Mention Monitoring

Lan Rong, Wang Yuhua, Yan Yucheng, Yin Zhefan

Executive Summary

This executive summary part provides a comprehensive overview of our innovative cloud-based application, "Algorithm-Based Sentiment Analysis and Automatic Summary for Business Public Opinion Monitoring System." The application is specifically designed to assist businesses in effectively monitoring, analyzing, and understanding customer sentiments and feedback gathered from social media platforms and review websites. Our solution offers a holistic approach with four core functionalities:

Automated Monitoring: Our application diligently searches for and records mentions of the business on various social media platforms and review websites on a daily basis. This process ensures that businesses have access to the most current information and can identify trending topics and potential issues in real-time. By automating this process, businesses can save valuable time and resources that would otherwise be spent on manual monitoring.

Advanced Data-Visualization: The application processes the collected data and presents it in an easily digestible, visual format. It compares the business's performance with similar competitors, offering a comprehensive view of their standing in the market. Additionally, users can explore recent reviews through word clouds and interactive charts that highlight emerging trends and patterns. This feature enables businesses to quickly grasp the overall sentiment and key themes in customer comments, providing valuable insights to inform future strategies and improvements.

Intelligent-Summarization: To further enhance the user experience, our system automatically generates concise summaries of customer comments and reviews. By extracting the most relevant keywords and key points, businesses can quickly understand the primary concerns and praises of their customers without having to read through all the comments. This feature streamlines the review process and allows businesses to focus on actionable insights.

Self-Sentiment Analysis: Utilizing advanced Natural Language Processing (NLP) and Machine Learning (ML) models hosted on AWS's ML server, our application is capable of analyzing and interpreting the emotions and feelings expressed in customer comments. The system automatically assigns "positive" or "negative" tags to each comment and review, making it easy for businesses to identify areas where

they excel and areas that require improvement. This data-driven approach enables businesses to make informed decisions and prioritize their efforts to enhance customer satisfaction.

This innovative application is a valuable tool for businesses looking to monitor and analyze customer sentiment effectively, ultimately helping them improve customer satisfaction, brand reputation, and business growth.

In conclusion, our application offers a comprehensive and efficient solution for businesses to monitor and analyze customer sentiments and feedback. By leveraging state-of-the-art cloud-based technologies and automation, our application empowers businesses to better understand their customers, make data-driven decisions, and improve their overall customer experience. Investing in our solution can lead to increased customer loyalty, enhanced brand reputation, and ultimately, business growth.

Business Case Identification

Problem Statement and Formulation

Many businesses struggle with tracking their public opinion online due to the sheer volume of data available on social media, blogs, and news sites. Manual monitoring of all these sources is time-consuming and prone to errors. Additionally, it is difficult to identify and analyze sentiment trends in real-time. As a result, businesses may miss important feedback from customers and stakeholders, leading to missed opportunities or potential reputation damage.

Our SaaS service, Algorithm-Based Sentiment Analysis and Automatic Summary for Business Public Opinion Monitoring System, aims to solve this problem by providing an automated tool that can monitor and analyze public opinion data in real-time, delivering accurate and actionable insights to businesses.

Purpose and Target Users

The purpose of our SaaS service is to help businesses monitor public opinion data and gain insights into customer and stakeholder sentiment in real-time. This tool can help businesses make data-driven decisions, improve customer satisfaction, and protect their reputation.

Our target users are businesses of all sizes and industries, including marketing and PR departments, customer service teams, and executive management. By using our service, these users can save time and resources on manual monitoring and gain deeper insights into public opinion data.

Comparison with Available Services

Currently, there are other sentiment analysis and monitoring tools available on the market, but many of them have limitations such as the lack of accuracy.

Our SaaS service sets itself apart by using advanced algorithms to provide accurate sentiment analysis across multiple languages and sources, and by delivering automatic summaries of key trends and insights.

Business Model

Our business involves offering analysis service for business owners that want to improve customer engagement and satisfaction. Our service will help them collect customers' feedback data from various sources such as public websites and social media and provide automated tools to analyze the data. The insights gained from the analysis can help their businesses to identify areas of improvement, detect customer pain points, and optimize customer service strategies. In addition, our analysis service is designed to be user-friendly and accessible, even for those people who may have less experience with data analysis. Clear and concise reports will be provided that can highlight key findings and recommendations. As a result, it is easy for any business owners to understand and act on the insights gained from the analysis.

The revenue model for our services can vary depending on the services. Some services may charge a flat fee for their use, while others may charge based on the volume of comments analyzed. Basic service (like auto seizing comments on websites) might charge by amount.

Some services may also offer tiered pricing plans based on the level of analysis and instructions provided. For a basic level, our service may only contain the basic part of seizing and displaying raw reviews. And a plus service, which will charge by subscribing fee monthly, may provide further service like sentiment analysis etc. Our business can be applied to various industries, such as retail, little clinics, and restaurants. For example, a restaurant chain could use our auto-sentiment analysis service to monitor customer's feedback on social media and identify areas where they need to improve their food quality or customer service. A clinic could use auto-sentiment analysis to monitor patient feedback and improve their services accordingly. For some hotels, our services could help hosts monitor and analyze feedback left by guests on their property listings so that they are able to improve the quality of service.

Based on our business model mentioned above, we will come out with our revenue table shown below.

Service	Pricing Model	Price/Volume
Basic Comment Seizing	Flat fee	$19.99 per month/ $95.99 per 6-months/ $155.99 per 12-months
Auto-Sentiment Analysis	Volume-based	$0.1 per comment
Volume-based Comment Summarization	Volume-based	$0.1 per comment
All Included Plan	Subscription-based	$44.99 per month/ $249.99 per 6-months/ $499.99 per 12-months
On-site/online training and support	Freemium	-

Compared with using on-premise IT resources, using our proposed SaaS service has several advantages. Our proposed SaaS service is highly scalable, which means that our system can easily handle an increase in the number of users and data volume without affecting the performance of the application. Moreover, our proposed SaaS service is accessible from anywhere with an internet connection, allowing users to access the application from various devices and locations. Using our proposed service also reduces the burden of maintenance on the client. Considering our target customers are owners of small businesses, it is much more reasonable to use our proposed SaaS service instead of developing their own. In summary, our proposed SaaS service is highly scalable, accessible from anywhere, and requires less maintenance.

AWS Service	Costing
AWS RDS	$50.59 / month
AWS SageMaker	$14.26 / month
AWS Elastic Beanstalk	$15.00 / month

SaaS Architecture & Implementation

Our SaaS solution utilizes a robust three-tier architecture, consisting of a presentation layer, an application layer, and a data layer, designed to optimize performance and user experience.

The presentation layer boasts a sleek, interactive user interface, crafted with the React framework and Material UI libraries. This state-of-the-art interface guarantees an engaging and intuitive user experience.

Within the application layer, we developed RESTful APIs using Java Spring Boot to efficiently manage user requests. We integrated advanced NLP models for sentiment analysis and summarization of social media mentions to provide valuable insights. After rigorous testing of various high-performing pre-trained models from HuggingFace on our dataset, we selected cardiffnlp/twitter-xlm-roberta-base-sentiment for sentiment analysis and knkarthick/meeting_summary for comment summarization, ensuring exceptional results. To boost inference speeds, we deployed these models on AWS SageMaker using ml.m5.xlarge instances.

The data layer is built upon a MySQL database hosted on AWS RDS, which offers high availability and scalability. This robust foundation supports our application's data management needs, allowing it to adapt and grow alongside our user base.

Economic Factors

The "Algorithm-Based Sentiment Analysis and Automatic Summary for Business Public Opinion Monitoring System" provides numerous economic benefits to businesses. In this section, we will discuss the key economic advantages, considerations, pricing models, and the tradeoff between cost and Service Level Agreement (SLA) compliance.

Economic Benefits:

1. Cost savings: The automation of monitoring, summarization, and sentiment analysis reduces the need for manual labor, lowering operational costs. Additionally, the cloud-based infrastructure allows businesses to scale resources according to their needs, ensuring cost-effective utilization.

2. Improved decision-making: By providing actionable insights, the application enables businesses to make informed decisions that can lead to cost-effective improvements in customer satisfaction, brand reputation, and overall business growth.

3. Enhanced customer retention: By understanding and addressing customer feedback, businesses can improve customer satisfaction and loyalty, leading to increased long-term revenue.

Key Considerations:

1. Implementation cost: Businesses need to consider the initial cost of implementing the cloud-based system, including integration with existing systems, staff training, and ongoing maintenance.

2. Data privacy and security: Ensuring data privacy and compliance with relevant regulations may require additional investments in security measures and infrastructure.

Pricing Models:

1. Subscription-based model: In this model, businesses pay a monthly, 6-months or annual fee for access to the application and its features. Subscription tiers can be introduced based on the size of the monitored dataset or the number of available features.

2. Pay-as-you-go model: This model allows businesses to pay only for the resources they consume, ensuring cost-effective utilization. Businesses can be charged based on the number of processed comments, analyzed sentiments, or generated summaries.

Tradeoff between Cost and SLA:

Balancing cost and performance: It's crucial to find the right balance between cost and performance to ensure the application meets the desired SLA requirements. Higher performance may require increased infrastructure investment but can lead to better customer satisfaction and reduced downtime.

Customizable SLAs: Offering customizable SLAs based on business requirements can help address the tradeoff between cost and performance. Businesses can choose the appropriate SLA level according to their needs, ensuring they receive the desired level of support without incurring unnecessary expenses.

In conclusion, understanding the economic factors associated with the "Algorithm-Based Sentiment Analysis and Automatic Summary for Business Public Opinion Monitoring System" will enable businesses to maximize the benefits and minimize the costs associated with the application. By considering these factors and adopting the appropriate pricing model, businesses can ensure they receive a cost-effective solution tailored to their needs.

Conclusion

In conclusion, the innovative cloud-based application "Algorithm-Based Sentiment Analysis and Automatic Summary for Business Public Opinion Monitoring System" offers businesses an efficient and comprehensive solution to monitor, analyze, and understand customer sentiments and feedback from various online platforms. By leveraging state-of-the-art technologies and automation, our application enables businesses to make data-driven decisions, ultimately improving customer satisfaction, brand reputation, and fostering growth. In addition, the economic factors discussed in this paper highlight the cost savings, improved decision-making, and enhanced customer retention that businesses can achieve by implementing our solution. With a careful consideration of the tradeoffs between cost and performance, businesses can adopt the appropriate pricing model and SLA level that best suits their needs, ensuring a tailored and cost-effective sentiment analysis solution.