Chapter 8
Sentiment Analysis in Customer Relationship Management

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ABSTRACT

Modern networking conversations generate annotated metadata, necessitating a method for synthesizing insights from statistics. Emotion detection is crucial for practical conversations, distinguishing joy, grief, and wrath. Corpora are becoming the standard for human-machine interaction, aiming to make interactions feel natural and real. A paradigm that identifies debates and customer views can provide a human touch to these interactions. Researchers developed a machine learning framework for assessing emotions in English phrases, utilizing LSTM (Long Short Term Memory) perspective and real-time emotion recognition in idiomatic speech. Emotion recognition rule (ERR) is created using ontologies like Word Net and Concept Net, Naive Bayes, and Random Forest. Real-time analysis of written words

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and facial expressions significantly outperforms current algorithms and command-ment classifiers in identifying emotional states.

INTRODUCTION

Customer Relationship Management (CRM) has evolved significantly with the integration of Artificial Intelligence (AI), reshaping how businesses interact with consumers. AI-driven CRM solutions enhance personalization, automate interactions, and provide deep insights into customer behaviors, leading to improved engagement and retention. Traditional CRM systems relied heavily on static data and manual interventions, but AI has enabled real-time, predictive analytics, allowing businesses to anticipate customer needs and proactively address concerns.

One of the key advancements in AI-CRM is Sentiment Analysis, which enables businesses to gauge customer emotions through natural language processing (NLP) and machine learning. This is particularly crucial in digital interactions, where understanding customer sentiment can guide response strategies. AI also enhances CRM by leveraging chatbots, recommendation engines, and automated customer support, reducing response times and improving service quality.

This paper explores the role of emotion recognition in AI-driven CRM, focusing on sentiment analysis techniques such as LSTM (Long Short-Term Memory), Naïve Bayes, and Random Forest models. The study highlights how AI can enhance CRM through real-time emotion detection, personalized customer interactions, and predictive analytics, leading to more effective customer engagement strategies.

Emotion recognition challenges humans to perceive emotions, requiring powerful machine learning techniques and substantial data for robots to successfully respond. Emotion recognition hampers individuals' perception and understanding, although humans can detect and express emotions. (Zahra et al,2009). To properly respond to emotional cues, robots require statistical data and advanced machine learning techniques ([Cohn et al, 1998). Advanced monitoring systems identify users' thoughts and feelings through conversational formats. (Liyanage et al, 2000). Wearable biosensors analyze emotions using web browsers and calendars.

The growth of monitoring technologies has paved the road for the identification of users' moods across varied communication formats, such as chat messages and social media interactions. While wearable devices can record biological data, their applicability for day-to-day use is restricted. In this context, the integration of soft biosensors into web browsers emerges as a fresh technique, leveraging analysis of tools like calendars and social networks to infer users' emotional states.

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