VISVESVARAYA TECHNOLOGICAL UNIVERSITY

BELAGAVI – 590018, Karnataka

INTERNSHIP REPORT

ON

"Social Media Sentiment Analysis"

Submitted in partial fulfillment for the award of degree

BACHELOR OF ENGINEERING

IN

"Machine Learning With Python"

Submitted by:

LIKITHA K

1KS21AI025

Conducted at

Varcons Technologies Pvt Ltd

K S INSTITUTE OF TECHNOLOGY, BENGALURU-560109

(Affiliated to VTU, Belagavi)

Department of AI&ML

Accredited by NBA, New Delhi

#14, Raghuvanahalli, Kanakapura Main Road, Bengaluru – 560109

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CERTIFICATE

This is to certify that the Internship titled **"Machine Learning With Python"** carried out by **LIKITHA K,** a bonafide student of K S Institute of Technology, in partial fulfillment for the award of **Bachelor of Engineering**, in **AIML** under Visvesvaraya Technological University, Belagavi, during the year 2023-2024. It is certified that all corrections/suggestions indicated have been incorporated in the report.

The project report has been approved as it satisfies the academic requirements in respect of Internship prescribed for the course Internship / Professional Practice

Signature of Guide **Signature of HOD** **Signature of Principal**

External Viva:

Name of the Examiner Signature with Date

1)_____

2)_____

D E C L A R A T I O N

I, LIKITHA K, third year student of AIML, K S Institute of Technology declare that the Internship has been successfully completed, in **VARCONS TECHNOLOGIES PVT LTD**. This report is submitted in partial fulfillment of the requirements for award of Bachelor Degree in AIML during the academic year 2023-2024.

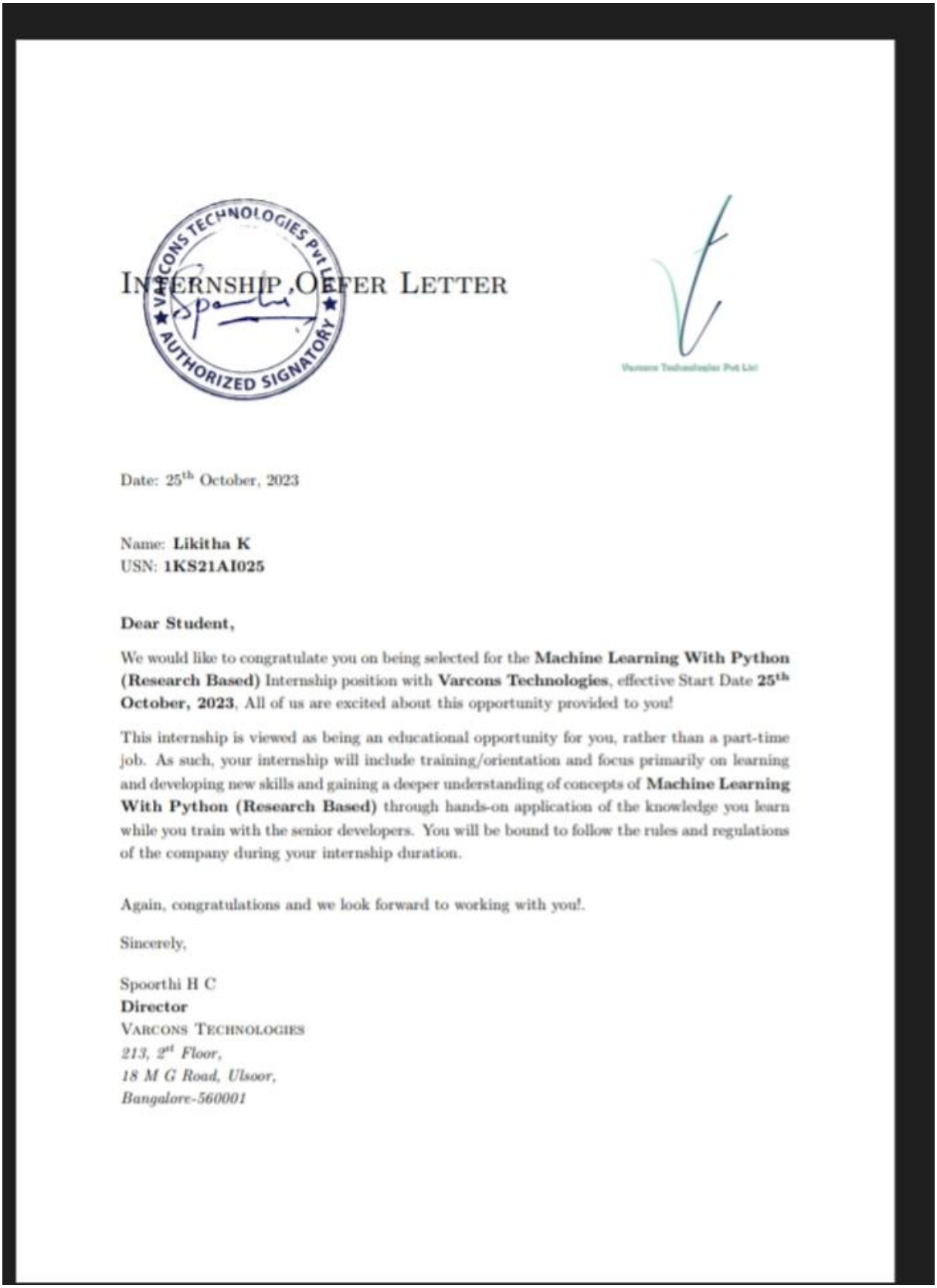
Date : 02-12-2023 :

Place : Bengaluru

USN : 1KS21AI025

NAME : LIKITHA K

OFFER LETTER PROVIDED BY THE COMPANY



INTERNSHIP OFFER LETTER

Date: 25th October, 2023

Name: **Likitha K**
USN: **1KS21AI025**

Dear Student,

We would like to congratulate you on being selected for the **Machine Learning With Python (Research Based)** Internship position with **Varcons Technologies**, effective Start Date **25th October, 2023**. All of us are excited about this opportunity provided to you!

This internship is viewed as being an educational opportunity for you, rather than a part-time job. As such, your internship will include training/orientation and focus primarily on learning and developing new skills and gaining a deeper understanding of concepts of **Machine Learning With Python (Research Based)** through hands-on application of the knowledge you learn while you train with the senior developers. You will be bound to follow the rules and regulations of the company during your internship duration.

Again, congratulations and we look forward to working with you!.

Sincerely,

Spoorthi H C
Director
VARCONS TECHNOLOGIES
213, 2nd Floor,
18 M G Road, Ulsoor,
Bangalore-560001

A C K N O W L E D G E M E N T

This Internship is a result of accumulated guidance, direction and support of several important persons. We take this opportunity to express our gratitude to all who have helped us to complete the Internship.

We express our sincere thanks to our Principal, for providing us adequate facilities to undertake this Internship.

We would like to thank our Head of Dept –AI&ML, for providing us an opportunity to carry out Internship and for his valuable guidance and support.

We would like to thank our Lab assistant Software Services for guiding us during the period of internship.

We would like to thank all the faculty members of our department for the support extended during the course of Internship.

We would like to thank the non-teaching members of our dept, for helping us during the Internship.

Last but not the least, we would like to thank our parents and friends without whose constant help, the completion of Internship would have not been possible.

LIKITHA K

1KS21AI025

ABSTRACT

social media are the fundamental assets to accumulate data about individuals' perspective and opinions towards various topics as they go through hours day to day on social medias and share their perspective. In this specialized paper, we show the utilization of sentimental analysis and how to associate with Twitter.

In this paper,using Lexicon-Based Approach", we are fundamentally breaking down the feelings of users involving Twitter as an online stage where users post remarks in regards to their perspectives about trending topics and which can be valuable for business associations for fulfilling their client's need, for legislators to serve better to the general population and do better campaigning etc. This is done by fetching data in the real time environment. With the help of sentiment analysis (Opinion Mining) users will also be able to take better decisions and make better strategies for future development of the organization and with that they will also be able to compare their previous performance with their current performance.

For bigger organizations it will also be useful for quick review for a new product or a new update. We will be applying Lexicon-based approach which is a dictionary or bag of words containing various sentiments like anger, happiness, fear, joy, etc The software which we have utilized for the execution is R-Studio which is an integral asset for analysing the information with numerous predefined techniques and libraries.

Table of Contents

CHAPTER 1

COMPANY PROFILE

1. COMPANY PROFILE

A Brief History of Varcons Technologies Pvt Ltd

Varcons Technologies Pvt Ltd, was incorporated with a goal ”To provide high quality and optimal Technological Solutions to business requirements of our clients”. Every business is a different and has a unique business model and so are the technological requirements. They understand this and hence the solutions provided to these requirements are different as well. They focus on clients requirements and provide them with tailor made technological solutions. They also understand that Reach of their Product to its targeted market or the automation of the existing process into e-client and simple process are the key features that our clients desire from Technological Solution they are looking for and these are the features that we focus on while designing the solutions for their clients.

Varcons Technologies Pvt Ltd is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Sarvamoola Software Services. specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements.

Varcons Technologies Pvt Ltd, strive to be the front runner in creativity and innovation in software development through their well-researched expertise and establish it as an out of the box software development company in Bangalore, India. As a software development company, they translate this software development expertise into value for their customers through their professional solutions.

They understand that the best desired output can be achieved only by understanding the clients demand better. Varcons Technologies work with their clients and help them to defiine their exact solution requirement. Sometimes even they wonder that they have completely redefined their solution or new application requirement during the brainstorming session, and here they position themselves as an IT solutions consulting group comprising of high caliber consultants.

They believe that Technology when used properly can help any business to scale and achieve new heights of success. It helps Improve its efficiency, profitability, reliability; to put it in one sentence ” Technology helps you to Delight your Customers” and that is what we want to achieve.

CHAPTER 2

ABOUT THE COMPANY

2. ABOUT THE COMPANY

Varcons Technologies Pvt Ltd is a Technology Organization providing solutions for all web design and development, MYSQL, PYTHON Programming, HTML, CSS, ASP.NET and LINQ. Meeting the ever increasing automation requirements, Varcons Technologies specialize in ERP, Connectivity, SEO Services, Conference Management, effective web promotion and tailor-made software products, designing solutions best suiting clients requirements. The organization where they have a right mix of professionals as a stakeholders to help us serve our clients with best of our capability and with at par industry standards. They have young, enthusiastic, passionate and creative Professionals to develop technological innovations in the field of Mobile technologies, Web applications as well as Business and Enterprise solution. Motto of our organization is to "Collaborate with our clients to provide them with best Technological solution hence creating Good Present and Better Future for our client which will bring a cascading a positive effect in their business shape as well". Providing a Complete suite of technical solutions is not just our tag line, it is Our Vision for Our Clients and for Us, We strive hard to achieve it.

Products of Company

Android Apps

It is the process by which new applications are created for devices running the Android operating system. Applications are usually developed in Java (and/or Kotlin; or other such option) programming language using the Android software development kit (SDK), but other development environments are also available, some such as Kotlin support the exact same Android APIs (and bytecode), while others such as Go have restricted API access.

The Android software development kit includes a comprehensive set of development tools. These include a debugger, libraries, a handset emulator based on QEMU, documentation, sample code, and zutorials. Currently supported development platforms include computers running Linux (any modern desktop Linux distribution), Mac OS X 10.5.8 or later, and Windows 7 or later. As of March 2015, the SDK is not available on Android itself, but softwaredevelopment is possible by using specialized Android applications.

Web Application

It is a client–server computer program in which the client (including the user interface and client- side logic) runs in a web browser. Common web applications include web mail, online

retail sales, online auctions, wikis, instant messaging services and many other functions. web applications use web documents written in a standard format such as HTML and JavaScript,which are supported by a variety of web browsers. Web applications can be considered as a specifific variant of client–server software where the client software is downloaded to the client machine when visiting the relevant web page, using standard procedures such as HTTP. The Client web software updates may happen each time the web page is visited. During the session, the web browser interprets and displays the pages, and acts as the universal client for any web application. The use of web application frameworks can often reduce the number of errors in a program, both by making the code simpler, and by allowing one team to concentrate on the framework while another focuses on a specifified use case. In applications which are exposed to constant hacking attempts on the Internet, security-related problems can be caused by errors in the program.

Frameworks can also promote the use of best practices such as GET after POST. There are some who view a web application as a two-tier architecture. This can be a "smart" client that performs all the work and queries a "dumb" server, or a "dumb" client that relies on a "smart" server. The client would handle the presentation tier, the server would have the database (storage tier), and the business logic (application tier) would be on one of them or on both. While this increases the scalability of the applications and separates the display and the database, it still doesn‟t allow for true specialization of layers, so most applications will outgrow this model. An emerging strategy for application software companies is to provide web access to software previously distributed as local applications. Depending on the type of application, it may require the development of an entirely different browser-based interface, or merely adapting an existing application to use different presentation technology. These programs allow the user to pay a monthly or yearly fee for use of a software application without having to install it on a local hard drive. A company which follows this strategy is known as an application service provider (ASP), and ASPs are currently receiving much attention in the software industry.

Security breaches on these kinds of applications are a major concern because it can involve both enterprise information and private customer data. Protecting these assets is an important part of any web application and there are some key operational areas that must be included in the development process. This includes processes for authentication, authorization, asset handling, input, and logging and auditing. Building security into the applications from the beginning can be more effective and less disruptive in the long run.

Web design

It is encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface design; authoring, including standardized code and proprietary software; user experience design; and

search engine optimization. The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development. Web designers are expected to have an awareness of usability and if their role involves creating mark up then they are also expected to be up to date with web accessibility guidelines. Web design partially overlaps web engineering in the broader scope of web development.

Departments and services offered

Company Name plays an essential role as an institute, the level of education, development of student's skills are based on their trainers. If you do not have a good mentor then you may lag in many things from others and that is why we at Varcons Technologies gives you the facility of skilled employees so that you do not feel unsecured about the academics. Personality development and academic status are some of those things which lie on mentor's hands. If you are trained well then you can do well in your future and knowing its importance of Varcons Technologies always tries to give you the best.

They have a great team of skilled mentors who are always ready to direct their trainees in the best possible way they can and to ensure the skills of mentors we held many skill development programs as well so that each and every mentor can develop their own skills with the demands of the companies so that they can prepare a complete packaged trainee.

Services provided by the Company

• Core Java and Advanced Java

• Web services and development

• Dot Net Framework

• Python

• Selenium Testing

• Conference / Event Management Service

• Academic Project Guidance

• On The Job Training

• Software Training

CHAPTER 3

INTRODUCTION

3. INTRODUCTION

Due to the rapid and enormous development of information technology, social media platforms such as Twitter, Instagram, and Facebook have become an important component of modern life. These platforms have grown extensively and have had a profound impact on people's daily life in recent years. A great number of users use them not just to meet new people and share their lives but also to express their opinions and sentiments related to various products, services and organizations through comments and posts [1], [2]. Therefore, an infinite amount of information generated by users is produced [3]. It is critical for individuals, organizations and governments to extract and make use of the meaningful information user-generated information [4], [5], [6], [7].

However, the rising popularity and proliferation of internet technologies, particularly social networking platforms, have created numerous challenges for data management [3]. As the volume of data continues to increase, how to extract useful information effectively and efficiently from the vast amount of data has become a critical issue. Researchers consider addressing this issue by utilizing big data approaches in terms of data storage, access, processing efficiency and security .

Performing effective data analysis is another challenge that has been addressed by inventing automatic ways to extract sentiment or opinions. Sentiment Analysis can be defined as the technique for automatic extraction of opinions, emotions, and sentiments from written language [9]. The primary benefit of sentiment analysis is to effectively identify and classify the attitudes and sentiments (positive, negative, or neutral) of users in texts to ascertain their attitudes toward products, subjects, or services .

The application of sentiment analysis has covered a wide range of areas, including healthcare , films , products , politics, and more. All these applications across different domains prove that sentiment analysis is a valuable tool for gaining useful insights into public opinion on specific topics of interest .

In the existing literature, a large number of scholars have worked on improving the performance of various sentiment classifiers or applying them to various domains using data from social networking platforms. However, the variety of data, models and algorithms used in these studies and the wide range of domains involved make it difficult for interested parties to choose the most appropriate one for their research or application. This paper utilizes the Preferred Reporting Items for the Systematic Review and Meta-Analysis (PRISMA) framework to report the findings on reviewing literature related to sentiment analysis in social media. It identifies challenges and other potential problems that scholars have encountered and suggests potential solutions. This review paper can assist practitioners and researchers in addressing questions related to sentiment analysis in a more effective manner and provide a basis for planning future research.

- They also benefit from the ability to launch updates in real-time – the application on the servers is the application people are using. The applications on people's laptops however is the version last installed. And when those laptops get left on a train it's not a concern, as nothing is stored locally.

Problem Statement as mentioned in the proposal

Built a python application that asks for a keyword and you need to identify the sentiment of that keyword in public..

CHAPTER 4

SYSTEM ANALYSIS

4. SYSTEM ANALYSIS

1. Knowledge-Based Techniques

These techniques categorize text based on affect categories, primarily relying on explicit affect words like "happy," "sad," "afraid," etc. Some knowledge bases also assign emotional affinity to certain words. This approach identifies emotions through direct or implied words within the text.

2. Statistical Methods

Statistical approaches leverage various machine learning techniques such as latent semantic analysis, support vector machines, bag of words, and deep learning models. They aim to detect sentiment holders and targets within text. Advanced methods focus on understanding sentiment holders (those expressing emotions) and targets (entities evoking emotions) in the text.

3. Hybrid Approaches

Hybrid methods combine machine learning with knowledge representation tools like ontologies and semantic networks. These approaches aim to detect subtle expressions of sentiment that might not be explicitly conveyed in the text. They do this by identifying implicit connections between concepts within the text.

Classification Algorithms for Social Media Sentiment Analysis

. Random Forest Classifier

This classifier employs multiple decision trees to analyze data. By combining results from various decision trees through a voting mechanism, it prevents overfitting and enhances the accuracy of predictions. Each decision tree processes input tweets and sends the results to a bagging technique for final classification.

2. Multinomial Naïve Bayes (MNB)

MNB utilizes the relative occurrence of words in documents belonging to specific classes to determine classification probabilities. It assumes independence between features and predicts tweet classification based on this conditional likelihood.

3. Logistic Regression

Logistic regression, a classification algorithm, relies on statistics and probability theory for analysis. It predicts dichotomous outcomes (e.g., positive/negative sentiment) using explanatory variables and coefficients associated with them.

4. Support Vector Machine (SVM)
SVM is a supervised ML algorithm used for classification and regression. It focuses on defining hyperplanes in N-dimensional spaces to accurately classify tweets. The effectiveness of classification relies on maximizing the margin of the hyperplane.

5. Decision Tree
A supervised machine learning classifier, decision trees segment data based on available parameters. Each internal node represents a test on an attribute, with branches displaying test results. The leaf nodes represent classified sentiment categories like Neutral (Index 0), Positive (Index 1), and Negative (Index 2).

Tools and Libraries Utilized

- Twin:
  - A Python-based Twitter intelligence tool used for scraping social media data without relying on the Twitter API. It allows scraping followers, comments, etc.

- Python Libraries:
  - **Pandas**: A popular library for data processing, including cleaning, modifying, and analyzing data. It provides Series and DataFrames for effective data manipulation.
  - TextBlob: A Python library for textual data processing, assisting in sentiment analysis and text processing tasks.
  - Scikit-Learn: An open-source library for machine learning that offers various methods for model fitting, data preprocessing, and model assessment.
  - Matplotlib & Seaborn: Libraries for constructing static, animated, and immersive visualizations and statistical graphics in Python.

These tools and techniques collectively form a comprehensive framework for analyzing social media sentiment by processing and classifying textual data from various social media platforms.

CHAPTER 5

REQUIREMENT ANALYSIS

5. REQUIREMENT ANALYSIS

5.1. HARDWARE REQUIREMENTS:

1. Laptop/Desktop
2. Processor: 12th Gen Intel(R) Core (TM) i5-1235U 1.30 GHz
3. RAM : 16.0 GB (15.7 GB usable)
4. System : 64-bit operating system, x64-based processor

5.2. SOFTWARE REQUIREMENTS:

1. PyCharm: Python 3.10 interpreter
2. Languages & Frameworks: Jupyter/Jupyter Servers
3. pandas
4. seaborn
5. scikit-learn
6. matplotlib
7. neattext

CHAPTER 6

DESIGN ANALYSIS

6. DESIGN & ANALYSIS

Social media sentiment analysis involves a systematic process to understand public sentiment toward a particular topic or event.
Steps Involved:

1. Data Collection:
- Gather a comprehensive dataset of social media posts (tweets, comments, etc.) related to the specific topic or event of interest, either through APIs (like Twitter API) or pre-existing datasets.

2. Data Pre-processing:
- Clean and prepare the collected data by removing irrelevant characters, symbols, and stop words. Normalize data by handling URLs, usernames, hashtags, and other noise in the text.

3. Feature Extraction:
- Extract relevant features from the pre-processed data using methods like bag-of-words, word embedding, or TF-IDF representation. This step converts text data into numerical form suitable for machine learning algorithms.

4. Training the ML Model:
- Select an appropriate machine learning algorithm (e.g., Naive Bayes, Support Vector Machines, Recurrent Neural Networks) and train the model using the extracted features.

5. Model Evaluation:
- Evaluate the trained model's performance using metrics like accuracy, precision, recall, and F1-score on a testing set. This step determines the model's effectiveness in accurately classifying sentiments.

6. Sentiment Analysis:
- Apply the trained model to new, unseen social media data to categorize posts into positive, negative, or neutral sentiments. This enables understanding public opinion and identifying sentiment trends or patterns related to the chosen topic.

7. Visualization and Reporting:
- Visualize sentiment analysis results using graphs, charts, or other visualization techniques to present clear insights. Generate comprehensive reports summarizing sentiment trends and public opinions regarding the chosen topic.

Algorithm for Sentiment Analysis:
Algorithm: Social Media Sentiment Analysis
Input: Social Media Posts Data (SD)
Output: Sentiments of SD

1. Gather social media posts data (SD) related to the topic of interest.
2. Preprocess and clean SD to remove noise using appropriate libraries.
3. Extract features from SD using methods like bag-of-words or word embeddings.
4. Train a machine learning model (e.g., Naive Bayes, SVM) using the extracted features.
5. Evaluate the model's performance using various metrics on a testing dataset.
6. Apply the trained model to categorize sentiments (positive, negative, neutral) of new social media data.

CHAPTER 7

IMPLEMENTATION

7. IMPLEMENTATION

Implementation Stage

The implementation phase is pivotal in transforming theoretical design into a functional system. It's crucial for instilling confidence in users regarding the system's efficiency and effectiveness. Implementation follows thorough testing to ensure it aligns with specifications. This phase involves meticulous planning, investigating the current system's constraints, designing changeover methods, and evaluating these methods.

Key Activities in Implementation:

Planning and Investigation:

- Understanding current system limitations and planning methods for changeover.
- Hardware and Software Acquisition:
- Acquiring necessary hardware and software components for the system.
- Software Development:
- Writing and testing programs, if required, for the system.
- User Education and Training:
- Educating and training users for smooth adoption of the new system.
- Changeover and System Discontinuation:
- Transitioning users to the fully tested new system while discontinuing the old one.

Testing Phase

- Testing is a critical part of software development, aimed at identifying errors, missing operations, and verifying whether the system meets objectives and user requirements.
- Steps in Software Testing:
- Unit Testing:
- Testing each module to ensure correctness, validity, and fulfillment of objectives.
- Identifying errors and rectifying them immediately.
- Enhancing program clarity and verifying if individual modules meet objectives.

Integration

Testing:

- Testing the software as a whole after successful individual module testing.
- Ensuring that combining modules into the entire system does not cause issues not found during unit testing.
- The testing phase is fundamental to software development, allowing for the identification and rectification of errors and ensuring the system functions seamlessly when modules are integrated.

1. Positive Sentiment:

- "I love how social media helps me stay connected with friends and family, especially during challenging times."
- "Social media has been a great platform for sharing positivity and spreading awareness about important causes."

2. Neutral Sentiment:

- "Using social media for both work and personal life has become a daily routine."
- "I have mixed feelings about social media; it has its pros and cons."

3. Negative Sentiment:
- "Social media can be so toxic with all the negativity and online hate."
- "I feel overwhelmed by the constant pressure and unrealistic standards set by social media influencers."

These sentiments reflect a variety of opinions and emotions people might express regarding their experiences with social media platforms.

CHAPTER 8

SNAPSHOTS

8. SNAPSHOTS

Input from the user

```
[279] X_test = ["it was pleasant"]
```

```
[280] X_clean = [getCleanedText(i) for i in X_train]
      xt_clean = [getCleanedText(i) for i in X_test]
```

```
[281] X_clean
```

```
['realli awesom awesom movi',
 'great movi ilik lot',
 'happi end awesom act hero',
 'love',
 'bad upto mark annoy',
 'could better',
 'realli dissapoint movi worst movi wast time']
```

```
[282] # Data before cleaning
      '''
      X_train = ["This was awesome an awesome movie",
                 "Great movie! Ilikes it a lot",
                 "Happy Ending! Awesome Acting by hero",
```

Connected to Python 3 Google Compute Engine backend

Multinomial Naive Bayes

```
[290] from sklearn.naive_bayes import MultinomialNB
```

```
[291] mn = MultinomialNB()
```

```
[292] mn.fit(X_vec, y_train)
```

```
MultinomialNB
MultinomialNB()
```

```
[293] y_pred = mn.predict(Xt_vect)
```

```
[294] y_pred
```

```
array(['positive'], dtype='<U8')
```

```
[ ]
```

Input from the user

```
X_test = ["experience was worst"]
```

```
[312] X_clean = [getCleanedText(i) for i in X_train]
      xt_clean = [getCleanedText(i) for i in X_test]
```

```
[313] X_clean
```

```
['realli awesom awesom movi',
 'great movi ilik lot',
 'happi end awesom act hero',
 'love',
 'bad upto mark annoy',
 'could better',
 'realli dissapoint movi worst movi wast time']
```

```
[314] # Data before cleaning
      '''
      X_train = ["This was awesome an awesome movie",
                 "Great movie! Ilikes it a lot",
                 "Happy Ending! Awesome Acting by hero",
                 "loved it!",
                 "Bad not upto the mark"
```

Multinomial Naive Bayes

```
[321] from sklearn.naive_bayes import MultinomialNB
```

```
[322] mn = MultinomialNB()
```

```
[323] mn.fit(X_vec, y_train)
```

```
MultinomialNB()
```

```
[324] y_pred = mn.predict(Xt_vect)
```

```
y_pred
```

```
array(['negative'], dtype='<U8')
```

CHAPTER 9

CONCLUSION

9. CONCLUSION

1.Diverse Perceptions:
Sentiments surrounding social media are highly diverse, showcasing a spectrum of opinions from positive to negative, indicating the varied experiences people have with these platforms.
2.Positive Aspects Acknowledged:
Many individuals appreciate social media for its ability to connect people, facilitate communication, and provide a platform for spreading positivity and awareness about important issues.
3.Mixed Feelings and Neutrality:
A significant number of people exhibit neutral sentiments, acknowledging both the benefits and downsides of using social media. They find it a part of their routine but acknowledge its dual nature.
4.Negativity and Toxicity Concerns:
Some express negative sentiments, highlighting the toxic side of social media characterized by online hate, pressure, and unrealistic standards set by influencers.
5.Varied Impact:
The conclusions drawn from these sentiments reveal that people experience and perceive social media differently, with its impact ranging from positive connections to negative mental health effects.
6.Importance of Balance and Awareness:
These sentiments underscore the importance of maintaining a balance in social media usage and being aware of its potential drawbacks while leveraging its positive aspects.

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