ABSTRACT

E-commerce is rising rapidly now a days, purchasing items on online has grown to be more and more fashionable outstanding of more options like lower in price, better supply system, therefore buyers plan to do Online shopping. User's comments are useful information to estimate product quality. This paper has a tendency to analyze the fundamentals of opinion mining. It consist different approaches including Extraction, Clustering and Classification. Extracting reviews from the website using flipkart product API, using product API we can easily fetch the brand name, reviews, rating and other related things for product, clustering using ROCK and using CART algorithm to classify reviews as positive and negative words from the comments and finally they come to know which product having more percentage of positive reviews.

Key Words: Product API, Data Mining techniques, Machine Learning algorithm, ROCK, CART.

CHAPTER - 1

COMPANY PROFILE

1.1 History of the Organization

Global Core Tech IT Education Institute and Placement, a leading provider of high-quality IT education and job placement services. Our mission is to empower individuals with the knowledge and skills they need to succeed in the fast-paced and rapidly evolving world of technology.

At Global Core Tech IT Education Institute and Placement, we offer a wide range of courses and training programs designed to prepare individuals for careers in IT. Our courses cover a broad range of topics, including programming languages, software development, web development, database management, and cybersecurity, among others. Our experienced instructors are passionate about sharing their knowledge and expertise with students and are dedicated to providing the best possible learning experience.

In addition to our educational programs, we also offer job placement services to help our students find employment in the IT industry. Our job placement services team works closely stood with our students to understand their career goals and connects them with top employers in industry. We have a proven track record of success in helping our students find employment in a variety of roles, including software developers, web developers, database administrators, network engineers, and cybersecurity specialists, among others

At Global Core Tech IT Education Institute and Placement, we are committed to providing our students with the tools and resources they need to succeed in the competitive world of IT. Whether you are looking to advance your career or just starting out, we have the expertise and experience to help you in achieving your goals.

1.1.1 Objectives

MISSION:

Our mission at our IT education institute is to provide high-quality, accessible, and affordable IT education and training to individuals of all backgrounds and experience levels. We are committed to equipping our students with the knowledge and skills they need to succeed in today's technology-driven world. Our goal is to empower individuals to reach their full potential in the field of IT.

VISION:

our vision is to empower individuals with the knowledge and skills they need to succeed in today's rapidly evolving technological landscape. We believe that everyone should have access to quality IT education and training, regardless of their background or experience.

VALUES:

Our worth adheres to our unique Education Technology Framework

- Knowledge & Attentiveness
- Mastery & Enablement
- Flexibility & Support
- Esteem & Accountability

1.1.2 Operation of the Organization

The organization is operated by Babjan.S who is the Founder and CEO of the company. There are about 25 people working in the organization working as intern guides in various platform and trained above students all over India

1.2 Structure of the Organization

Global Core Tech IT Education Institute and Placement, a leading provider of high-quality IT education and job placement services based in Bangalore started by Babjan.S. They are focused on providing quality education on latest technologies of great need to the society. Additional

services provided by Global core tech include global distribution and sales of cutting-edge electronic products, project consultancy services for a diverse range of companies, technical assistance and product development services. Their specialties include internet of things, research and development, skill development, hardware design, and innovation. Global core tech also provides personalized attention to students by assigning a team of 2-3 trainers to oversee the training period and assist with any doubts.

ABOUT THE DEPARTMENT

Specific Functionalities of the Department:

Global Core Tech has a team of about 12 members who specialize in various fields such as internet of things, skill development in full stack web development, machine learning, artificial intelligence, project consultancy, and hardware design.

My role at the company was specifically focused on Data Science Intern, which involves designing and developing Online Shopping Sentiment Analysis.

1.3 Services Offered

- IT & Non-IT Training

- Soft Skills Training

- Internships

- Academic Projects

- Online Courses

1.4 Benefits of Choosing an Internship with Us

- Hands-On Learning Experience

- Opportunity for Growth

- Mentorship and Guidance

- Innovation and Creativity

- Challenging and Rewarding

1.4.1 Merits of Enhancing Internship Skills

- Industry-Relevant Experience
- Networking Opportunities
- Confidence and Self-Assurance
- Learning from Mentors
- Communication skills
- Corporate skills

Chapter 2

Regarding the Internship Program:

As per the regulations set forth by various universities, we offer a diverse range of internship training and development programs. The duration of these internships typically spans from 4 to 8 weeks. Our primary goal is to provide students with effective solutions that enable them to enhance their knowledge and apply it practically by engaging in project development.

Our carefully crafted internship program is specifically tailored to meet the present industry standards and demands. By doing so, we strive to bridge the gap between academic learning and industry requirements, offering value-added courses that bolster students' skills. This approach ensures that our students are well-prepared to embark on a successful career in the field of computer science.

Internships during college studies play a pivotal role in elevating the quality of higher education and fostering the development of essential skills and competencies among students. By providing practical experience, these internships serve as a vital link between theoretical classroom learning and its real-world application in professional settings.

It's important to note that students undergoing internships during their three-year degree courses may experience time constraints, which can impact their performance in regular exams. However, the benefits are substantial, as internships equip students with higher professional competencies and excellence in their chosen fields, enabling them to perform exceptionally well in their future careers with a wealth of practical knowledge and skills.

2.1 Positive Aspects of Internship

Challenges in job hunting due to lack of experience, while also needing experience to secure a job, create a difficult predicament. However, internships offer a viable solution. Internships provide invaluable work experience for university students, recent graduates, and those considering career changes.

Universities endorse internship participation, recognizing the benefits of applying theoretical knowledge in supervised real-life work settings. While studies show improved academic

performance for students who complete internships, the direct impact on classroom performance remains inconclusive.

Internships impart valuable employability skills like teamwork, leadership, communication, and problem-solving, facilitating a seamless transition from academia to the professional world. In tough job markets, internships distinguish candidates, and employers recognize the value of practical experience. Moreover, internships grant students clarity in career choices, allowing them to make informed decisions for their future paths.

2.1.1 Secure Valuable Practical Knowledge

An internship offers the chance to acquire practical work experience that is beyond what can be attained in a classroom setting. Entry-level job seekers and those transitioning to new careers may not always be preferred candidates, yet companies are often willing to provide them with training as interns, granting them the necessary experience to become job-ready.

- **Building Professional Connections**

    Building professional connections is essential for career growth and advancement. These connections can open doors to new opportunities, collaborations, and valuable insights within the industry. Networking allows individuals to establish meaningful relationships that can positively impact their professional journey.

- **Utilize Learning in Real-World Situations**

    Utilizing learning in real-world situations is a crucial aspect of practical education. By applying classroom knowledge to real-life scenarios, individuals can deepen their understanding, enhance problem-solving skills, and adapt theoretical concepts to practical challenges. This experiential approach bridges the gap between academic learning and practical application, preparing individuals for success in their chosen fields.

2.2 Soft Skill Acquisition

- **Personal Progression**

Personal progression refers to the continuous and intentional process of self-improvement and growth in various aspects of an individual's life. It encompasses developing one's skills, knowledge, attitudes, and behaviors to achieve personal goals and enhance overall well-being. Embracing personal progression involves a commitment to lifelong learning, introspection, and adaptability to face life's challenges and opportunities with resilience and determination.

Engaging in personal progression requires a proactive approach, setting clear objectives, and taking actionable steps towards self-development. It involves identifying strengths and areas for improvement and working on refining those aspects to become a better version of oneself. Through personal progression, individuals can enhance their emotional intelligence, communication skills, and decision-making abilities, empowering them to navigate life's complexities with confidence and efficacy.

The journey of personal progression is unique to each individual, as it is shaped by personal experiences, values, and aspirations. It involves embracing new experiences, seeking feedback, and being open to constructive criticism as essential elements of growth. Ultimately, personal progression not only leads to a more fulfilling and meaningful life but also enables individuals to positively impact their communities and contribute to the greater good.

- **Expressive Speech**

Expressive speech refers to the art of communicating one's thoughts, emotions, and ideas with clarity, passion, and conviction. It goes beyond mere words, as it involves using tone, intonation, and body language to effectively convey the intended message. Whether in informal conversations, public speaking engagements, or artistic performances, expressive speech captivates the audience and leaves a lasting impact.

The power of expressive speech lies in its ability to evoke emotions, inspire action, and create connections with the listeners. A skilled orator or communicator can use the art of

expressive speech to engage, persuade, and influence their audience, making the message memorable and relatable.

Those who possess the art of expressive speech often excel in various fields, including leadership, sales, teaching, and the performing arts. They have the ability to bring stories to life, motivate teams, and foster meaningful connections with people from diverse backgrounds.

Mastering expressive speech is a journey that involves practice, self-awareness, and a willingness to connect authentically with others. Through continuous refinement of vocal delivery, gestures, and overall presence, individuals can enhance their ability to communicate effectively and leave a lasting impression on others. Embracing the art of expressive speech empowers individuals to articulate their ideas with passion, confidence, and charisma, making them influential communicators in both personal and professional settings.

- **Efficient Time Handling**

Efficient time handling is a valuable skill that empowers individuals to make the most of their available time and resources. It involves optimizing productivity by prioritizing tasks, setting clear goals, and utilizing time wisely. Those who excel in efficient time handling can strike a balance between various responsibilities and commitments, ensuring that each task is completed effectively and on schedule.

Adept time managers understand the importance of organizing their day, creating to-do lists, and setting realistic deadlines for themselves. They focus on important tasks first and avoid getting bogged down by less critical or time-consuming activities. By eliminating distractions and staying focused on their objectives, they maximize their efficiency and achieve desired outcomes in a timely manner.

Efficient time handling is not just about working harder but also about working smarter. It involves recognizing personal energy levels and identifying the best times for different types of tasks. By aligning their work with their peak productivity periods, individuals can achieve better results and maintain a higher level of motivation throughout the day.

In both personal and professional spheres, efficient time handling leads to reduced stress, increased accomplishments, and a greater sense of accomplishment. It allows individuals to create space for personal development, hobbies, and maintaining a healthy work-life balance. Embracing the art of efficient time handling fosters a sense of control over one's life and contributes to a more fulfilling and successful journey toward personal and professional goals.

CHAPTER – 3

TASK PERFORMED

Week 1 Activities
• Introduction to the Internship Program • Selection of Internship Domain and Mini Project • Introduction to the Python Programming –Part 1

| Week 2 Activities |
| --- |
| • Python programming including OOPs –Part 2

• Introduction to Data Science

• Data Science Life Cycle |

Week 3 Activities
• Data Science Packages – pandas,matplotlib,seaborn,nltk,wordcloud • Exploratory Data Analysis (EDA) • Steps to EDA

Week 4 Activities
• Implementation of Project – Tools : Anaconda Jupiter Notebook • Project Code Execution • Results and Conclusions • Future Work and Enhancement • Report Preparation and Submission • Internship Presentation - PPT

3.1 Introduction

About Python - A Versatile and Beginner - Friendly Programming Language

- Python, a widely used high-level programming language, was created by Guido van Rossum and initially released in 1991. It serves as a powerful tool for general-purpose programming, boasting features like interactivity, object-orientation, and ease of readability.

- One of Python's notable characteristics is its interpretive nature, allowing code to be executed directly at runtime without the need for prior compilation, unlike languages such as C, C++, and Java. This dynamic execution enables developers to quickly test and iterate their code, streamlining the development process.

- Python also stands out as an interactive language, enabling developers to interact directly with the interpreter through a prompt to write and execute programs seamlessly. This interactive approach fosters a strong sense of exploration and experimentation, making it an excellent environment for learning and code refinement.

- With a focus on object-oriented programming (OOP), Python empowers developers to encapsulate code within objects, promoting efficient code organization and reusability. OOP principles like inheritance and polymorphism enable developers to build modular and scalable applications with ease.

- A standout feature of Python is its beginner-friendly nature, making it an ideal language for those new to programming. Its intuitive syntax and comprehensive libraries cater to a wide range of applications, encouraging beginners to explore and create diverse projects. Additionally, Python's supportive and welcoming community provides ample learning resources and assistance, nurturing the growth of aspiring developers.

- Python's popularity continues to soar, and its welcoming design ensures that it remains a favored language for developers of all skill levels, driving innovation across various domains and industries.

- Whether used for web development, data analysis, artificial intelligence, automation, or countless other applications, Python's versatility and ease of use make it a go-to choice for programmers worldwide.

Python Structure
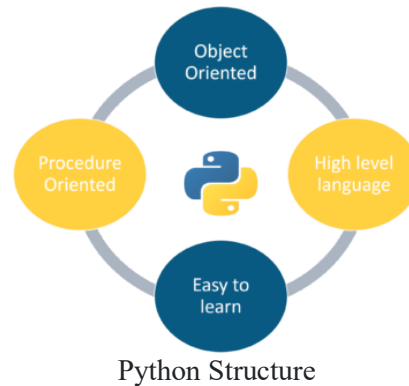
Python Merits

• **User-Friendly:** Python is easy-to-learn, featuring a straightforward syntax and a limited number of keywords, making it accessible for beginners.

• **Readability:** Python code is easy-to-read, with a clear and visually appealing structure, enhancing code comprehension.

• **Manageability:** Python's source code is easy-to-maintain, facilitating efficient debugging and updates.

• **Extensive Library:** Python boasts a broad standard library that is highly portable and compatible across various platforms like UNIX, Windows, and Macintosh.

• **Interactive Mode:** Python supports an interactive mode, enabling developers to test and debug code snippets interactively.

• **Platform-Independent:** Python is portable, running on diverse hardware platforms while maintaining the same interface across all systems.

• **Customizability:** Python can be extended with low-level modules, empowering programmers to enhance efficiency by customizing their tools.

• **Database Connectivity**: Python offers interfaces to major commercial databases, facilitating seamless integration with database systems.

• **GUI Development:** Python supports GUI applications that can be created and ported to different systems, including Windows MFC, Macintosh, and X Window on UNIX.

• **Scalability**: Python provides a structured and scalable approach for large programs, offering advantages over shell scripting.

In addition to the features mentioned above, Python boasts a plethora of other advantages.Some of these include:

• **Versatile Programming Paradigms:** Python supports functional and structured programming methodologies alongside object-oriented programming (OOP), allowing developers to choose the most suitable approach for their projects.

• **Scripting and Compilation:** Python serves as both a scripting language for quick prototyping and as a language that can be compiled to byte-code, facilitating the development of large-scale applications.

• **Dynamic Data Types:** Python offers high-level dynamic data types, making it flexible and adaptable to various data structures. It also supports dynamic type checking, enhancing code robustness.

• **Automatic Garbage Collection:** Python includes an automatic garbage collection mechanism, relieving developers of manual memory management and ensuring efficient resource utilization.

• **Seamless Integration:** Python can be seamlessly integrated with other languages and platforms, such as C, C++, COM, ActiveX, COBRA, and Java. This interoperability enhances its versatility and applicability in diverse software ecosystems.

Initiating the Journey into Data Science

Data science delves into the exploration of data to derive valuable insights for business purposes. This interdisciplinary field harmonizes principles from mathematics, statistics, artificial intelligence, and computer engineering to analyze vast data sets. This analytical approach empowers data scientists to pose and answer critical questions, such as identifying past events, understanding their causes, predicting future occurrences, and leveraging the results for informed decision-making.

The Significance of Data Science

Data science plays a pivotal role by amalgamating tools, methodologies, and technology to extract meaning from data. In today's data-driven world, organizations face an abundance of data, with an increasing number of devices collecting and storing information. From e-commerce and medicine to finance and various aspects of life, we encounter an abundance of text, audio, video, and image data.

Evolution of Data Science

While the term "data science" has historical roots, its connotations have evolved over time. Initially coined as an alternative name for statistics in the 1960s, it gained formal recognition among computer science professionals in the late 1990s. Subsequently, data science was viewed as a distinct field encompassing data design, collection, and analysis. Despite its inception in

academia, it took another decade for data science to find broader applications outside academic realms.

Shaping the Future of Data Science

The future of data science is driven by revolutionary advancements in artificial intelligence and machine learning. These innovations have accelerated data processing, making it more efficient than ever before. The industry's demand for data science expertise has led to the establishment of comprehensive courses, degrees, and specialized job positions. With its cross-functional skillset and expertise requirements, data science is projected to experience robust growth in the years to come.

The Versatility of Data Science Applications

Data science serves as a powerful tool for studying data in four main ways:

Descriptive Analysis: Unveiling insights into past and current data trends through visualizations like charts and graphs.
**Diagnostic Analysis:** Conducting in-depth examinations to comprehend the reasons behind certain data occurrences.
Predictive Analysis: Using historical data to make accurate forecasts of future data patterns.
Prescriptive Analysis: Going beyond predictions to suggest optimal responses and recommend the best course of action based on data insights.

Data science's multifaceted applications empower businesses and industries to gain a comprehensive understanding of their data, make informed decisions, and shape their future strategies with confidence.

Data Science Methodology
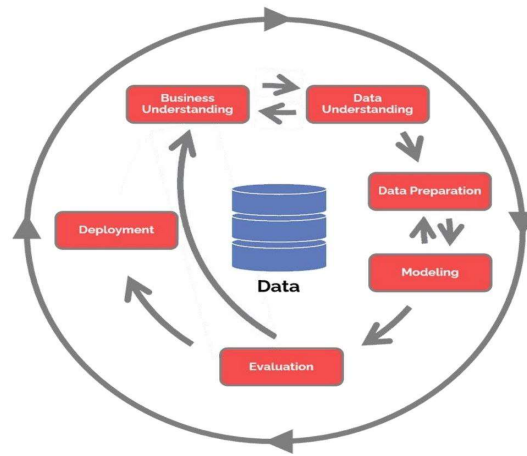
Data Science Life Cycle

The primary stages in the Data Science project lifecycle are as follows:

Business Understanding:

This initial phase emphasizes the importance of framing relevant questions for an organization's success, focusing on the quality of inquiries rather than the amount of data or computing resources. A notable example is Google's shift from asking "What constitutes relevant search results?" to "Which ads are relevant to a user?" as their business expanded. Correctly identifying key questions, such as Amazon's consideration of server usage during lean periods or Uber drivers' consistent income, is crucial before delving into data collection.

Data Collection:

Data serves as the essential ingredient after posing the right questions. Data scientists partition the problem into smaller components, determining the necessary ingredients, their collection methods, and how to prepare the data. Amazon, for instance, tracked server operation logs to assess server usage, leading to the creation of AWS.

Data Understanding and Preparation:

In this phase, information gathered is analyzed further, and data preparation takes place for subsequent analysis. The data must accurately represent the problem to be solved. Uber, for instance, collected data on drivers' earnings, ride completion, idle time, and fuel costs, while the latter wasn't directly relevant. Data statistics and visualization methods aid in understanding and preparing the data, involving steps like handling missing data, correcting errors, and organizing data for analysis.

Modelling:

Data modeling uncovers patterns or behaviors in data, facilitating either descriptive or predictive insights. Machine learning modeling consists of training, validation, and testing stages. Accurate model evaluation based on performance and relevance to the original question marks the end of the modeling process.

Deployment and Iteration:

Putting data science projects into practice is crucial, and deployment can occur through various platforms like apps or enterprise software. An iterative process is applied to fine-tune the methodology, with the majority of steps overlapping. Exploratory Data Analysis (EDA) is a crucial part of this, allowing data scientists to analyze and investigate datasets, understand patterns, detect anomalies, and test hypotheses before progressing to more advanced analyses or modeling.

Exploratory Data Analysis (EDA):

Exploratory Data Analysis (EDA) is an investigative approach for data analysis utilizing visual techniques. It is employed to uncover trends, patterns, or validate assumptions through statistical summaries and graphical representations.

What is exploratory data analysis?

Exploratory data analysis is a technique utilized by data scientists to scrutinize and examine datasets while summarizing their primary attributes, often employing methods of data visualization. It aids in determining optimal data manipulation strategies to derive desired insights, simplifying pattern discovery, anomaly identification, hypothesis testing, and assumption validation.

EDA primarily serves to unveil insights beyond formal modeling or hypothesis testing, facilitating a more comprehensive comprehension of dataset variables and their interrelations. It also assists in gauging the appropriateness of statistical techniques contemplated for data analysis. Originating from the work of American mathematician John Tukey in the 1970s, EDA techniques remain a widely embraced approach in contemporary data exploration.

Why is exploratory data analysis crucial in data science?

The central objective of EDA is to comprehensively assess data before formulating assumptions. It aids in identifying evident errors and enhancing comprehension of inherent data patterns, unveiling outliers or exceptional occurrences, and revealing intriguing relationships among variables.

Exploratory analysis empowers data scientists to validate the credibility and applicability of their findings concerning desired business objectives. Furthermore, EDA supports stakeholders in confirming the appropriateness of their inquiries. It also facilitates addressing queries pertaining to standard deviations, categorical variables, and confidence intervals. Following the completion of EDA and the derivation of insights, its findings can be harnessed for sophisticated data analyses and modeling endeavors, encompassing machine learning applications.

Aim of the Project

To conduct sentiment analysis on user reviews of products on Flipkart, utilizing data science techniques to extract valuable insights into customer sentiments, preferences, and satisfaction levels, contributing to a deeper understanding of user experiences on this prominent Indian ecommerce platform.

The objectives of the project are:

Sentiment Classification: Develop a robust sentiment analysis model capable of classifying user reviews into positive, negative, or neutral sentiments. This involves utilizing natural language processing techniques and machine learning algorithms to accurately gauge the emotional tone of the reviews.

User Satisfaction Trends: Identify and analyze trends in user satisfaction over time by examining the sentiment distribution in reviews. This objective aims to reveal patterns in customer sentiments, allowing for a deeper understanding of the factors influencing user satisfaction on Flipkart.

Product Preference Analysis: Investigate and categorize user sentiments towards specific product categories or brands on Flipkart. This objective aims to provide insights into consumer preferences and highlight popular products or brands based on sentiment, aiding in targeted marketing and inventory management.

Feedback for Improvement: Extract constructive feedback from negative sentiments to pinpoint areas of improvement for Flipkart. By analyzing negative reviews, the project seeks to identify common issues or pain points reported by users, enabling the platform to make informed decisions to enhance the overall online shopping experience.

4.1 Software Requirements

Scripting language   : Python Programming

Scripting Tool   : Anaconda Navigator (Jupyter Notebook)

Operating System   : Microsoft Windows 7, 8 or 10

Dataset   : online_review.csv

Machine Learning Packages : Pandas, Matplotlib , Seaborn ,nltk,wordcloudetc..

4.2 Hardware Requirements

Processor	:	3.0 GHz and Above
Output Devices	:	Monitor (LCD)
Input Devices	:	Keyboard
Hard Disk	:	1 TB
RAM	:	8GB or Above

SYSTEM DESIGN

1. **Data Collection:**
- Utilize the Flipkart product API for extracting reviews, ratings, and brand information.
- Gather data on customer sentiments from user comments on the platform.

2. **Preprocessing:**
- Clean the extracted data to remove noise and irrelevant information.
- Perform text preprocessing, including lowercasing, removing punctuation, and stemming.

3. **Feature Extraction:**
- Extract relevant features from the cleaned text data.
- Utilize natural language processing (NLP) techniques to identify key sentiments.

4. **Clustering:**
- Apply clustering algorithms like ROCK for grouping similar reviews.
- Group reviews based on content and sentiment to identify patterns.

5. **Classification:**
- Implement classification algorithms, such as CART, for labeling reviews as positive or negative.
- Train the model on labeled data to predict sentiment.

6. Visualization:

- Utilize Matplotlib, Seaborn, and WordCloud for visualizing sentiment distribution.
- Create charts and word clouds to present insights in an understandable format.

7. Insights and Recommendations:

- Derive insights into product popularity and customer satisfaction.
- Provide recommendations based on sentiment analysis for business improvement.

8. User Interface:

- Develop a user-friendly interface for stakeholders to interact with analysis results.
- Present visualizations, sentiment breakdowns, and recommendations.

System Architecture

System architecture is the structural design of a complex software system that outlines its components, relationships, and interactions. It serves as a blueprint for building and evolving the system, providing a high-level view of its organization and functionality. The primary goals of system architecture are to ensure scalability, reliability, maintainability, and efficiency throughout the software development and deployment lifecycle.

Key Components of System Architecture:

Components: System architecture defines the major components or modules that make up the entire system. These components encapsulate specific functionalities and are designed to interact seamlessly.

Communication Mechanisms: The architecture outlines how different components communicate with each other. This includes specifying communication protocols, data formats, and the methods used for inter-component communication.

Data Management: It addresses how data is stored, accessed, and managed within the system. This involves defining databases, data models, and strategies for data retrieval and storage.

Concurrency and Parallelism: System architecture considers how the system handles multiple tasks concurrently and in parallel. It defines mechanisms to ensure efficient resource utilization and optimal performance.

Scalability: A crucial aspect of system architecture is scalability—ensuring that the system can handle increased loads and user demands. This may involve strategies such as load balancing and distributed computing.

Security: Security measures, including authentication, authorization, and data encryption, are integrated into the architecture to safeguard the system against unauthorized access and data breaches.

Fault Tolerance and Reliability: System architecture addresses how the system continues to operate in the presence of failures. This may involve redundant components, error handling mechanisms, and failover strategies.

Performance Optimization: The architecture aims to optimize system performance by considering factors such as response time, throughput, and resource utilization. This may involve caching, indexing, and other performance-enhancing techniques.

CONCLUSION

- Most of the reviews are in favor of Neutral.
- The Negative review score has a small proportion, and Positive reviews are midway.
- we can conclude that most people are satisfied with the products and services they received from Flipkart.
- This states that sentiment analysis is a good process to gather insights into each product, which
- Ultimately benefit present and future customers and e-commerce companies.
- Sentiment analysis is important because, based on bad reviews, the e-commerce company makes
- Those products better or replaces those products with better and newer ones, which ultimately
- Improves the overall customer service too.

Outcomes:

SCREENSHOTs

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