking Real News" (fig 5.3), if the news is FAKE then it says "Looking Spam News" as shown in fig 5.4
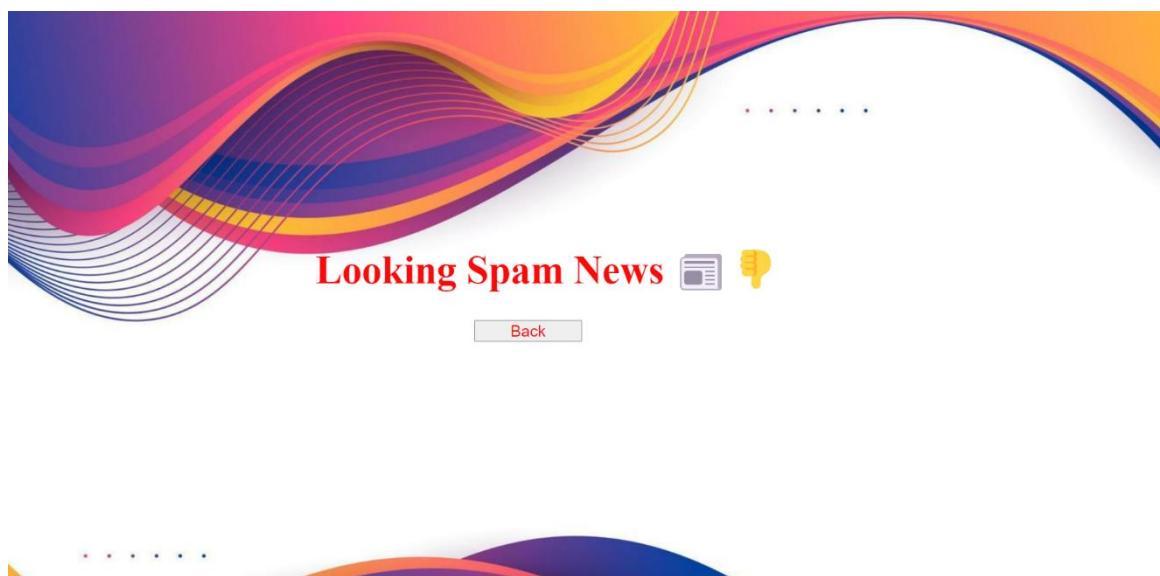
Fig 5.4: Interface of Fake News

CHAPTER 6

CODE SNIPPETS

6.1 Login Page using HTML and CSS

```html
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8">
    <meta name="viewport" content="width=device-width, initial-scale=1">
    <title>Login</title>
    <style type="text/css">
        body{
            margin: 0;
            padding: 0;
            background-image: url('static/assests/images/image.jpg');
            background-size: cover;
        }
        .container{
            top: 50%;
            left: 50%;
            position: absolute;
            transform: translate(-50%,-50%);
        }
        .card{
            padding: 100px 80px 70px 80px;
            background: rgb(50, 50, 50);
            border-radius: 10px;
        }

        #name{
            width: 200px;
            border: none;
            outline: none;
```

```
                        background: transparent;

                        border-bottom: 1px solid white;

                        padding: 6px;

                        margin-bottom: 20px;

                        color: white;

                }

                #button{

                        border-radius: 20px;

                        padding: 10px 20px;

                        background: #0E89F5;

                        color: white;

                        margin-top: 20px;

                        border: none;

                        outline: none;

                        margin-left: 10px;

                }

                img{

                        border-radius: 50%;

                        position: absolute;

                        margin-left: 150px;

                        margin-top: -50px;

                }

                h2{

                        color:white;

                        position:relative;

                        margin-bottom:20px;

                        bottom:30px;

                        text-align:center;

                }

        </style>

</head>


<body><form action="/login" method="GET">

        <div class="container">

                <img src="static/assests/images/user.png" height="70" width="70">
```

```
                    <div class="card">

                          <h2>Admin Login</h2>

<input type="text" name="user" placeholder="username" value="ParvaM"><br>

<input type="password" name="pass" placeholder="password" value="P@12345"><br>

<input type="submit" value="Login" name="" id="button">

<div class="results">

                          {% if result == '1' %}

                          <h4 style="color:#9A9999;"><b>Login unsuccessful <br>Please

                          Enter Correct details</b></h4>

                          {% endif %}

                                 </div>

                    </div>

              </div>

</form>

</body>

</html>
```

6.2 Code Snippet for Index Page

```
<!DOCTYPE html>
<html lang="en">

<head>
   <meta charset="utf-8">
   <meta name="viewport" content="width=device-width, initial-scale=1">
   <meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1,
user-scalable=no">
   <title>Fack News Detection</title>

   <style>


     .bg
     {

        background-image: url('/static/image/sss.jpg');

        /* Full height */
        height: 729px;
        width:100%;

        /* Center and scale the image nicely */
        background-position: absolute;
        background-repeat: no-repeat;

        background-size: cover;


     }

     input {
            position:absolute;
            padding: 20px;
            width: 20%;
            height:0px;
            left:500px;
            right: 200px;
            top:300px;
            bottom: 300px;
          }


     button{

        left:500px;
        hight:10%;
        width:60px;
        position:absolute;
```

```
        right: 600px;
        top:350px;
        bottom: 375px;

        }
    h1{
        padding-bottom: 40px;
        color: #ff0808;
        position: absolute;
        left: 400px;
        right: 400px;
        font-size: 70px;
        top: 100px;

        }

    </style>

</head>

<body>

    <div class="bg">

        <form class="a" action="/login/home" method="post" >
          <h1>Fake News Detection </h1>
          <input type="text" name= "datainput" >
          <br>
          <button type="submit">submit</button>
        </form>
    </div>

</body>

</html>
```

6.3 Code Snippet for Submit Page

```
    <!DOCTYPE html>
    <html lang="en" xmlns:top="http://www.w3.org/1999/xhtml">
     <head>
        <meta charset="UTF-8">
        <meta name="viewport" content="width=device-width, initial-scale=1">
        <meta name="viewport" content="width=device-width, initial-scale=1, maximum-
```

```
      scale=1, user-scalable=no">
    <title>Fack News Detection</title>
  <style>
      *{
      margin:0;
      padding:0;
      }
      .bg
      {

          background-image: url('/static/image/ccc.jpg');

          /* Full height */
          height: 729px;
          width:100%;

          /* Center and scale the image nicely */
          background-position: absolute;
          background-repeat: no-repeat;

          background-size: cover;


      }

       button{
          color: #ff0808;
          hight:10%
          width:60px;
          position: absolute;
          left: 600px;
          right: 800px;
          font-size: 20px;
          top: 400px;
        }

      h1{
          padding-bottom: 40px;
          color: #ff0808;
          position: absolute;
          left: 400px;
          right: 300px;
          font-size: 50px;
          top: 300px;
      }

   </style>
  </head>
 <body>
    <div class="bg">
      <form class="a" action="/" method="get">
        <div>
```

```
        {% if prediction == 0 %}

        <h1>Looking Spam News 📰 👎 </h1>


        {% elif prediction ==  1 %}

        <h1><b>Looking Real News 📰 👍 </b></h1>

        {% endif %}
          <p align="center">
            <button> Back</button>
          </p>
      </div>
    </form>
  </div>

  </body>
  </html>
```

6.4 Code Snippet For Flask

```python
from flask import Flask,g,render_template,redirect,request,url_for


app = Flask(__name__)  # creating the Flask class object
app.secret_key = 'abcdefgdhdhsjsjs'


@app.route('/')
def login():
   return render_template('login.html')




@app.route('/login/home',methods=["GET","POST"])  # decorator drfines the
def skp():
   data = str(request.form['datainput'])
   import pandas as pd
   import numpy as np  # used to create numpy arrays and to read numerical values
   from sklearn.model_selection import train_test_split
   from sklearn.feature_extraction.text import TfidfVectorizer  # it is a vectorizer func and to
convert the text data into numerical values
   from sklearn.linear_model import LogisticRegression
   from sklearn.metrics import accuracy_score
```

```python
tweet = pd.read_csv('train.csv')
# tweet['description'].unique()

tweet.drop('id', axis='columns', inplace=True)
tweet.drop('author', axis='columns', inplace=True)
tweet.drop('text', axis='columns', inplace=True)



# print(df.info())

twitter = tweet.where((pd.notnull(tweet)), '')
twitter.head()  # prints first 5 rows from datasets

# checking the number of rows and columns of our datasets or shape of datasets
twitter.shape



# separating the data as texts and label
x = twitter['title']
y = twitter['label']

# splitting the data into training data & testing data
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=3)
# to see the shape of x, x_train & x_test
x.shape
x_train.shape
x_test.shape

# transform the text data to feature vectors that can be used as input to the logistic
regression model
feature_extraction = TfidfVectorizer(min_df=1, stop_words='english', lowercase='True')
x_train_features = feature_extraction.fit_transform(
    x_train)  # fitting the train data into vectorizer and using vectorizer to transform x_train
and using same to transform x_test
x_test_features = feature_extraction.transform(x_test)

# converting y_train and y_test values as integers
y_train = y_train.astype('int')
y_test = y_test.astype('int')

x_train_features

# training the logistic regression model
model = LogisticRegression()
# training the logistic regression model with the training data
model.fit(x_train_features, y_train)
```

```python
    # evaluating the trained model prediction on training data

    prediction_on_training_data = model.predict(x_train_features)
    accuracy_on_training_data = accuracy_score(y_train, prediction_on_training_data)
    print('Accuracy on training data : ', accuracy_on_training_data)

    prediction_on_test_data = model.predict(x_test_features)
    accuracy_on_test_data = accuracy_score(y_test, prediction_on_test_data)
    print('Accuracy on test data : ', accuracy_on_test_data)

    # building the predictive system
    input_tweet = [data]
    # convert text to feature vectors
    input_data_features = feature_extraction.transform(input_tweet)

    # making predictions
    prediction = model.predict(input_data_features)
    return render_template('submit.html',prediction=prediction)

@app.route('/login')
def home():
    return render_template('index.html')


if __name__ == '__main__':
    app.run(debug=True)
```

CONCLUSION AND FUTURE SCOPE

Our project can ring the initial alert for fake news. The model produces worse results if the article is written cleverly, without any sensationalization. This is a very complex problem, but we tried to address it as much as we could. We believethe interface provides an easier way for the average person to check the authenticity of a news. Projects like this one with more advanced features shouldbe integrated on social media to prevent the spread of fake news.

Fake news is categorized as any kind of cooked-up story with an intention to deceive or to mislead. In this paper we are trying to present the solution for fake news detection task by using Machine Learning techniques. Many events have resulted to a rise in the prominence and spread of phony news. The widespread impacts of the massive onset of fake news can be seen, humans are conflicting if not outright poor detectors of fake news. With this, endeavors are being made to automate the task of fake news detection. The most mainstream of such actions include blacklisting of sources and authors that are unreliable. Even though these tools are useful, but in order to produce a progressive complete end to end solution, we are required to represent for tougher cases where reliable sources and authors are responsible for releasing fake news. Here, the purpose of this project was to build a model that help us to recognize the language patterns that can be used to classify fake and real news with the help of Machine Learning techniques.

The outcome of this project shows the capability of Machine Learning to be fruitful in this task. We have tried to build a model that helps in catching many intuitive indications of real and fake news as well as in the visualization of the classification decision. Now-a-days fake news is such a big problem that it is affecting our society as well as our facts and opinions. The problem that needs to be solved can be solved using AI and Machine learning techniques.

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