Enhancing Sentiment Analysis of Twitter Data Using Recurrent Neural Networks with Attention Mechanism

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Abstract

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Abstract:
Sentiment analysis, the intricate task of discerning and classifying the myriad of sentiments conveyed within textual data, has captured substantial interest and intrigue, primarily driven by the pervasive utilization and influence of social media platforms. In this study, a novel approach to enhance sentiment analysis of Twitter data by employing Recurrent Neural Networks (RNNs) with an attention mechanism is proposed. The proposed model leverages the sequential nature of tweets and the attention mechanism to capture the inherent dependencies between words and highlight salient information. The RNN-based model on a large-scale dataset of annotated Twitter data, encompassing diverse sentiments is trained. The model effectively learns the contextual information and sentiment patterns, enabling accurate sentiment classification. A comprehensive set of tests were run to evaluate the effectiveness of this methodology, and the outcomes were meticulously compared to those of traditional machine learning algorithms and established deep learning models. The empirical findings demonstrate that proposed attention-based RNN model performs better than competing methods and achieves cutting-edge performance on sentiment analysis of Twitter data. Moreover, an in-depth analysis of the attention weights generated by the model, shedding light on the significant words and phrases influencing sentiment classification is conducted. This provides valuable insights into the underlying sentiment dynamics in Twitter data. Proposed research contributes to the field of sentiment analysis by proposing an effective and robust approach for Twitter sentiment classification. The findings highlight the potential of RNNs with attention mechanisms in capturing the nuanced sentiment expressions prevalent in social media text. The proposed model can facilitate various applications, including real-time sentiment monitoring, brand reputation analysis, and public opinion tracking, benefiting industries a...

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