

INSTASENSE

Sentiment Analysis of Instagram Content

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Abstract: INSTASENSE is an intelligent social media analytics application built using Flutter that leverages Instagrapi to perform real-time sentiment and engagement analysis of Instagram profiles. Unlike conventional analytics tools that focus solely on metrics such as likes or followers, INSTASENSE uses natural language processing (NLP) techniques through VADER Sentiment Analyzer to interpret the emotional tone of captions, comments and posts. It provides a holistic understanding of audience perception by classifying sentiments into positive, neutral and negative categories. Users can input public Instagram handle and INSTASENSE will generate an in-depth analysis report highlighting content performance, emotional insights and engagement insights. Designed for influencers, marketers and analysts, INSTASENSE bridges a gap between social emotion and digital strategy, empowering users to make data-driven content decisions that resonate with their audiences.

Keywords: INSTASENSE, Flutter, Sentiment Analysis, Instagram Analytics, VADER Sentiment Analyzer, Social Media Insights, NLP, Data Visualization.

1. Introduction:

Social media has become an integral part of modern digital communication, where millions of users share content, express opinions and engage with brands daily. Among all platforms, Instagram stands out as one of the most influential spaces for personal branding, marketing and audience engagement. However, as the platform continues to grow, understanding how users perceive and react to content has become increasingly complex. While traditional analytics provide surface-level metrics such as likes, followers and comments they fail to capture the emotional sentiment behind user interactions – the true essence of social influence. This is where INSTASENSE steps in. INSTASENSE is a Flutter-based application designed to deliver intelligent sentiment and engagement analysis of Instagram profiles by integrating Instagrapi and VADER Sentiment Analysis. It bridges the gap between quantitative metrics and qualitative insights by analysing captions, comments and engagement patterns to determine whether audience reactions are positive, neutral or negative. This approach enables users to go beyond numbers and truly understand how their audience feels about their content. The application continuously retrieves and processes real-time Instagram data, generating a detailed report that visualizes overall sentiment distribution. It simplifies social media analysis by transforming complex emotional and engagement data into easily understandable visuals through interactive charts and dashboards. Whether you are a social media influencer, brand strategist or digital marketer, INSTASENSE equips you with actionable insights to improve content strategy, boost engagement and build stronger audience connections. With the increasing competition in digital spaces, relying on manual observation or basic analytics is no longer sufficient. INSTASENSE eliminates guesswork by combining data-driven sentiment intelligence with real-time engagement monitoring, helping users make informed decisions. Designed with privacy,

accuracy and usability in mind, INSTASENSE represents a new step forward in social media analytics-offering a smarter,faster and more insightful way to understand and grow your digital presence.

2. Literature Review:

[1] **“Decision Making for Celebrity Branding: An Opinion Mining Approach Based on Polarity and Sentiment Analysis Using Twitter Consumer-Generated Content”** by Ali Nikseresht, Mohamma Hosein Raeisi, and Hossein Abbasian Mohammadi. The study explored how Twitter opinions support strategic decisions in celebrity branding.Using lexicon-based and Naïve Bayes classifier, tweets were categorized into positive, negative and neutral sentiments.Results showed that sentiment analysis provides useful insights for selecting celebrity endorsements and shaping marketing campaigns.

[2] **“A Comprehensive Tool for Authenticating Instagram Profiles Using Instaloader”** by Yash Shukla, Sameer Awasthi, Yogesh Shukla, Samraddhi Saurabh Pathak, and Karan Verma.This study developed a Python-based tool using Instaloader to extract Instagram data such as followers, engagement, and posting frequency.It assists in influencer profiling, digital marketing and competitor analysis while highlighting limitations like private account restrictions and rate-limiting.

[3] **“Virtual Influencers on Instagram: A Text Mining Study of Consumer Sentiment in China”** by Puneett Bhatnagr .The paper analyzed 20,000 Instagram comments using lexicon-based sentiment analysis to study public perception of virtual influencers.Results revealed both positive themes(creativity) and negative themes(deception, commercialization).It concluded that authenticity and creativity are key for brand success.

[4] **“Five Years of COVID-19 Discourse on Instagram”** by Nirmalay Thakur.This study analyzed 200,153 multilingual Instagram posts (2020-2024) using VADER and XLM-RoBERTa for sentiment classification.Findings showed a decline in positive sentiment and rise in neutral tone over time,reflecting changes in public emotion during the pandemic.

[5] **“Sentiment Analysis on Social Media Instagram of Depression Issues Using NB Method”** by Voni Anggraei Suwito Putri et al.The study analyzed 1,300 Instagram comments on depression using Naïve Bayes, achieving 79-82.5% accuracy. Results showed that simple ML models can effectively detect sentiments in health- related discussions.

[6] **“Machine Learning and Natural Language Processing to Assess the Emotional Impact of Influencers” Mental Health Content on Instagram”** by Noemi Merayo, Alba Ayuso-Lanchares, and Clara Gonzalez-Sanguino.Publishes in PeerJ Computer Science, the paper applied AI and NLP to classify 21,000 Instagram comments into emotional categories like love,empathy, sadness and anger.The hybrid deep learning model achieved 72.5% accuracy,demonstrating how AI can analyze emotional reactions to influencer content.

3. Research Methodology:

The research methodology for the INSTASENSE project followed a systematic and user-focused approach aimed at building an intelligent, reliable and efficient Instagram sentiment analysis application.The development process combined cutting-edge technologies with a design philosophy centered on simplicity, interactivity and accuracy.Each stage of the methodology ensured that the applications provided real-time insights and meaningful analytics through an intuitive interface.

Following agile development principles, the project was executed in iterative cycles, enabling a continuous testing, feedback incorporation and refinement of features.The primary objective was to create a system capable of fetching,analysing and visualising Instagram data dynamically while maintaining high performance and scalability.The methodology emphasized data accuracy, user experience and system responsiveness to meet the expectations of modern digital analysts and social media enthusiasts.Below is a breakdown of the core technologies used in this project and their roles:

- **Flutter (Front-end Development):** Used to build the cross-platform mobile interface, ensuring seamless performance and a consistent user experience on Android devices through a single codebase.
- **Instagrapi (Data Extraction):** Utilised to collect real-time data from public Instagram profiles, including usernames, captions, comments and follower details serving as the backbone for content analysis.
- **VADER Sentiment Analyzer (Natural Language Processing):** Integrated for performing sentiment analysis on textual data such as captions and comments, determining the overall sentiment as positive, neutral or negative
- **MongoDB (Back-end & Database Management):** Implemented to handle data storage, retrieval and management efficiently. MongoDB's NoSQL structure allowed flexing handling of unstructured Instagram data, such as captions and comments, ensuring scalability and fast query performance. It securely stores analysed sentiment data enabling smooth synchronisation between analytical processes and the application interface.
- **Manually Created Models and Controllers:** Custom-built models and controllers to handle data parsing, analysis and display logic, ensuring smooth communication between user interface, database and analytical modules.
- **Dart Language:** Powered the application's logic, handling asynchronous operations efficiently – such as API calls, data processing and real-time sentiment updates – ensuring smooth user experience and fast data response times.

By integrating these technologies, the INSTASENSE application delivers a comprehensive and interface platform for social media sentiment and engagement analysis. The research methodology ensured that the final system was accurate, responsive and user-friendly, offering valuable insights for content creators, marketers and digital analysts to optimise their Instagram strategies effectively.

4. Results:

The INSTASENSE project successfully achieved its primary objective of developing an intelligent, real-time Instagram sentiment analysis application. The system enables users to easily analyse public Instagram profiles to understand audience reactions, sentiment trends, and engagement behaviour. By combining Instagrapi, VADER Sentiment Analyzer and MongoDB the application provides accurate, data-driven insights through a modern and visually appealing surface. Below are the key outcomes reflected through the user interface design and functionality.

[1] **Home Page:** The home Page features a clean, interactive dashboard where users can enter their Instagram ID, password and target username to perform sentiment analysis. It also displays a history of previously analyzed profiles, enabling users to revisit or reanalyze past profiles easily. The interface is designed for simplicity, ensuring a smooth and intuitive experience while initiating the analysis process.

[2] **Analysis Page:** The Analysis Page displays sentiment breakdown of Instagram posts and comments, categorized as positive, neutral or negative using the VADER Sentiment Analyzer. The results are visualized through interactive graphs and percentage charts, giving users a clear understanding of the audience's emotional response towards the content. This helps influencers, marketers and analysts evaluate content perception and make better engagement decisions.

The overall outcome highlights INSTASENSE ability to convert unstructured Instagram data into meaningful insights. By combining efficient data extraction, natural language processing and visual analytics, the application offers a responsive, accurate and user-centric platform. The successful implementation of its features analysts aiming to optimize their online engagement strategies.

5. **Conclusion:**

We are pleased to announce the successful design, development and deployment of the INSTASENSE application aligning with the goal outlined in the initial project proposal. The development process was carried out with careful attention to accuracy, performance and user experience, ensuring a robust and dependable solution for social media sentiment and engagement analysis. The project successfully addressed one of the key challenges faced by digital marketers and influencers – the difficulty of understanding audience sentiment beyond surface-level engagement metrics. By integrating Instagram API for data extraction and VADER Sentiment Analyzer for emotion detection, INSTASENSE provides users with a deeper understanding of how their audience perceives their content. The inclusion of data visualization dashboards further enhances clarity, allowing users to interpret emotional trends and engagement patterns effectively. Through this project, we demonstrated how combining data-driven analytics, machine learning techniques and intuitive UI design can transform the way social media insights are gathered and interpreted. The application empowers users to make informed content and marketing decisions, brand image and audience relations.

Looking ahead, the team aims to expand the functionality of INSTASENSE by integrating multi-platform social analytics such as Twitter and Youtube, incorporating advanced NLP models for emotion detection and adding predictive analytics to forecast engagement trends. Our ongoing commitment is to enhance the convenience, scalability and analytical depth of the system, ensuring that INSTASENSE continues to serve as an intelligent and reliable tool for the evolving world of social media analytics.

6. **Reference:**

- [1] **Decision Making for Celebrity Branding: An Opinion Mining Approach Based on Polarity and Sentiment Analysis Using Twitter Consumer-Generated Content** by Ali Nikseresht, Mohammad Hosein Raeisi, and Hossein Abbasian Mohammadi.
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