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UNBOXING FEELINGS: MEASURING IPHONE HAPPINESS THROUGH SENTIMENT

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INTRODUCTION

The iPhone is widely recognised not just as a smartphone but a global icon of innovation, style, and technological advancement. Each new release generates significant public attention, with millions of users expressing excitement, sharing opinions and occasionally, voicing concern. Common issues raised include pricing, battery performance, and camera quality, often in comparison with competing brands (Kumar et al. 2025). Understanding this user sentiment is crucial for evaluating overall product satisfaction. This study investigates how sentiment analysis can produce an accurate classifier model for examining text to detect opinion or emotional tone that can be applied to measure iPhone users' happiness and satisfaction level. Besides that, this study can uncover recurring themes and highlight key concerns within the feedback.

Sentiment analysis involves collecting and processing textual data from sources such as customer reviews, online forums, and social media discussions (Bourequat & Mourad, 2021). Using natural language processing (NLP) techniques, each comment is classified as happy or unhappy. This allows researchers to identify the trends in user satisfaction at scale rather than relying on individual opinions

METHODOLOGY

This study adopted the Cross Industry Standard Process for Data Mining (CRISP-DM) framework to guide the sentiment analysis of iPhone product reviews. CRISP-DM provides a structured and iterative approach consisting of six phases: business understanding, data understanding, data preparation, modelling, evaluation, and deployment, as depicted in Figure 1. Its flexibility makes it widely applicable in data-driven research, particularly in text mining and sentiment analysis (Kurniawan & Yasir, 2022).

In this study, CRISP-DM was used to systematically analyse user-generated content related to iPhones to uncover patterns of customer happiness and unhappiness. The business understanding phase established the research objective of identifying prediction model of iPhone sentiment, key sentiment trends in product reviews, and gaining insights into customers' experiences, preferences and areas for improvement about iPhone products. The data understanding phase involved collecting review data from bestbuy.com, trustpilot.com, consumeraffairs.com and walmart.com using the Instant Data Scraper method. A total of 1331 records were gathered, followed by conducting an initial exploration of sentiment distribution. The dataset collected consists of a few important features such as user name, date and the review comment. During data preparation, textual data underwent preprocessing steps such as aggregation of data from different sources, removing duplicate records, tokenization, stop-word removal, stemming, and vectorization to ensure suitability for modelling. The polarity of the records was determined using a sentiment dictionary and manually rechecked to ensure accuracy

The modelling phase applied sentiment classification techniques to categorize reviews into happy and unhappy sentiments. Model performance was assessed in the evaluation phase using accuracy, precision, sensitivity and specificity to ensure reliability of insights. Finally, the deployment phase focused on interpreting the results to highlight consumer perspectives and provide actionable insights for product improvement and customer engagement strategies.

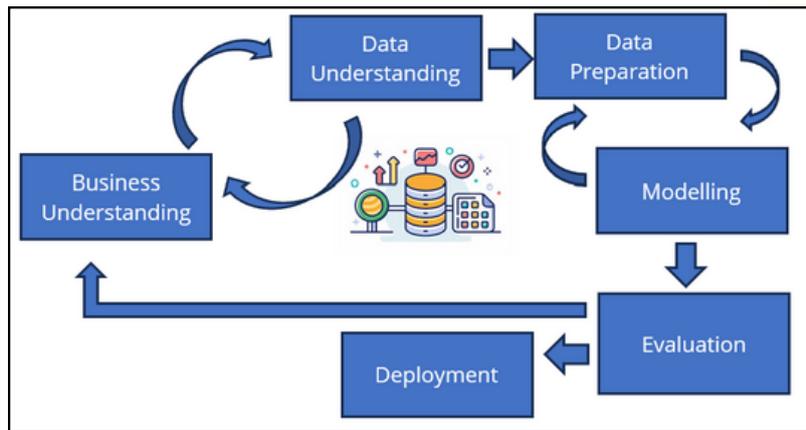


Figure 1: Crisp-DM Methodology of Sentiment Analysis of iPhone Product

RESULT AND DISCUSSION

This section presents the findings of the iPhone happiness through sentiment analysis, focusing on both descriptive and predictive insights. The descriptive analysis highlights sentiment trends over time, enabling the monitoring of customer perceptions and the identification of recurring issues and satisfaction drivers. Similarly, the predictive analysis evaluates the performance of sentiment classification models in predicting future sentiment patterns.

Reviews from 2013 to 2025 were collected from different websites and sorted into happy and unhappy categories during preprocessing. From all the reviews collected, 85.5% expressed happy sentiment, and 14.5% expressed unhappy sentiment or bad experience. Based on Figure 2, from 2013 to 2016, the number of customer reviews was relatively low but a significant increase occurred in 2017 and 2018. However, the volume of reviews declined between 2019 and 2022. The highest number was recorded in 2023 with 276 reviews, peaking at 253 happy reviews. Although the total decreased to 229 in 2024, it still remained relatively strong. In 2025, the number of reviews rise again to 261, reflecting renewed customer engagement. Meanwhile, happy reviews followed a similar trend, remaining low from 2013 to 2016, then increasing in 2017, before dropping again between 2019 and 2022, with a low review in 2020. Unhappy reviews remained consistently low between 2013 and 2016, followed by a slight increase in 2017 and again in 2021, before reaching their peak in 2025. Overall, customer satisfaction with the iPhone varied, with high satisfaction in 2023 and a spike in unhappy reviews in 2025, suggesting periods of dissatisfaction linked to certain product releases. This emphasizes the importance of continuous product improvement and responsiveness to user feedback.

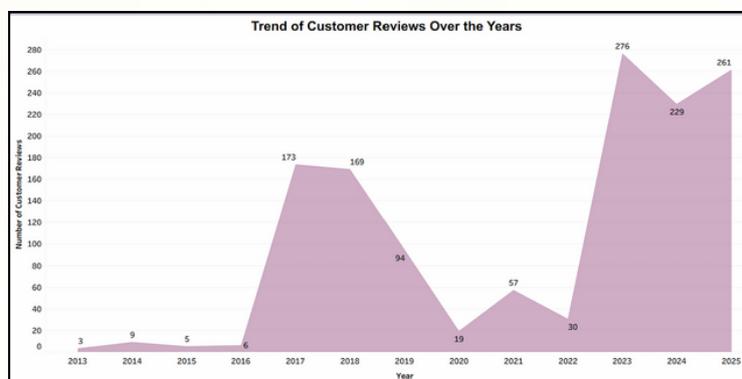


Figure 2: Trends of Customer Reviews Over the Years

Figure 3 below shows six most popular words in reviews which are application, battery, work, camera, purchase and screen. Among the analysed keywords, camera was associated with the highest proportion of positive sentiment, with 88.65% of reviews classified as happy. In contrast, the keyword 'application' recorded the lowest percentage of positive sentiment at 66.96%. The analysis indicates that iPhone users are most satisfied with the camera. In contrast, 'applications' were associated with the lowest level of positive sentiment, suggesting that while core features such as the 'camera' are strong contributors to customer satisfaction, software-related experiences may still require for improvement.

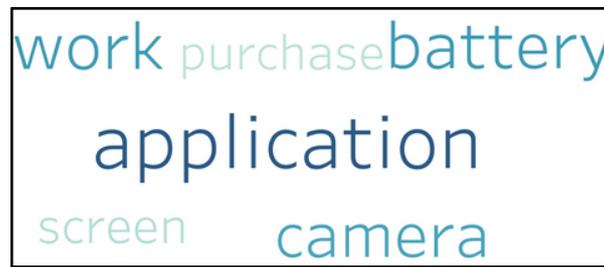


Figure 3: Popular Words in iPhone Review

For predictive insight, the experiments were conducted to identify the most effective prediction model of iPhone sentiment using three different classification algorithms; Decision Tree, Naive Bayes and K-Nearest Neighbour. The performance of the model was evaluated using accuracy, sensitivity, specificity and precision. The table 1 present the results of the experiment.

Table 1: Model Performance of iPhone Sentiment Happiness Prediction

Algorithms	Accuracy	Sensitivity	Specificity	Precision
Decision Tree	99.39%	99.91%	100%	99.38%
Naive Bayes	66.42%	72.79%	33.33%	86.99%
K-Nearest Neighbor	85.23%	98.13%	11.95%	86.48%

The Decision Tree achieved the best overall performance with 99.39% accuracy, 99.91% sensitivity and 100% for specificity. Naive Bayes showed the weakest performance, with moderate accuracy (66.42%) and very low specificity (33.33%). K-Nearest Neighbor performed better than Naive Bayes with 85.23% accuracy and high sensitivity (98.13%), conversely its specificity was low (11.95%). These results indicate that the Decision Tree model is highly effective in distinguishing between happy and unhappy user sentiment.

In conclusion, the analysis of iPhone reviews highlights a fluctuating customer sentiment, with periods of high satisfaction and dissatisfaction. To maintain positive user experiences, the iPhone company should focus on addressing customer concerns, enhancing product features, and improving its NLP and machine learning algorithms for more accurate sentiment analysis. Additionally, refining business strategies and development based on customer feedback will help ensure continued growth and success in a competitive. However, this study has a few limitations. The dataset was imbalanced, with many more happy reviews than unhappy ones, which reduced the models' ability to detect negative sentiment. In addition, the reviews were only collected from a few websites, so they may not fully reflect the experiences of all iPhone users. For future work, more diverse data sources should be included, and data balancing techniques or advanced models can be used to improve the accuracy and reliability of sentiment detection.

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