Sentiment Analysis for Social Media Appearance

A Major Project Report Submitted To

Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal

Towards Partial Fulfilment for the Award Of

Bachelor of Technology

In

ARTIFICIAL INTELLIGENCE & DATA SCIENCE

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Prestige Institute of Engineering , Management and Research, Indore(M.P.)

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PRESTIGE INSTITUTE OF ENGINEERING MANAGEMENT AND RESEARCH

INDORE (M.P.)

DECLARATION

We **Anshul Patel, Rupesh Soniya, Sonal Khetkar, Sheetal Parihar and Vishal Kumar Gupta** hereby declare that the project entitled "**Sentiment Analysis for Social Media Appearance**", which is submitted by us for the partial fulfilment of the requirement for the award of "Bachelor of Technology in Artificial Intelligence and Data Science", to the Prestige Institute of Engineering, Management and Research, Indore (M.P.). Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal, comprises my own work and due acknowledgement has been made in text to all other material used.

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DISSERTATION APPROVAL SHEET

This is to certify that the dissertation entitled "**Sentiment Analysis for Social Media Appearance**" submitted by **Anshul Patel (0863AD201004), Rupesh Soniya (0863AD201039), Sonal Khetkar (0863AD201049), Sheetal Parihar (0863AD201045), and Vishal Kumar Gupta (0863AD201057)** to the Prestige Institute of Engineering, Management, and Research, Indore (M.P.) is approved as fulfillment for the award of the degree of "Bachelor of Technology in Artificial Intelligence & Data Science" by Rajiv Gandhi Proudhyogiki Vishwavidyalaya, Bhopal (M.P.).

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CERTIFICATE

This is certified that the project entitled "**Sentiment Analysis for Social Media Appearance**" submitted by **Anshul Patel, Rupesh Soniya, Sonal Khetkar, Sheetal Parihar, and Vishal Kumar Gupta** is a satisfactory account of the bona fide work done under our supervision and is recommended towards partial fulfillment for the award of the degree Bachelor of Technology in Artificial Intelligence and Data Science to Rajiv Gandhi Proudyogiki Vishwavidyalaya, Bhopal (M.P.).

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CHAPTER 1

INTRODUCTION

1.1 Introduction

As the world is advancing and the internet era has begun many youngsters have developed a habit of starting their new day with a good morning text The intention of these technologies was to make human life easier and friendlier and they are useful in every aspect of our lives Today the machines have become so advanced that these machines can even predict the future with the help of artificial intelligence based on current data .

As social media websites keep evolving and slowly become the source of all kinds of information people started posting their opinion on various topics discussions issues complaints and expressing negative positive or neutral emotions in response to the product they use or the condition they go through Many brands and companies even conduct polls on these sites and blogs to understand the general people sentiment and demand of their various offerings This is requirement for some technology that can identify and summarize overall people's sentiment.

1.2 Motivation

Social media analysis is motivated by the desire to gain insights into customer behavior, market trends, and public sentiment. It enables businesses to make informed decisions, improve customer relations, and stay competitive. Additionally, it serves researchers, policymakers, and activists by providing valuable data for studies, policy development, and social impact initiatives. Social media analysis has become an indispensable tool for understanding and engaging with the digital world's vast and influential audience. In summary, the motivation for social media analysis can vary widely, from business and marketing objectives to research, social impact, and personal growth. The wealth of information available on social media platforms makes it a valuable resource for a wide range of purposes.

1.3 Objective

The primary objective of social media analysis is to extract valuable insights and information from the vast amount of data generated on social platforms. This analysis serves a multitude of purposes, such as understanding and engaging with a target audience more effectively, tracking and managing brand reputation, and identifying emerging trends and opportunities within a specific industry or field. It also plays a crucial role in competitive intelligence, enabling businesses to monitor the strategies and performance of their rivals. Moreover, social media analysis empowers businesses to improve customer relations and satisfaction by identifying and addressing issues promptly. It can serve as an early warning system for crisis management, enabling proactive responses to potential problems. In addition, it is instrumental in influencer marketing, content strategy refinement, political and social research, advocacy and activism, health and safety monitoring, education, and even policy development.

1.4 Analysis

It can refer to examining the practices, methods, and outcomes of social media analysis itself Here are some aspects to consider when analyzing social media analysis. Analyzing social media analysis is a critical step in ensuring that it is used effectively, responsibly, and ethically. It also helps in adapting to the ever-evolving nature of social media platforms and the technologies used for analysis.

1.4.1 Functional Requirements

Functional requirements for social media analysis refer to the specific features and capabilities that a social media analysis system or tool should possess to meet its intended goals and objectives. These requirements can vary depending on the context and purpose of the analysis. Some common functional requirements for social media analysis are data collection, data processing, keyword and topic tracking, user profiling, trend detection, real-time monitoring, custom queries, data visualization, data export, and report generation. These functional requirements can be tailored to specific use cases, whether it's for marketing, brand management, research, or any other application of social media analysis. The choice of features will depend on the objectives and needs of the users or organizations conducting the analysis.

1.4.2 Non-Functional Requirements

Non-functional requirements for social media analysis refer to the qualities and characteristics that describe how a social media analysis system should perform, rather than specific features or functionalities. These requirements are essential for ensuring that the system operates effectively and meets the expectations of users and stakeholders. Some non-functional requirements for social media analysis are performance, scalability, reliability, availability, security, data integrity, usability, and interoperability. These non-functional requirements are crucial for creating a reliable, secure, and efficient social media analysis system that meets the needs of users and complies with industry standards and regulations.

1.4.3 Use Case Diagram

A use case diagram is used to represent the dynamic behaviour of a system. It encapsulates the system's functionality by incorporating use cases, actors, and their relationships. It models the tasks, services, and functions required by a system/subsystem of an application. It depicts the high-level functionality of a system and also tells how the user handles a system. Following are the purposes of a use case diagram given below:

1. It gathers the system's needs.
2. It depicts the external view of the system.

3.It recognizes the internal as well as external factors that influence the system.

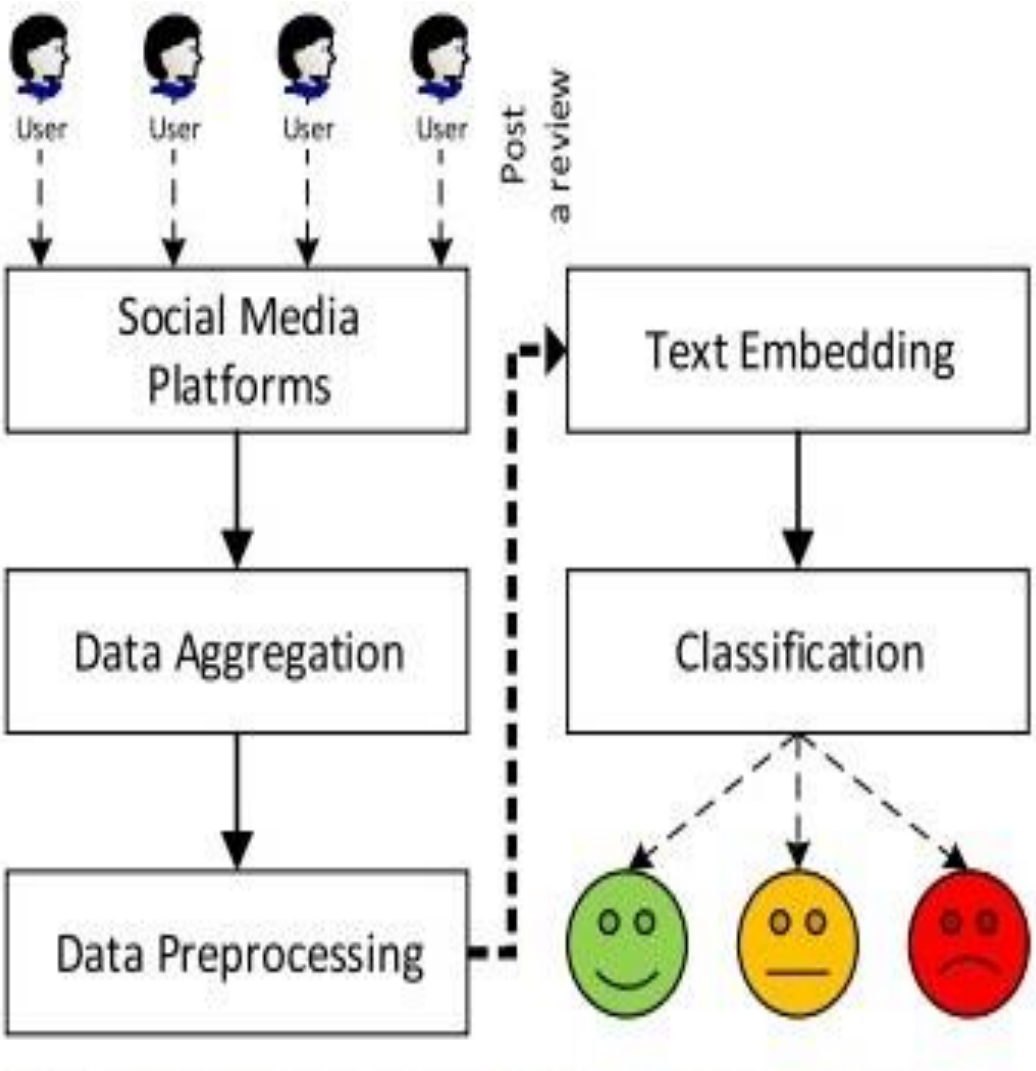

Figure1.1UseCase Diagram

CHAPTER 2
BACKGROUND
AND
RELATED WORK

2.1 Problem Statement

Social media is the hub of public opinion where millions of opinions are shared every few minutes. As more and more people are expressing their thoughts on social media which can be both neutral and polarizing. The problem is to plot public sentiments on the relative topic and monitor it.

2.2 Background Work

Social media analysis ,also known as social media analytics ,is the process of collecting, monitoring, and analysing data from social media platforms to gain insights and make in formed decisions .Here is an over view of the background work in volved in social media analysis:

1. Data Collection:

   - Data Sources: Identify relevant social media platforms (e.g., Facebook, Twitter, Instagram, LinkedIn, YouTube).
   - API Access: Access the platforms' APIs (Application Programming Interfaces) to gather data in a structured and automated manner.
   - Web Scraping: If APIs are limited or unavailable, web scraping techniques can be used to collect data from public profiles and posts.

2. Data Preprocessing:

   - Data Cleaning: Clean the collected data by removing duplicates, irrelevant information, and handling missing values.
   - Data Transformation: Convert data into a format suitable for analysis, such as structured data or text for natural language processing.
   - Normalization: Standardize data for consistency and comparability.

3. Data Storage:

   - Database Management: Store the collected data in a database for easy access and retrieval.
   - Data Warehousing: For larger-scale operations, consider using data warehousing solutions.

4. Data Analysis:

   - Descriptive Analysis: Generate basic statistics, such as likes, shares, comments, and follower counts, to understand user engagement and trends.
   - Sentiment Analysis: Use natural language processing techniques to determine the sentiment (positive, negative, or neutral) of social media posts and comments.

- Network Analysis: Examine the connections and interactions between users or entities to identify influential individuals or groups.
- Topic Modeling: Identify key topics and trends in the data through techniques like Latent Dirichlet Allocation (LDA) or clustering.

5. Data Visualization:

   - Create visual representations of the data using charts, graphs, and dashboards to make the insights more accessible to stakeholders.

6. Monitoring and Alerting:

   - Implement real-time or periodic monitoring of social media channels to stay updated with the latest trends, mentions, or issues related to your brand or topic.
   - Set up alerts to be notified of significant events or anomalies.

7. Reporting and Insights:

   - Generate reports summarizing key findings and insights from the data analysis.
   - Translate data-driven insights into actionable recommendations for marketing, customer service, or other relevant departments.

8. Machine Learning and Predictive Analysis:

   - Utilize machine learning models for predictive analysis, such as predicting future trends, sentiment, or user behaviour.

9. Privacy and Ethical Considerations:

   - Ensure compliance with data privacy regulations (e.g., GDPR, CCPA) when collecting and storing user data.
   - Adhere to ethical guidelines when conducting social media analysis to protect the privacy and rights of individuals.
   - Regularly update your analysis methods to adapt to changing social media platforms and user behaviour.

2.3 Technology Used

Social media analysis relies on a variety of technologies and tools to collect ,process ,and analyse data from social media platforms. The choice of technology depends on the specific objectives of the analysis and the scale of the operation. Here are some key technologies used for social media analysis:

1. APIs (Application Programming Interfaces):

   - Social media platforms provide APIs that allow developers to access and retrieve data from their platforms.
   - APIs are crucial for real-time data collection and automation.

2. Data Scraping Tools:

   - Web scraping tools like Python's Beautiful Soup and Scrapy can be used to extract data from social media websites when API access is limited or restricted.

3. Natural Language Processing (NLP):

   - NLP libraries and frameworks like NLTK, spaCy, and TensorFlow are used to perform text analysis, sentiment analysis, and text classification on social media content.

4. Machine Learning and AI:

   - Machine learning algorithms and models, such as neural networks, decision trees, and support vector machines, are applied to predict trends, sentiment, and user behaviour.

5. Data Visualization Tools:

   - Tools like Tableau, Power BI, and Python libraries like Matplotlib and Seaborn are used to create data visualizations and dashboards to present insights.

6. Sentiment Analysis Tools:

   - Specialized sentiment analysis APIs and libraries, like VADER and Text Blob, help determine the sentiment of social media content.

CHAPTER 3
DESIGN (UML AND DATA MODELING)

3.1 UML Modelling

The Unified Modelling Language (UML) is a general-purpose, developmental modelling language in the field of software engineering that is intended to provide a standard way to visualize the design of a system. It is based on diagrammatic representations of software components. UML has been used as a general-purpose modelling language in the field of software engineering.

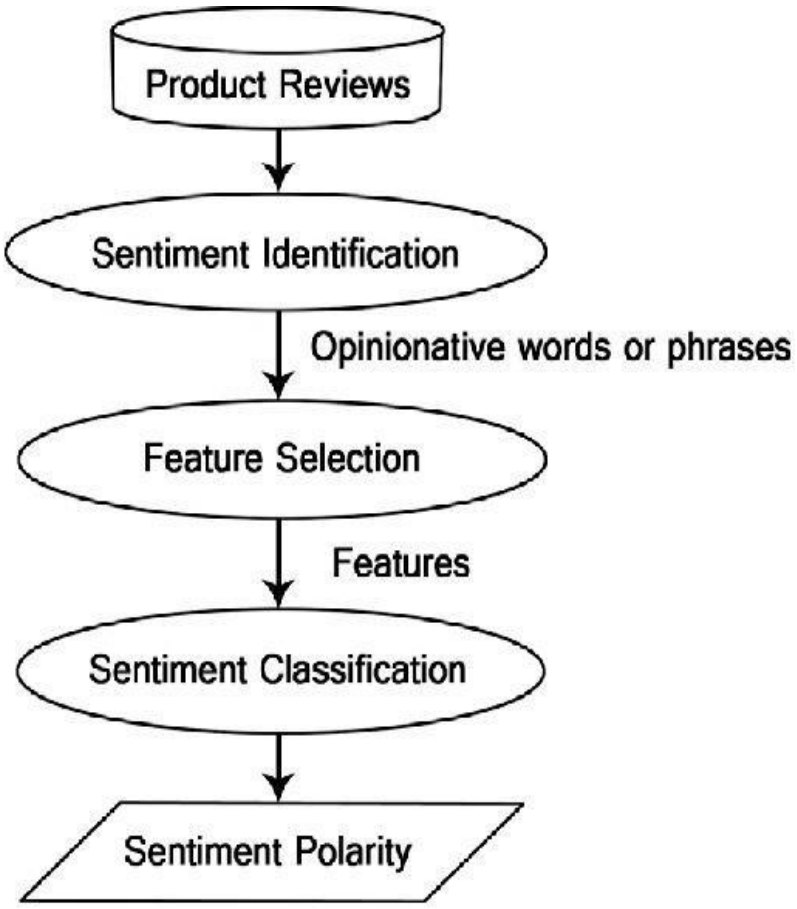

Figure3.1 UML Diagram

CHAPTER 4
IMPLEMENTATION

4.1 Tools Used

Social media analysis tools are essential for collecting, processing, and analyzing data from various social media platforms. These tools offer a wide range of features, from data gathering and sentiment analysis to reporting and visualization. Here are some popular tools used for social media analysis:

1. HTML:

HTML is the foundation of web development, and to work with it effectively, you need the right tools. A text editor is the most basic requirement for writing HTML code. While you can use simple text editors like Notepad (Windows) or TextEdit (macOS), it's often more practical to use code editors that offer features like syntax highlighting, code completion, and project management. Popular code editors for web development include Visual Studio Code, Sublime Text, and Atom. These tools make it easier to manage and maintain your HTML code.

2. CSS :

When working with CSS, the choice of text editor or code editor is similar to that for HTML. You can use a basic text editor, but it's more practical to use a code editor with syntax highlighting ,code completion, and other features tailored to CSS development. They allow you to inspect and manipulate the CSS styles of a web page in real-time, making it easy to see how changes affect the layout and appearance of your site.

3. Python:

Python is a versatile and popular programming language with a wide range of applications, and several tools and technologies support its development. Integrated Development Environments (IDEs) like PyCharm and Visual Studio Code provide user-friendly interfaces for writing and running Python code. They offer features like code completion, debugging, and integrated tools to enhance your Python development workflow.

4. Sprout Social:

Sprout Social provides social media management and analytics features, including scheduling, monitoring, and detailed reporting. It also offers sentiment analysis.

5. Google Analytics:

Google Analytics can be used to track website traffic originating from social media and measure the

impact of social media campaigns on web conversions.

6. Social Mention:

Social Mention is a free, web-based tool that provides real-time social media search and sentiment analysis for brand mentions and keyword tracking. These tools vary in terms of features, pricing, and platform compatibility. The choice of a tool depends on your specific social media analysis needs, budget, and the platforms you want to monitor. It's important to evaluate these tools based on your organization's goals and requirements.

4.2 Technology

Social media analysis relies on a diverse array of technologies and tools to collect, process, and analyse data from social media platforms. The choice of technology depends on the specific objectives of the analysis and the scale of the operation. Here are some key technologies employed in the field:

1. Data Scraping Tools:

- Web scraping tools like Python's Beautiful Soup and Scrapy can extract data from social media websites when API access is limited or restricted.

2. Machine Learning and AI:

- Machine learning algorithms and models, such as neural networks, decision trees, and support vector machines, are utilized to predict trends, sentiment, and user behaviour.

3. Data Visualization Tools:

- Tools like Tableau, Power BI, and Python libraries like Matplotlib and Seaborn are used to create data visualizations and dashboards to present insights effectively.

4. Sentiment Analysis Tools:

- Specialized sentiment analysis APIs and libraries, like VADER and Text Blob, facilitate determining the sentiment of social media content.

4.3 Testing

Testing for social media analysis should be an ongoing process, as social media data and platforms are dynamic and subject to change. Regular testing and validation help maintain the quality of your analysis and ensure that it continues to provide valuable insights for decision-making and strategy development.

4.3.1 Testing Approach

1. Define Objectives and Requirements:

- Clearly define the objectives of your social media analysis. What specific insights are you looking to gain?
- What are the critical requirements for your analysis tools and processes?

2. Test Planning:

- Develop a detailed test plan that outlines the testing strategy, scope, schedule, and resources required.
- This plan should align with your objectives and requirements.

3. Data Collection Testing:

- Verify that data collection methods are working correctly. Test APIs, web scraping scripts, and data import processes.
- Ensure that the data collected matches your requirements, including the content, volume, and format.

4. Data Preprocessing Testing:

- Test data cleaning procedures to remove duplicates, irrelevant data, and handle missing values.
- Validate data transformation and normalization steps to ensure the data is structured correctly for analysis.

5. Analysis and Algorithms Testing:

- Test the accuracy and effectiveness of sentiment analysis algorithms by comparing their results to manually labeled data.
- Evaluate the performance of topic modelling, machine learning models, and other analysis techniques using appropriate testing datasets.
- Ensure that analysis results align with your objectives and provide actionable insights.

6. Data Visualization Testing:

- Verify the accuracy of data visualizations, including charts, graphs, and dashboards.
- Test the interactivity of visualization tools and ensure that users can explore data effectively.

7. Real-time and Monitoring Testing:

- If your analysis includes real-time monitoring, validate the functionality of alerting and notification systems.
- Test the responsiveness and accuracy of real-time data updates.

8. Security Testing:

- Evaluate the system for vulnerabilities and security weaknesses.
- Implement security measures to protect data and maintain data integrity.

CHAPTER 5
PROJECT SCREENSHOT

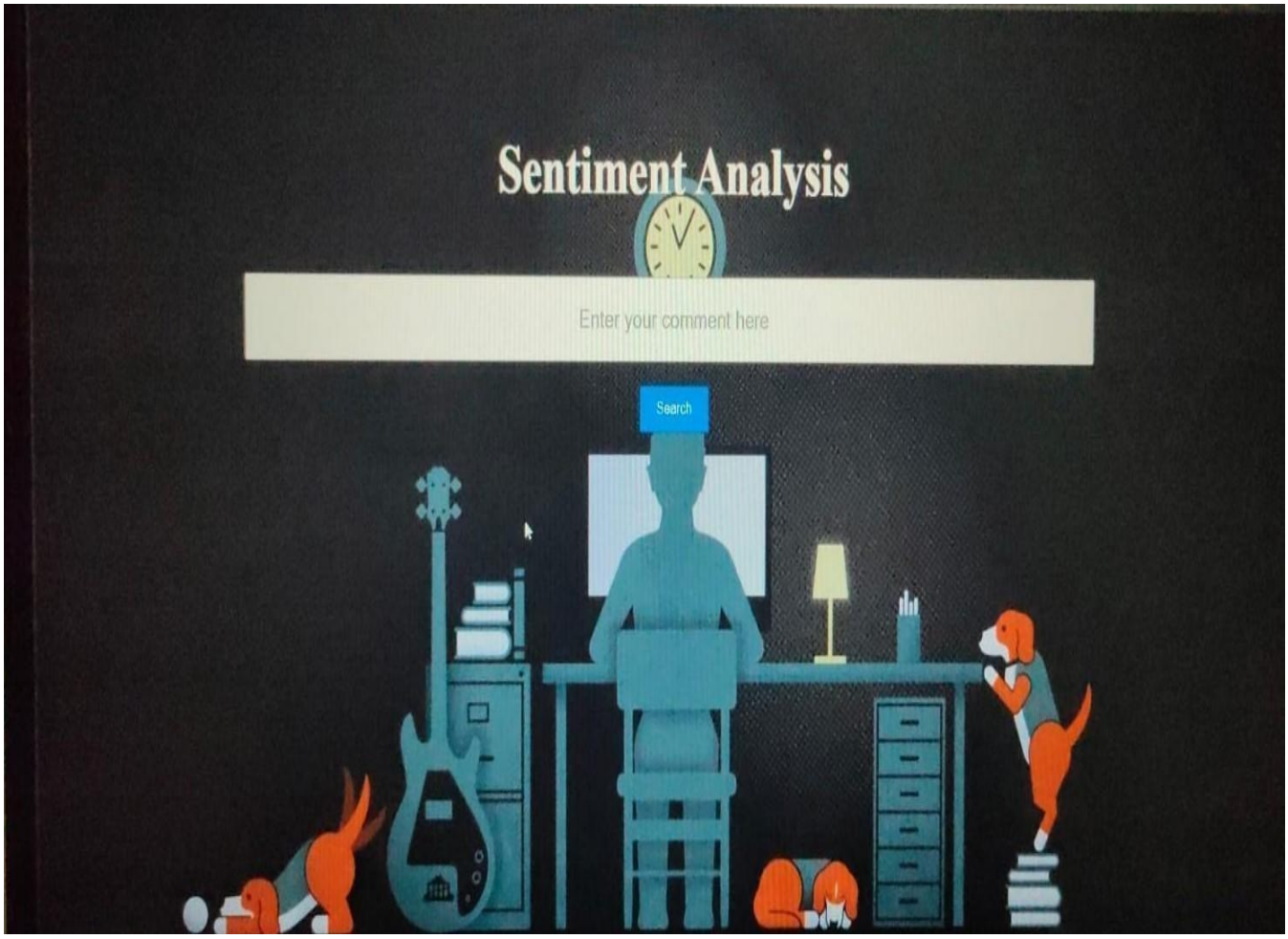

Figure5.1 Frontend Snapshot

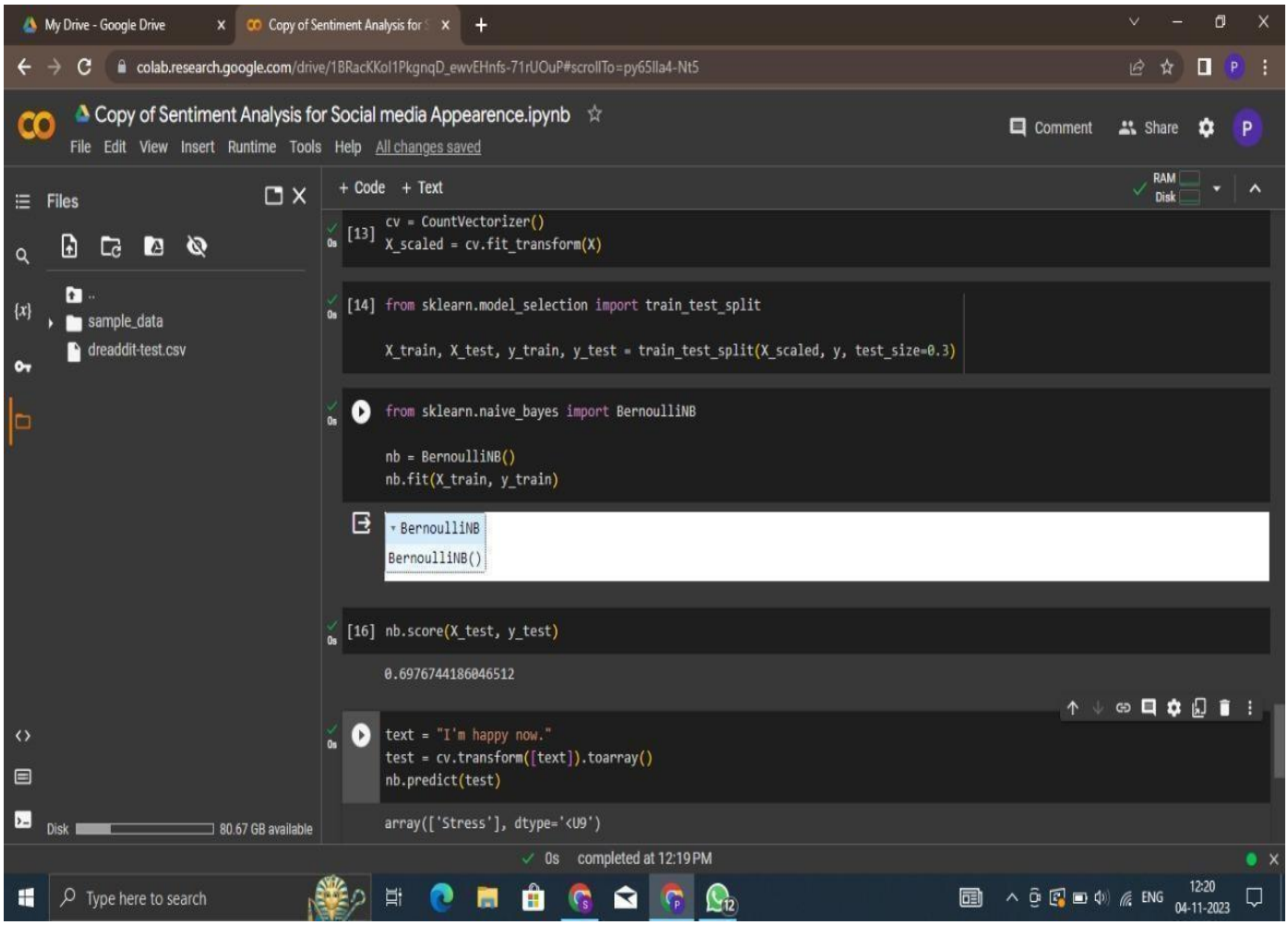

Figure5.2 Backend Snapshot

CHAPTER 6
CONCLUSION/FUTURE SCOPE

7.1 Conclusion

The insights gleaned from this social media analysis will be instrumental in informing our decision-making processes, refining our social media strategies, and enhancing our overall online presence. The actionable recommendations presented will serve as a roadmap for implementing changes that will have a positive impact on our organization's online engagement, reputation, and success. We would like to express our sincere appreciation to the team members, stakeholders, and individuals who contributed to the success of this analysis project. Their collaboration and unwavering support were instrumental in the achievement of our objectives.

7.2 Application Domain

Social media analysis provides valuable insights into user behaviour, market trends, and public sentiment, making it applicable across various industries and sectors. Here are some key application domains:

1. Marketing and Advertising:

- Understanding consumer behaviour and sentiment: Optimize ad targeting and content strategy based on user preferences and sentiment analysis.
- Monitoring campaign performance: Track the effectiveness of marketing campaigns and assess their impact on brand perception and sales.

2. Customer Service:

- Responding to inquiries and feedback: Engage with customers directly on social media platforms to address their inquiries and concerns promptly.
- Identifying and resolving customer issues: Actively monitor online conversations to identify potential customer issues and resolve them effectively in real-time.

3. Market Research:

- Analysing public opinion and sentiment: Gain insights into consumer preferences and market trends by analysing public opinion and sentiment on social media.
- Tracking competitors and their online strategies: Monitor competitor activity and analyse their online strategies to gain a competitive edge.

4. Public Health:

- Monitoring disease outbreaks and public health concerns: Identify potential public health risks and facilitate timely interventions by analysing social media discussions.
- Assessing public reaction to health-related news and campaigns: Gauge public understanding and sentiment towards health initiatives to ensure effective communication and policy development.

5. Political Analysis:

- Measuring public sentiment and reactions: Understand public opinion on political candidates and policies by analysing social media sentiment during elections and political events.
- Analysing social media data to gauge campaign effectiveness: Evaluate the effectiveness of political campaigns by analysing social media data and user engagement.

Future Scope

The future of sentiment analysis for social media is promising, driven by advancements in technology, user behaviour, and business needs. Here are some key trends and areas of growth in the field:

1. Deep Learning and AI Integration:

- Deeper integration of deep learning and artificial intelligence will lead to more sophisticated sentiment analysis, image recognition, and predictive modeling. This will empower businesses to make more informed decisions based on social media data.

2. Social Listening for Brand Protection:

- Social media analysis will play a crucial role in safeguarding and managing brand reputation. Organizations will rely increasingly on real-time monitoring and response to address potential crises and negative sentiment.

3. E-commerce and Social Commerce Optimization:

- Social media analysis will be critical for optimizing e-commerce and social commerce strategies. By analysing data, businesses can gain deeper insights into consumer behaviour, product preferences, and conversion drivers.

4. Privacy and Ethical Considerations:

- With growing concerns about data privacy and ethics, the future of social media analysis will involve a stronger focus on adhering to regulations and best practices while handling user data.

5. Integrated Social Data Hubs:

- Organizations will build centralized social data hubs, consolidating data from various platforms. This will provide a holistic view of online conversations, trends, and engagement, enabling effective strategic decision-making.

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