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FAKE TWEET DETECTION USING MULTINOMIAL NAIVE BAYES CLASSIFIER ALGORITHM (CEC/CS/2022/P26)

SYNOPSIS REPORT

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IN

COMPUTER SCIENCE & ENGINEERING

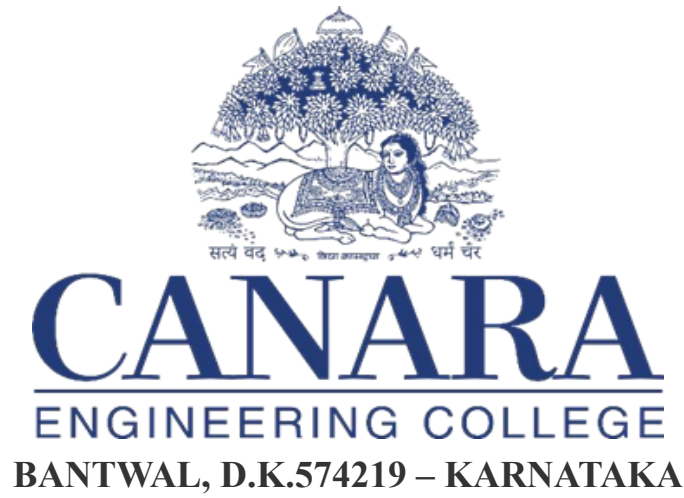
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CERTIFICATE

This is to certify that “**Mr. S Sreenivasa Shenoy (4CB19CS087), Mr. P Padmaprasad Shenoy (4CB19CS064), Mr. Subramanya A Shet (4CB19CS105) and Mr. Suhas S Kamath (4CB19CS106)**” has successfully completed the PROJECT WORK PHASE – I (Synopsis Presentation) of the project entitled “***FAKE TWEET DETECTION USING MULTINOMIAL NAIVE BAYES CLASSIFIER ALGORITHM***” under the guidance of **Prof. Shatananda Bhat P**. The project report has been approved as it satisfies the academic requirements in respect of Project work.

Signature of the Guide

(Prof. Shatananda Bhat P)

Abstract

Nowadays, online social media plays a vital role in real-world applications with potentially positive and negative effects. When some event has occurred, many of us discuss it online through social networking. Once sudden events happen there's conjointly faux news that's broadcasted that makes confusion because of the character of the events. This is important because fake tweets can spread misinformation and cause panic.

The dataset used in this study will be a dataset of tweets that have been labeled as fake or not fake. The machine learning model will be trained on this dataset and then tested on a separate dataset. The model will be evaluated on its ability to correctly classify fake tweets.

LIST OF CONTENTS

CONTENTS	Page No.
Abstract	iii
1. Introduction	01
1.1 Overview	01
1.2 Objectives	02
1.3 Problem Statement	02
1.4 Problem Description	02
1.5 Outcomes	03
2. Literature Survey	04
2.1 Summary of Literature Survey	04
3. Methodology	10
3.1 Proposed System Architecture	10
3.2 Methodology	10
3.3 Gantt Chart	12
Bibliography	13

LIST OF FIGURES

Figure No.	Figure Description	Page No.
3.1	Proposed System Architecture	10
3.3	Gantt Chart of the project	12

LIST OF TABLES

Table No.	Table Description	Page No.
2.1	Summary of Literature Survey	04

Chapter 1

Introduction

1.1 Overview

With the rise of social media, there has been an increase in the spread of fake news. Fake news is often spread through social media platforms, such as Twitter. This can be extremely harmful, as it can lead to the spread of misinformation. Fortunately, there are ways to detect fake tweets using machine learning. Machine learning is a type of artificial intelligence that can be used to learn from data and make predictions. The project “Fake Tweet Detection using Multinomial Naive Bayes Classifier Algorithm” aims to help predict whether the tweet is fake or real. Prediction is done using the Multinomial Naive Bayes approach from extracted tweets using Twitter API. The classifier will be trained only on text data. Traditionally text analysis is performed using Natural Language Processing(NLP). NLP is a field that comes under Artificial Intelligence whose main focus is on letting computers understand human language and process it. In the project, Training Data is pre-processed, then sent to the classifier, then the classifier predicts whether the tweet is real or fake.

The development of Fake tweets detection using the Multinomial Naive Bayes Classifier Algorithm for our project is in its early stages. We have completed the research and planning phase, and we are now beginning to develop the algorithms and code that will be necessary to build the project. At this point, we have identified the algorithm and its parameters, and have begun to develop a prototype of the system. We are currently working on collecting and pre-processing the data for the classifier, as well as training the model. Once the model is trained, we will be able to test the model with real data to evaluate its performance.

The aim of using the Multinomial Naive Bayes Classifier Algorithm for Fake tweets detection is to develop an accurate and efficient model for the classification of tweets as either real or fake. This model should be able to identify the features of fake tweets and use them to accurately classify them as fake. The objective is to use the Multinomial Naive Bayes Classifier Algorithm to accurately classify fake tweets from real ones, improving the accuracy and efficiency of the fake tweet detection process.

The market potential for Fake tweets detection using Multinomial Naive Bayes Classifier Algorithm is very promising. This algorithm is a powerful tool that can be used to detect and classify fake tweets. This can be used to help protect people from malicious online behavior, such as online fraud, cyberbullying and misinformation. The algorithm can also be used by companies to detect fake news and protect their brand reputation.

The competitive advantage of using the Multinomial Naive Bayes Classifier Algorithm is that it is fast and accurate. This algorithm can accurately detect fake tweets in a short amount of time, making it a valuable tool for businesses and individuals alike. It is also relatively easy to implement, making it an attractive option for businesses that need to quickly detect and address fake tweets. Furthermore, the algorithm is highly versatile and can be used for a variety of tasks, such as text classification, sentiment analysis, and spam filtering.

1.2 Objectives

- To extract the tweets using Twitter API and apply pre-processing methods on the extracted data.
- To train and classify whether it is fake or real tweets by using the Multinomial Naive Bayes Classifier Algorithm.

1.3 Problem Statement

Extract the set of tweets from twitter, apply the suitable text pre-processing technique, train the model and classify the tweets whether fake or real using the Multinomial Naive Bayes Classifier Algorithm.

1.4 Problem Description

The project “Fake Tweet Detection using Multinomial Naive Bayes Classifier Algorithm” aims to help predict whether the tweet is fake or real. Prediction is done using the Multinomial Naive Bayes approach from extracted tweets using Twitter API. The classifier will be trained only on text data. Traditionally text analysis is performed using Natural Language Processing(NLP). NLP is a field that comes under Artificial Intelligence whose

main focus is on letting computers understand human language and process it. In the project, Training Data is pre-processed, then sent to the classifier, then the classifier predicts whether the tweet is real or fake.

1.5 Outcomes

- A model is implemented to extract the tweets and preprocess the data.
- A model is implemented to train and classify whether it is fake or real tweets by using the Multinomial Naive Bayes Classifier Algorithm.

Chapter 2

LITERATURE REVIEW

The following survey has been conducted to detect the fake tweets and also the different techniques that could be employed to successfully implement the intention suggested in the overview. The detailed survey highlights the different methodologies used to extract the Twitter data, preprocess them and analyze the extracted data to generate an effective analysis report. For the mentioned purpose around twenty standard research articles and journals have been considered for reference wherein each one has aided in the concise progression of the proposed idea.

Sl. No	Article Title	Authors	Journal	Methodology Used	Remarks
1	Fake News Detection using Machine Learning	Pranita P. Deshmukh , Sakshi A. Dulhani , Parmita C. Adkane, Priyanka Y. Belekar	International Journal of Research in Engineering, Science and Management	Naïve bayes, Logistic regression, Support vector machine	We are considering the Multinomial Naive Bayes algorithm.
2	The Detection of Fake Messages using Machine Learning	Maarten S. Looijenga	University Of Twente	Linear Support Vector Machines, Naïve Bayes, Decision Trees, Extra Trees, Stochastic Gradient Descent, Random Forests	These algorithm are computationally expensive and highly dependent on the size of an input data set.
3	Can Fake News Detection Models Maintain the	Nuno Guimarães , Álvaro Figueira, Luís Torgo	Mathematics Journal	Decision Tree, Naive Bayes, K-Nearest Neighbors	We are considering the Naive Bayes algorithm as well as the

	Performance through Time? A Longitudinal Evaluation of Twitter Publications				Decision tree.
4	A Novel Stacking Approach for Accurate Detection of Fake News	Tao Jiang, Jian Ping Li, Amin Ul Haq, Abdus Saboor, Amjad Ali	IEEE Access	Logistic Regression, Decision Tree, K-Nearest Neighbor, Random Forest, Convolutional Neural Networks	These methods had a much worse performance on small datasets.
5	An Improved Multiple Features and Machine Learning-Based Approach for Detecting Clickbait News on Social Networks	An Improved Multiple Features and Machine Learning-Based Approach for Detecting Clickbait News on Social Networks	Applied Sciences Journal, published by MDPI	Multiple-feature-based approach Random Forest, Stochastic Gradient Descent, Support Vector Machine, Logistic Regression, Multinomial Naïve Bayes, K-nearest Neighbor	We are considering the Multinomial Naïve Bayes approach.
6	Self Multi-Head Attention-based Convolutional Neural Networks for fake news detection	Yong Fang, Jian Gao, Cheng HuangID, Hua Peng, Runpu Wu	Open access journal, published by PLOS ONE	Convolutional Neural Network	These methods are time consuming and take a long time in the training process.

7	Fake Sentence Detection Based on Transfer Learning: Applying to Korean COVID-19 Fake News	Jeong-Wook Lee, Jae-Hoon Kim	Applied Sciences Article, published by MDPI	Bidirectional Encoder Representations from Transformers[B. E.R.T] with NLP	Slow to train because it is big and lots of weights to update.
8	A comprehensive Benchmark for fake news detection	A. Galli, E. Masciari, V. Moscato, and G. Sperli	Journal of Intelligent Information Systems (2022), published by springer	Stochastic Gradient Descent	Works wrongly due to the frequent updation in datasets.
9	Collecting a Large Scale Dataset for Classifying Fake News Tweets Using Weak Supervision	Stefan Helmstetter and Heiko Paulheim	Future Internet article, published by MDPI	Naive Bayes, Decision Trees, Support Vector Machines	We are considering the Naive Bayes algorithm as well as the Decision tree.
10	Deep Learning for Fake News Detection: A Comprehensive Survey	LinMei Hua, SiQi Weib, Ziwang Zhaob, Bin Wub	Journal Pre-proof, published by AI Open	DL-based FND method	These methods had a much worse performance and has vanishing gradient problems.
11	Fake News Detection on Social Media using Deep learning and Semantic	Vian Sabeeh, Mohammed Zohdy, Atiqul Mollah	Journal of Computer Science IJCSIS, published by academia	SPOT Approach	Should extend this approach by exploring and selecting the useful features over

	Knowledge Sources	Rasha Al Bashaireh			the massive features
12	Combining Machine Learning with Knowledge Engineering to detect Fake News in Social Networks-a survey	Sajjad Ahmed, Knut Hinkelmann, Flavio Corradini	CEUR Workshop	New Combination Algorithm Approach	Fake news detection organizations are required to update their strategies.
13	Detecting Fake News Spreaders in Social Networks via Linguistic and Personality Features	Anu Shrestha, Francesca Spezzano, and Abishai Joy	CEUR Workshop	Ngrams, Empath Tool	Applicable to small datasets.
14	A Benchmark Study on Machine Learning Methods for Fake News Detection	Junaed Younus Khan, Md. Tawkat Islam Khondaker, Anindya Iqbal, Sadia Afroz	Machine Learning with appliances, published by Research Gate	Features - Style, Ngrams	Hard to differentiate from users who never shared fake news.
15	Analyzing User Profiles for Detection of Fake News Spreaders on Twitter	María S. Espinosa, Roberto Centeno, and Álvaro Rodrigo	Work. Notes CLEF 2020 - Conf. Labs Eval. Forum	Psychological, Linguistic traits, Twitter Actions Features & Headline Analysis Data	It needs an expectable performance when datasets vary.
16	Fake News	Federico	Published by	Fruchterman-Rei	It works accurately

	Detection on Social Media using Geometric Deep Learning	Monti, Fabrizio Frasca, Davide Eynard, Damon Mannion, Michael M. Bronstein	arxiv.org	ngold force-directed algorithm.	with large data and not limited data.
17	Credibility Analysis on Twitter Considering Topic Detection	Maria , Ana Aguilera, Irvin Dongo, Jose Cornejo-Lupa, Yudith Cardinale	Applied Sciences Article, published by MDPI	Clustering, frequent pattern mining ,exemplar based,matrix factorization,probabilistics techniques.	This approach uses twitter API where they provide a limited amount of data (900 tweets per 15 min).
18	Fake News Analysis Modeling Using Quote Retweet	Y. Jang, C. H. Park, and Y. S. Seo	Electronics Article, published by MDPI	Quote Retweet feature	It is not prone to work on new features introduced in Twitter
19	Fake News Data Exploration and Analytics	Mazhar Javed Awan, Awais Yasin, Haitham Nobanee, Ahmed Abid Ali, ZainShahzad, Muhammad Nabeel, Azlan Mohd	Electronics Article, published by MDPI	Pre-processed and extensive data exploration,automatic detection approaches based on deep learning and machine learning	We are considering the decision tree classifier method.

		Zain, Hafiz Muhamma d Faisal Shahzad			
20	Deep Learning for Fake News Detection in a Pairwise Textual Input Schema	Despoina Mouratidis , Maria Nefeli Nikiforos, Katia Kermanidi s	Computation Article, published by MDPI	Two tweets method, Naive Bayes and selection methodology.	We are considering the Naive Bayes algorithm as well as the Decision tree.

The above-mentioned articles focus on extracting data from Twitter, pre-processing them by removing the unwanted data, applying various Machine Learning Algorithms to classify the data and to provide the results. To summarize, the data can be extracted from Twitter with the help of Twitter API. The extracted data is then pre-processed using various libraries in Python. Literature Review has assisted to a conclusion that Naïve Bayesian Algorithm. This helps us in detecting the tweets whether it is fake or not.

Chapter 3

Methodology

3.1 Proposed System Architecture

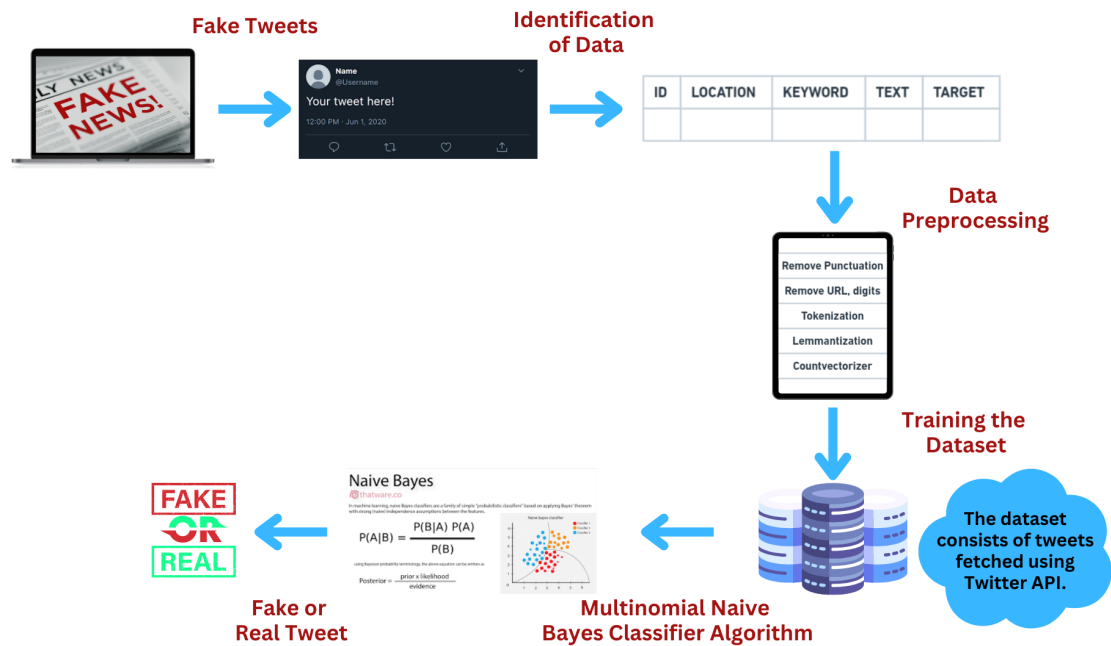


Figure : Proposed System Architecture Diagram

3.2 Methodology

Identification of data:

In this project, the detection of fake or real tweets is done using the Multinomial Naive Bayes approach from extracted tweets by using Twitter API. This project works only on text data. It has five columns:

- Id: tells the unique identification of each tweet
- Text: It tells the tweet in text form
- Location: It tells the place from where the tweet was sent and it can be blank
- Keyword: It tells a particular word in the tweet and it can be blank
- Target: It tells the actual value of the tweet whether it's a real tweet or fake

Data-preprocessing:

- First, the preprocessing is done in the dataset which includes the removal of punctuations, then the removal of URLs, digits, non-alphabets and contractions, then tokenization and removing Stopwords.
- Then, lemmatization is done on the dataset.
- After preprocessing, the Countvectorizer is used to convert text data into numerical data as the classifier only works for numerical data.
- The dataset is then split into 70% training data and 30% test data.

Definition of Training Data:

The training dataset which contains 70% of the whole dataset is used for training the model.

Algorithm:

Multinomial Naive Bayes classifier algorithm is used for detecting disaster tweets whether they are fake or real.

Evaluation with test set:

Several text samples are passed through the model to check whether the classification algorithm gives the correct result or not.

3.3 Gantt Chart

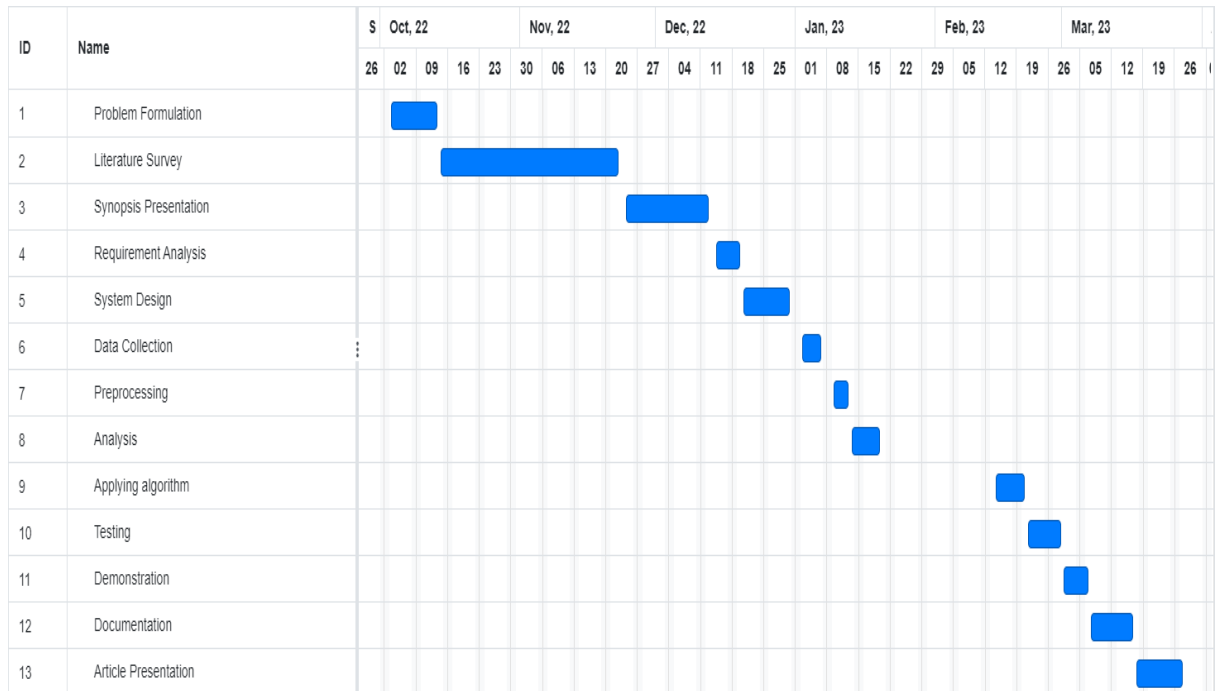


Figure : Gantt Chart

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