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# AI-Driven Sentiment Analysis for IT Service Improvement: Leveraging Digital Marketing Data to Enhance User Experience

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#### Abstract

The advancement of artificial intelligence in different industries has also changed the face of business especially IT service Management. In this work, we investigate the use of big data analytics and specifically sentiment analysis to assess the potential of enhancing IT service delivery through incorporation of digital marketing data for improved user satisfaction. This study seeks to show that through the application of AI, it is possible to identify content and sentiment of the users from digital marketing channels including social media, reviews and forums in relation to IT service strategy. We then employed these models based on advanced AI algorithms for sentiment classification and analysis to real large datasets of user feedbacks to generate relevant information. The research design is a quantitative sentiment analysis study where qualitative user experience evaluation is integrated to determine the effectiveness of AI solutions. It is established that the sentiment analysis models can be used to predict the trends in user satisfaction and hence point out the areas that need attention in IT services. This study's contribution is to combine digital marketing data, a research object that is not commonly used in the context of IT service management, to connect the marketing understanding with service execution. This paper extends the current research in the following ways by presenting real data on the applicability and effectiveness of AI for sentiment analysis to enhance IT services. It has identified the use of digital marketing data as a useful tool to help IT managers improve service quality

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and user experience. The conclusion of this research has important implications for organisations that are interested in improving customer satisfaction and organisational performance.

Keywords: Sentiment Analysis, AI, IT Service Improvement, Digital Marketing Data, User Experience

#### **INTRODUCTION**

Artificial intelligence (AI) has progressed so rapidly that it is revolutionising several sectors, especially the IT service sector, in which AI contributes to improved user experience. Sentiment analysis is one such NLP technique that interprets and classifies human emotions and opinions from text data, and it is one of the most promising applications of AI in this field. The ability to analyze sentiment from vast amounts of unstructured data, including customer reviews, social media posts and forum discussions, has brought sentiment analysis a lot of attention. As organizations compete in a digitized world, the need to enhance IT service delivery using AI driven sentiment analysis has become more apparent to optimize service resources and improve user satisfaction.

It has also been recognized that digital marketing data contributes significant importance to improve IT services. While businesses are continuing to scoop up customer data across various online platforms, there is a huge wealth of feedback to work with in order to glean valuable insights. To make decisions about product development, advertising strategy, and consumer behavior predictions, traditional marketing data has been analyzed. Its potential application in the improvement of IT services has been little explored. Through the use of sentiment analysis, IT service managers can use user feedback on digital marketing platforms, such as social media, online reviews and customer forums, to measure customer satisfaction and pinpoint areas where services are not quite up to scratch.

In this paper, filling this gap, an attempt is made to explore the possibility of using AI driven sentiment analysis to enhance IT services by processing digital marketing data as its primary resource. The study seeks to answer the following research questions: What are the uses of sentiment analysis to IT service improvements based on a digital marketing data? How do the insights derived from user feedback help us optimize IT service strategies? Additionally, the research determines whether digital marketing data, when integrated with AI tools, offers a competitive advantage in the provision of better IT services when compared to matches to user expectation.

However, there has been little or no research on sentiment analysis in the area of IT service improvement. Current studies are mainly limited to sentiment analysis for customer services management, social media monitoring or marketing campaigns. But functionality in optimizing IT service management, using digital marketing data, has not been established well. This paper makes a contribution to the literature by providing empirical evidence of the benefits of AI powered sentiment analysis for enhancing IT service delivery and user experience. The contribution of this research is to explore yet underutilized potential of digital marketing data to enable IT service management.

Further, this research also fills in the growing demand for businesses to stay agile and responsive to user feedback. Customer satisfaction is the key success determinant in a highly competitive digital environment. This is why using AI powered sentiment analysis to drive actionable insights that allow a business to beat its customers' needs, and keep on improving services is a necessary resource. This study can have critical implication for IT service managers as the results suggest that sentiment analysis can



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serve as a strategic tool to identify improvement areas, streamline service delivery, and in addition, contribute toward improving user experience.

#### I. LITERATURE REVIEW

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Artificial intelligence (AI) in sentiment analysis has applications in many industries and the IT service management service is no exception. Sentiment analysis is one of the AI driven use cases that uses Natural Language Processing (NLP) techniques to glean insights from large amounts of unstructured data, like customer feedback, social media posts and online reviews, etc. Over the year's sentiment analysis has progressed from keyword-based techniques to advanced machine learning algorithms that can interpret context and nuances in human language<sup>1</sup>. Bonin et al.<sup>2</sup> explain that the IT service industry needs to incorporate AI to provide a better customer service, optimize service delivery, and satisfy users better<sup>3</sup>.

In the IT services world, user feedback is essential for finding things that need to be improved. Typically, traditional methods of collecting customer insights (i.e., surveys and interviews) are limited in scope and scalability. However, sentiment analysis provides a hands down more dynamic and scalable way of crunching the inspiring pool of feedback that millions of customers leave on digital marketing platforms such as social media and online reviews<sup>4</sup>,<sup>5</sup>. It has also been shown that analyzing customer sentiments from these platforms can support IT service managers in their decision making on how to improve service quality<sup>6</sup>.

In digital marketing data, AI driven sentiment analysis can greatly improve the IT services. Companies can put focus on user feedback received on social media, customer support interactions, and product reviews to get a better understanding of customer needs<sup>7</sup> and<sup>8</sup>. These data sources can be used to train the AI models that predict customer dissatisfaction and they can identify patterns that require intervention<sup>9</sup>,<sup>10</sup>. Sentiment analysis has already been used in marketing for tracking brand perception and customer satisfaction levels<sup>11</sup>,<sup>12</sup>, which could also be applied for IT services for optimizing service offerings.



Figure 1: Sentiment distribution across multiple platforms for IT service feedback.

Figure description: This chart visualizes the sentiment distribution across multiple digital marketing pla-



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tforms, including social media, customer review sites, and forums. The sentiment is categorized into positive, neutral, and negative sentiments, providing an overview of how different platforms reflect customer satisfaction regarding IT services. The chart helps identify areas where sentiment is most concentrated, indicating where IT services may be excelling or need improvement.

This chart highlights the significant variation in sentiment across different platforms, underscoring the importance of analyzing feedback from multiple sources. Social media platforms like Twitter and Facebook often reflect more immediate reactions, while review sites like Trustpilot may provide more in-depth insights into user experiences. By comparing sentiment across these platforms, IT service managers can tailor their strategies to address concerns raised in negative feedback and build on positive sentiment.

New research has identified that sentiment analysis can be integrated with other Artificial Intelligence (AI) techniques like machine learning or deep learning to enhance IT service management. Sentiment analysis can be improved with machine learning algorithms by learning and improving predictions on an increasingly large dataset<sup>13</sup>. Convolutional neural networks (CNNs) and recurrent neural networks (RNNs ) have been used to understand context and emotional tone in customer feedback<sup>2</sup>,<sup>14</sup>. More accurate sentiment classifications with these advanced methods can directly feed into IT service strategy improvements<sup>15</sup>.

Despite this, the use of AI based sentiment analysis in IT service management has some challenges. An important issue is the need for a large amount of high quality, labeled data used to train models for sentiment analysis<sup>16</sup>. Customer feedback data often is noisy in many cases or inconsistent, so training AI models on it becomes more difficult. Moreover, the sentiment of users evolves over time, making it difficult to construct accurate sentiment analysis models<sup>17</sup>. However, researchers believe that with proper data preprocessing and model fine tuning, AI can substantially enhance the sentiment analysis of expertise services<sup>18</sup>.

In addition, sentiment analysis combined with digital marketing data presents a unique chance to improve IT service delivery. Commercial research indicates that user generated content is plentiful in digital marketing platforms as they are a rich source of observing customer sentiment across various touchpoints<sup>19</sup>. Social media, product reviews, and online forums are examples of these platforms, that often reflect real time customer experience with real time feedback to IT service providers<sup>20</sup>. Sentiment analysis and insights from digital marketing data can be combined in order to help businesses react proactively to customer concerns and improve service quality.

Recent literature has well documented the potential benefits of sentiment analysis based on AI for IT service improvement, but much remains to be investigated. Most of the existing works are primarily dedicated to customer service applications, and only a few report the direct influence on IT services. With companies getting more dependent on digital marketing data to engage with customers, sentiment analysis can be a strong tool for IT service managers' strategies to provide better user experiences. In order to fill these gaps, this paper applies AI driven sentiment analysis to innovate IT services using digital marketing data.

#### II. METHODOLOGY

An AI driven sentiment analysis-based approach to applying digital marketing data to improve user exp-



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erience for IT service improvement is investigated in this study by a mixed method approach. In this study the methodology integrates qualitative and quantitative elements of research, with the emphasis on analyzing customer feedback data extracted from different digital marketing channels, such as social media, online reviews and customer service interactions. The research method is observational and exploratory wherein we explore the relationship between user sentiment and IT service performance, and also test the capacity of the AI models to extract meaningful insights from big data.

This study uses publicly available customer feedback data from popular digital marketing platforms to collect relevant data. Primary sources of user generated content are social media platforms, e.g. Twitter, Facebook, customer review sites, e.g. Yelp, Trustpilot, and forums discussing IT services. IT services feedback data is collected via automated web scraping tools that collect user reviews, posts and feedback containing comments of the services. These platforms represent a rich source of unstructured textual data, which reflect the real time experiences and sentiments of users. These platforms were selected for their heavy use and the variety of opinions and sentiments provided by users about IT services.

As for sentiment analysis, the study handles the textual data by using several AI driven techniques. First the data is preprocessed to remove noise, stop words, irrelevant words, special characters etc. They then feed the preprocessed data through sentiment analysis models (machine learning algorithms like support vector machines (SVM) or deep learning models like convolutional neural networks (CNNs) or recurrent neural networks (RNNs)). These classifies sentiment (positive, negative, neutral) on customer reviews and are trained on labeled datasets. In addition, in this study, the machine learning models have been trained using a dataset of over 10K labeled reviews thus the machine learning models are able to correctly identify sentiment throughout different users' opinions.

Performance metrics including accuracy, precision, recall, and F1 score were used to evaluate the performance of the AI models in identifying sentiment within the sentiment classification and detecting patterns in user feedback. It also studies the case where sentiment scores are correlated with the actual IT service improvement, including response time, issue resolution rate, and customer satisfaction score. The study analyzes these correlations so as to determine if sentiment trends biomarkers, uncovered by AI driven sentiment analysis, could be used to forecast service quality and user experience outcomes.

Given the production of user-generated data this research needs to take into account ethical considerations. Data collected from digital platforms made publicly available is all anonymized to ensure no private or sensitive data is extracted. The ethical routines adhere to guide line for collecting data, maintain transparency, and keeping user generated content protect. The study also complies with data protection rules (e.g. GDPR) by only processing aggregated data which is not traceable to individual users.

The study utilizes the statistical technique of regression analysis to analyse the effect of sentiment on IT service improvement for data analysis. Furthermore, the capability of AI models to support actionable insights is tested, with the objective of utilizing sentiment analysis as a weapon for IT service managers to help to refine their customer service strategies. The methodology is transparent allowing replication and provides all relevant algorithms, tools, and datasets used in the study. This means, that the process both can be replicated and the results verified by future researchers.



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Figure 2: Monthly sentiment trends over a six-month period for IT service feedback.

Figure description: This chart displays the monthly sentiment trends for IT service feedback over a sixmonth period. It highlights how the positive, neutral, and negative sentiments fluctuated over time, allowing IT service managers to assess seasonal or campaign-related changes in customer satisfaction. The chart reflects the impact of service updates, customer support interactions, and issue resolution efforts.

By observing sentiment trends over time, this chart helps identify whether specific changes in IT service management correlate with customer feedback. For instance, a noticeable dip in negative sentiment following an upgrade or response to customer concerns may indicate successful interventions. Such data can be crucial for planning future service improvements.

An approach is provided whereby a mixed method combining machine learning based sentiment analysis and use of quantitative service performance data measures the extent to which digital marketing data can be utilized to improve IT service delivery and user satisfaction.

#### III. AI MODELS AND SENTIMENT ANALYSIS IN IT SERVICE IMPROVEMENT

The application of AI models, particularly sentiment analysis, has revolutionized the way organizations understand customer feedback and improve their service offerings. In the context of IT service management, sentiment analysis helps businesses identify patterns in customer opinions, providing actionable insights that can drive service improvements. Sentiment analysis models, such as machine learning (ML) algorithms and deep learning (DL) networks, have been widely employed to assess customer emotions, detect dissatisfaction, and gauge user sentiment in real-time.

Machine learning models, including Support Vector Machines (SVM) and Random Forest, have traditionally been used for sentiment classification tasks. These models work by identifying specific features in text data, such as words or phrases that correlate with positive or negative sentiments. In IT service improvement, these models can analyze feedback from various platforms—such as customer reviews, online forums, and social media—to gauge overall satisfaction levels and pinpoint service shortcomings. For instance, if a user mentions "slow response time" or "unresolved technical issues," these phrases would be flagged as negative sentiments, helping service providers prioritize areas for improvement. Studies have shown that such ML models can achieve high accuracy in sentiment classification, with performance improving as the models are trained on larger and more diverse datasets<sup>1,2</sup>.



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Deep learning models, including Convolutional Neural Networks (CNNs) and Recurrent Neural Networks (RNNs), offer more advanced sentiment analysis capabilities. These models are capable of understanding context and emotional tone in customer feedback, which allows them to perform sentiment classification with greater accuracy. Unlike traditional ML models that focus on individual words, DL models analyze the sequence of words in a sentence, making them more adept at recognizing subtle nuances, such as sarcasm or irony, that can be critical for accurately understanding customer sentiment. This is particularly valuable in IT services, where user feedback can often contain nuanced emotions that traditional models may miss<sup>3</sup>,<sup>4</sup>. For example, a user might express frustration with a technical issue in a complex, indirect way, and RNNs are better at capturing the sentiment in such cases. AI-driven sentiment analysis models can also be used to track sentiment trends over time, allowing IT service managers to identify patterns and take proactive measures before issues escalate. By analyzing sentiment data across different periods, such as before and after a system upgrade or customer service intervention, organizations can evaluate the impact of their actions on user satisfaction<sup>5</sup>,<sup>6</sup>. This predictive capability of sentiment analysis can also help IT service providers anticipate customer dissatisfaction and intervene early, ensuring a higher level of customer retention and service optimization.

The integration of sentiment analysis into IT service management not only enables businesses to understand customer perceptions but also provides actionable insights to refine their service strategies. By leveraging AI models, IT service managers can make data-driven decisions, improving response times, issue resolution processes, and overall service quality. The potential of AI-driven sentiment analysis to enhance IT service management is vast, and as the technology continues to evolve, it promises even more refined methods for improving customer satisfaction.

#### V. ROLE OF DIGITAL MARKETING DATA IN ENHANCING IT SERVICES

The strategy of integrating digital marketing data into IT service management has become a key way for companies to optimise customer experiences and service delivery. In general, there are digital marketing platforms like social media, customer review websites and online forums that give us a wealth of user generated content that can give us the insights as to how customer feels about us, their preferences and pain points. Using AI driven sentiment analysis on this huge dataset, IT service managers are able to get real time analysis on service quality, spot service quality issues, and respond more quickly to customer demands.

Twitter, Facebook, and Instagram as well as other social media platforms offer as an important source of real time user feedback. These platforms are used by customers to share, sometimes positive and negative experiences, with IT services. By analyzing sentiment on social media, IT service providers can quickly spot sighs of dissatisfaction and take steps to fix things before they turn into larger issues. For example, if a user tweets that he had difficulty using a product, or that the support times are long, sentiment analysis will mark that as negative feedback. IT managers can take immediate corrective actions on these issues, for instance sending alarms to tech support or sending the customer an immediate communication to resolve the issue. It has been shown through recent studies<sup>1,2</sup>, that businesses which monitor and address sentiment of social media are more likely to maintain customer satisfaction and brand loyalty.

Beyond social media, even review sites like Trustpilot, Yelp, and Google Reviews can contain a lot of



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data to gain service enhancement insights from. These platforms gather customer reviews and ratings that clearly indicate overall customer satisfaction and most frequently occurring service problems. Analyzing the sentiment around the reviews allows businesses to identify recurring themes or issues within the businesses IT service offering. For instance, slow response times and unhelpful customer service become an easy target for process improvement or a training effort in support teams. Additionally, positive reviews can help you spot what the service is doing well and what they like. This indicates where businesses need to focus, in order to address weaknesses and reenforce strengths<sup>23</sup>.

Valuable data to help your business improve its services can be found in online forums and discussion boards, like Reddit, and specific IT service communities. These platforms allow users to talk about their experience with the IT services in more detail than before and in a more in-depth way, detailing specific issues and potential solutions. Given that a large part of these discussions is covered on social media, the los AI, sentiment analysis on these conversations enables the businesses to break down the complex requirements of their users. Furthermore, IT service managers can track trends and sentiment in various platforms and get a full picture of customer satisfaction, which enables making more informed decisions and adjusting services based on the trend<sup>5</sup>,<sup>6</sup>.

Integrating sentiment analysis with digital marketing data does not only enable the speed that problems are identified but gives them a proactive service improvement perspective. Businesses can therefore build strategies to handle customer issues before they hurt their customer satisfaction with the help of this data to anticipate customer concerns. AI sentiment analysis plus digital marketing data can be a great source of IT service managers to enhance user satisfaction, improve response time, and improve service quality.

#### VI. DISCUSSIONS

Using digital marketing data and AI driven sentiment analysis in improving IT service, the potential to improve user experience and quality of service is clear. This study finds that AI tools can turn customer feedback into actionable insights, which then helps IT service managers pinpoint and resolve service deficiencies in real time. Sentiment analysis offers a distinct ability to digest and analyze big volumes of unstructured data from internet based stages, for example, media, online surveys, and client forums, and assist organizations with updating their strategic approach in like manner.



Figure 3: Conversion funnel for IT service customer satisfaction from feedback to resolution.



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Figure description: The chart represents the stages of customer interaction with IT services, from feedback submission to issue resolution. It visualizes the percentage of users who moved through each stage, highlighting the drop-off rates at each stage. The chart helps IT service managers identify bottlenecks in the customer experience that may hinder service delivery or satisfaction.

The chart clearly shows where service delivery processes may be faltering, such as a high drop-off rate during the issue resolution stage. Addressing these bottlenecks by improving response times or increasing the efficiency of troubleshooting could enhance overall customer satisfaction and minimize frustration.

Key finding of this study is that sentiment analysis models can be used to predict customer dissatisfaction and areas of service that need attention. IT service managers can identify recurring issues distributed user feedback from multiple sources, like long response times, poor communications or problems with technical issues that haven't been resolved. Through this method, business is able to continue through this proactive approach, deal with issues as quick or quick as they possibly can, solving the problems before they become large, and come to constant customer satisfaction. One of the advantages of sentiment analysis is the speed at which it can gather feedback, an advantage over slower, resource intensive traditional methods such as surveys or focus groups. This allows businesses to continuously monitor and improve service quality by keeping this always in near real time.

Further, this study shows that when AI-driven sentiment analysis complements digital marketing platform data, the picture of what the customer feels becomes much more holistic. Customer feedback comes in different sources such as social media platforms, customer review sites, online forums who provide different perspectives and insight in the user's experience. By integrating sentiment analysis across these platforms, IT service managers can better understand more sentiment about customers which could be used for decision making and strategic planning. For instance, by analyzing sentiment trends over time we can find out whether the performance of the service, eg. software updates and/or customer support policy change, had a positive or a negative effect on user experience. Such feedback loop can assist businesses to keep improving their offerings so as to fulfil customers' expectation.

In addition, the study shows that AI models should be able to monitor sentiment trend not just in a point in time but over long periods. IT service managers can then use this information to assess the affect of service changes over time as well as determine overall customer satisfaction across multiple service interactions. The business can see shifts in sentiment longer than is immediately evident, giving a fuller picture of the customer's satisfaction. It also helps businesses identify emergent issues before they become widespread so that we can address them before they become issues.

The challenges faced by implementing sentiment analysis into IT service management are inevitable. Sentiment analysis models have one limitation, they can be complex for human language. Despite the bolstered capabilities of AI models to grasp context and detect sentiment, errors are still far from uncommon, especially when it comes to decoding intricate, witty, or subtle expressions. The nature of sarcasm, irony etc, cultural difference can all affect the accuracy of sentiment classification and can lead us into wrong conclusions with respect to sentiment of a user. However, in the midst of these challenges, progress in natural language processing (NLP) and deep learning has been steadily increasing the accuracy and reliability of sentiment analysis models.



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Thus, sentiment analysis driven by AI constitutes an extremely valuable means for IT service providers for increasing their ability to deliver services and better satisfy their customers. With available digital marketing data, businesses can gather real time feedback, find opportunities for improvement and improve faster. Despite the challenges of applying sentiment analysis, within complex language, it is clear they are worth the effort. As the AI models keep changing, AI models will progressively assume a vital part in characterizing the eventual fate of IT administration the board, permitting enterprises to convey a reclass user experience and to consistently have a competitive edge in an always advancing advanced scene.

#### VII. RESULTS

This study's results show that the use of AI sentiment analysis with digital marketing data has a significant impact on the IT service improvement. Using advanced sentiment analysis models, we were able to mine user generated feedback amassed on social media, online reviews and forums that culminated into actionable insights which were directly input into IT service strategies.

Sentiment analysis models were found to correctly mark the trends of user satisfaction and service performance problems as one of the main findings. We fed in a dataset with more than 20,000 customer reviews, social media comments and forum posts about IT services for the AI models to process. An assessment of sentiment classification demonstrated that positive and neutral sentiments were the prevailing feedback expressed, while negative sentiments tended to be clustered around specific service areas, response times and issue resolution. To begin with, this finding reveals that whilst customer sentiment towards IT services was largely positive, there was still a lot more dissatisfaction in some pockets that certainly needed fixing. Early identification of these trends allowed IT service managers to introduce strategies specifically designed to address these problem areas.

Finally, by analyzing sentiment data we found strong correlation between negative feedback and certain service bottlenecks like the delayed response times and inadequate resolution to technical issues. The cases, the lowest negative score, where customers reported waiting long hours for technical support or they didn't find a solution to their problem even after multiple interactions. With these insights the IT service team changed their focus towards improving response times and improving their troubleshooting processes which resulted in directly measurable improvements to customer satisfaction scores.



Figure 4: Breakdown of customer sentiment by service type for IT services.



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Figure description: The chart visualizes the breakdown of customer sentiment based on the type of IT service provided. Each layer of the chart represents different categories of services (e.g., software support, network troubleshooting, etc.) and the sentiment associated with them (positive, neutral, or negative). The chart offers a quick overview of where improvements are most needed.

This chart helps IT service providers quickly identify which areas of service are most problematic. By focusing on improving services with high negative sentiment, businesses can make targeted interventions that address customer pain points and enhance the overall user experience.

In addition, the sentiment analysis models gave us a sense of what was the emotional tone of the user feedback, allowing us get more info about the user frustration and satisfaction. For instance, mapping sentiment scores to specific customer service engagements, the models demonstrated that customers were most dissatisfied with a response that was either too generic or failed to respond specifically to their concerns. In contrast, personalized and empathetic responses resulted in higher amount of satisfaction. The importance of offering personalized service and having human empathy in the process of improving customer experience even when automated systems are used is deepened by this finding.

A second important outcome of this study is that we were able to track sentiment trends over time. We deduced the effect of IT service changes on user sentiment by analyzing of the user sentiment feedback of multiple service interactions. For example, sentiment analysis revealed a notable rise on positive feedback after a new service update was distributed to the public, particularly when it came to new features and a number of improvements in functionality. Across different platforms, this trend suggested that customers believed the update solved their core problems. However, when certain features were temporarily unavailable during maintenance, users reacted strongly (feeling negatively) to the downtime, illustrating how sensitive users tend to be to outages.

Additionally, sentiment analysis helped us discover emerging issues before the widespread of these issues. For example, early signs of small, but growing dissatisfaction with instructional materials that are unclear, were detected through negative feedback on social media and review sites. This gave the IT team the opportunity to course corrects and clarify their user guides and FAQ's, which would in turn have helped to prevent the frustration from continuing.

Finally, the results of this study show that AI applied sentiment analysis may be applied to identify areas of improvement in IT services. The study analyzed digital marketing data to identify specific service deficiencies and to track sentiment trends over time, while also providing actionable insights for optimizing IT service delivery. However, these findings also show the benefit in using AI to process unstructured user feedback so that we can be more proactive and data driven in our efforts to improve the user experience in IT services.

#### VIII. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

The results from this study can help understand the application of AI driven sentiment analysis for IT service improvement but it is important to note multiple limitations of the research which might constrain the generalizability and interpretation of the results. The limitations are driven largely by practical difficulties in sentiment analysis models, in combining data, and in the changeable IT service environments.





#### Figure 5:Sentiment accuracy across different AI models for IT service feedback analysis.

Figure description: The chart compares the sentiment analysis accuracy of different AI models, including Support Vector Machines (SVM), Recurrent Neural Networks (RNN), and Convolutional Neural Networks (CNN), in classifying IT service feedback. This comparison highlights the strengths and weaknesses of each model in understanding customer sentiment.

This chart helps assess the relative effectiveness of various AI models in handling customer feedback data. It can guide IT service managers in selecting the most appropriate model for sentiment analysis based on accuracy and the specific needs of their service environment.

The first is the inherent complexity of human language. Natural language processing (NLP) and AI have come a long way forward, but sentiment analysis models remain challenged in accurately interpreting nuances like sarcasm, irony, or humorous lines that have a culturally specific meaning. In circumstantious way when users are angry, there are chances of misclassification of sentiment as the attributes are subtle. While deep learning models such as recurrent neural networks (RNNs) and convolutional neural networks (CNNs) demonstrate good accuracy in sentiment classification, they too are not immune to error; in particular they are not natural at working with ambiguous or complex language. As a result, negative sentiment may be perceived as neutral or positive where no insight occurs and potentially affects the end decision making.

The quality and representativeness of the data limits another limitation. For this study, feedback was obtained from social media, online reviews, and forums. Rich datasets are made available by these platforms but they do not capture the views of all the users (esp. those who are less active on these platforms or choose to share feedback from private channels). Moreover, the data employed in this work is mostly written feedback, and such data may not fully capture all the aspects of customer sentiment. Sentiment analysis is not enough in cases where the customer may have expressed dissatisfaction in a nonverbal way (by phone or in person). Digital marketing data is therefore a valuable resource, yet it may not capture all customer experience.

Depending on the quality and quantity of provided labelled training data, sentiment analysis models are extremely sensitive. The performance of the AI models in this study was based on a dataset of over 20,000 user reviews and comments that provided high quality, but labeled data is always of paramount importance. The problem of sentiment labeling can inject noise into the training data with possible errors or inconsistencies, which will reduce the model's accuracy of prediction. Real world use of model



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usually results in getting a large and well labeled dataset, and data labeling is not always consistent, making it difficult to guarantee model reliability.

For the future, these limitations provide several avenues to be addressed for research to fill in these gaps and develop sentiment analysis in IT service management further. One potential direction is how to use multimodal data in sentiment analysis models. Sentiment classification can be enhanced if it is combined with other forms of data (perhaps voice recordings, video interactions), so it can complement feedback, instead of just being based on it. They would also be able to capture more of the emotional cues when it comes to understanding the customer sentiment via tone of voice and other things that are not captured by the language often. Moreover, future research could examine how hybrid AI models (such as sentiment analysis combined with other AI methods like emotion recognition or customer segmentation) can provide more elaborate predictions of customer satisfaction.

Future investigation could be made about the integration of sentiment analysis to real time service performance metrics. Linking sentiment scores directly to IT service KPIs, like resolution times, system uptime, or first call resolution rates, allows more companies to gain a more holistic picture of the sentiment — service performance relationship. This would furthermore enable prediction of customer dissatisfaction and close down service areas prior to their escalation into big issues.

Finally, while those findings from this study can be of great value when thinking about the possibilities of how AI can be leveraged toward increasing of IT service, there are of course several limitations that have to be addressed. Future research then should work to improve the accuracy of sentiment classification, expand data sources, and incorporate sentiment analysis with real time service metrics. Businesses could have even more powerful tools to further improve its IT service quality and customer satisfaction using these advancements.

#### IX. CONCLUSION AND RECOMMENDATIONS

This study evidences the powerful capability of AI-enabled sentiment analysis to promote IT service improvement with the support of digital marketing data, thus concluding. Using AI models to analyze user social media, online reviews, and forums content to uncover customer sentiment, and to spot where businesses need to improve in their IT service delivery. Proactively addressing customer concerns and optimizing service performance are real advantages IT service managers have at their fingertips thanks to the ability to process large volumes of unstructured feedback in real time. The results of this study demonstrate why incorporating AI derived sentiment analysis is fundamental for IT service management to improve the user experience and satisfaction that is highly dependent upon the quality of IT services.

In addition, the findings point to the importance of using digital marketing data as a source for developing IT service improvement. Businesses can use feedback from widely used platform to monitor customer satisfaction and detect quickly any emerging issues. A sentiment analysis adds another dimension to the ability of companies to leave traditional feedback methods like surveys or focus groups and move to a more dynamic and scalable product of all customer experiences. In addition, businesses can also track sentiment trends over time and determine the service changes impact and calculate service improvements in customer satisfaction. This positive feedback loop means businesses can run an endless cycle of on IT services and respond to customer needs.





Figure 6: Customer satisfaction correlation with service performance and sentiment.

Figure description: The chart visualizes the correlation between customer satisfaction, service performance metrics (e.g., resolution time), and sentiment analysis results. This chart demonstrates how improving service performance can positively impact overall customer satisfaction and sentiment. This figure highlights the interconnected nature of service performance, customer sentiment, and overall satisfaction. IT service managers can use this chart to understand how improvements in specific performance areas (e.g., faster resolution times) can lead to higher customer satisfaction and more positive sentiment.

Nevertheless, the study offers some promising insights that are, however, likely to be limited by a number of caveats. The difficulty in human language, including sarcasm and cultural nuances, is a problem for sentiment analysis models. Moreover, the data analyzed in this study originates primarily from publicly available digital platforms, and, therefore, this may not fully capture all users' experiences, as some users may prefer private channels, to provide feedback. In order to deal with these challenges future research should concentrate on improving sentiment classification models accuracy, especially the ability to understand complex emotional expressions. Also, when expanding to data sources, including multimodal feedback such as voice or a video, the data provides more comprehensive information about customer sentiment.

The findings from this study let us make several recommendations to businesses that are considering integrating sentiment analysis into their IT service management strategy. The first thing businesses should do is invest in building and maintaining great quality AI models which can interpret customer feedback sufficiently. It is important to ensure that the data we use for sentiment analysis isn't unreliable or inaccurately biased in some way. Second, companies should use sentiment analysis as one component in a more holistic view of service quality, along with other IT service metrics including resolution times and system performance. This allows businesses to use sentiment data to better correlate with key performance indicators to see how changes to a service can affect customer satisfaction.

Businesses also need to proactively chat with customers based on sentiment. Organizations can avoid small issues from mushrooming, and keep customer loyalty, by quickly and efficiently meeting negative feedback. Monitoring sentiment trends on different platforms on a regular basis lets IT service managers know how dissatisfied clients are with the provisioned service and improves timely delivery of the same. Finally, companies should continue to explore more new ways of listening to customer feedback and attempt more novel approaches to improve their knowledge on user experiences and better service provision in IT.



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Summarily, sentiment analysis driven by AI is a very great thing for improvement of IT service since it gives businesses an opportunity to understand customers' sentiment and react in real time. Digital marketing data and sentiment analysis combined is a highly efficient method for businesses to make their IT services more optimized, improve user experience, and stay competitive in the market. Finally, businesses need to start working with the challenges of sentiment analysis and look at how to further develop their models and data sources to help close the gap between sentiment analysis and its potential.

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