

Research on 5G User Perception Detection and Experience Improvement Optimization Based on Capsule Network

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ABSTRACT

COVID-19 caused a global public disaster as well as an economic crisis, and other challenges. The fifth-generation network, or 5G, connects practically every machine, person, and thing on the planet. We can analyse the public's opinions and sentiments connected to COVID-19 from 5G user-generated content on social media, which will eventually aid in promoting health intervention strategies and designing successful projects based on public perceptions. The BERT language model is first used to preprocess data that has been obtained from Sina Weibo. Following that, the features of the preprocessed data are chosen using a class-wise information technique. Finally, a capsule network (CapsNet) approach is used to identify the 5G user perception and experience optimization. Dynamic routing algorithm is used for optimizing the capsule network. By comparing the suggested framework's performance with certain existing approaches, its effectiveness is evaluated. Simulation results show that the proposed method is more accurate than previous approaches at identifying 5G user experiences.

KEYWORDS

5G user perception detection, BERT language model, Capsule network model, optimization technique, user experience

INTRODUCTION

In recent years, the rapid development of social networking platforms has made it convenient for people to share opinions and ideas, thus becoming an important source of data for studying various topics (Tasneem et al., 2020). With the spread of the COVID-19 pandemic, people are increasingly concerned about the security and risk issues of 5G technology. Therefore, this article aims to explore the feelings of 5G customers toward the pandemic and optimize the 5G user experience by analyzing relevant data and adopting new strategies. In this study, we chose a popular social networking platform, Sina Weibo, as a tool to investigate the feelings of 5G customers toward the pandemic. Our goal is to understand the attitudes and opinions of users toward this epidemic by analyzing the data obtained from Sina Weibo. We pre-processed the data collected from Sina Weibo. Using the

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BERT language model, we cleaned and summarized the data to ensure the accuracy and reliability of subsequent analysis. Next, we adopted the category information method to perform feature selection on the pre-processed data, in order to help us better understand and classify user opinions and ideas. In the study, we also proposed a strategy based on capsule neural networks (CapsNets) to optimize 5G user experience and perception. Through simulation experiments, we found that this strategy performs better than traditional methods in identifying 5G user experience. This provides a valuable reference for improving the 5G user experience. Finally, we also tested the performance of different deep learning models on classification problems to evaluate their effectiveness and applicability. This study explored whether the development of 5G technology related to the COVID-19 pandemic would pose risks to consumers. We hope to conduct in-depth research to determine whether there are potential problems and challenges in the speculative development of this technology. This study can help decision-makers better understand the needs and expectations of the public, thereby formulating more targeted policies and measures. In addition, optimizing the 5G user experience and perception can improve user satisfaction and promote the application and development of 5G technology. This study provides useful methods and technical references for researchers and practitioners in related fields.

The contributions made by this study are as follows:

1. Data collection method: This study collected relevant data on the feelings and opinions of 5G users toward the COVID-19 pandemic by using Sina Weibo, a widely used social network platform. This data source provided a comprehensive and diverse sample for research, which helps to better understand user attitudes and opinions.
2. Preprocessing method: This study used the BERT language model to preprocess the data collected from Sina Weibo. BERT is one of the cutting-edge technologies in the field of natural language processing, which can effectively extract semantic information from text. Using BERT for preprocessing improved the quality and availability of data, laying the foundation for subsequent analysis.
3. Feature selection method: This study used a classification information method to select the features of preprocessed data. This method can help identify the most relevant and important features of the research problem, thereby improving the accuracy and interpretability of the analysis.
4. Optimization method: This study adopted the CapsNet method to determine the optimization strategy for 5G user perception and experience. The CapsNet is an emerging artificial intelligence algorithm with strong pattern recognition and feature extraction capabilities. By applying CapsNets, personalized optimization can be carried out to meet the needs and preferences of 5G users, improving user experience and satisfaction.

In summary, the contribution of this study lies in the selection of data collection methods, application of preprocessing methods, application of feature selection methods, and exploration of optimization methods. These contributions contribute to improving the credibility and practicality of research, while providing useful methods and technical references for researchers in related fields.

LITERATURE REVIEW

The fifth-generation (5G) mobile network is a new type of global communications infrastructure with the potential to link any machines for any purpose (Márquez-Sánchez et al., 2023; L.Wang et al., 2023). There is a need for improved key performance indicators (KPIs) in 5G networks compared to their predecessors. There is considerable agreement on the importance and usefulness of KPIs (Han et al., 2020). The operator is primarily concerned with metrics like capacity, reliability, and service quality (Giachos et al., 2023). From the standpoint of the user, the most crucial criteria are round-the-clock accessibility, boundless data storage, and zero latency. However, no technology has shown itself to

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