

논문 요약 보고서

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How Effectively Can BERT Models Interpret Context and Detect Bengali Communal Violent Text?

저자: Abdullah Khondoker, Enam Ahmed Taufik, Md. Iftekhar Islam Tashik, S M Ishtiaq Mahmud, Farig Sadeque

플랫폼: arxiv

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카테고리:

cs.CL

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초록:

The spread of cyber hatred has led to communal violence, fueling aggression and conflicts between various religious, ethnic, and social groups, posing a significant threat to social harmony. Despite its critical importance, the classification of communal violent text remains an underexplored area in existing research. This study aims to enhance the accuracy of detecting text that incites communal violence, focusing specifically on Bengali textual data sourced from social media platforms. We introduce a fine-tuned BanglaBERT model tailored for this task, achieving a macro F1 score of 0.60. To address the issue of data imbalance, our dataset was expanded by adding 1,794 instances, which facilitated the development and evaluation of a fine-tuned ensemble model. This ensemble model demonstrated an improved performance, achieving a macro F1 score of 0.63, thus highlighting its effectiveness in this domain. In addition to quantitative performance metrics, qualitative analysis revealed instances where the models struggled with context understanding, leading to occasional misclassifications, even when predictions were made with high confidence. Through analyzing the cosine similarity between words, we identified certain limitations in the pre-trained BanglaBERT models, particularly in their ability to distinguish between closely related communal and non-communal terms. To further interpret the model's decisions, we applied LIME, which helped to uncover specific areas where the model struggled in understanding context, contributing to errors in classification. These findings highlight the promise of NLP and interpretability tools in reducing online communal violence. Our work contributes to the growing body of research in communal violence detection and offers a foundation for future studies aiming to refine these techniques for better accuracy and societal impact.

Evaluating Compliance with Visualization Guidelines in Diagrams for Scientific Publications Using Large Vision Language Models

저자: Johannes Rückert, Louise Bloch, Christoph M. Friedrich

플랫폼: arxiv

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카테고리:

cs.AI, cs.CL

초록:

Diagrams are widely used to visualize data in publications. The research field of data visualization deals with defining principles and guidelines for the creation and use of these diagrams, which are often not known or adhered to by researchers, leading to misinformation caused by providing inaccurate or incomplete information. In this work, large Vision Language Models (VLMs) are used to analyze diagrams in order to identify potential problems in regards to selected data visualization principles and guidelines. To determine the suitability of VLMs for these tasks, five open source VLMs and five prompting strategies are compared using a set of questions derived from selected data visualization guidelines. The results show that the employed VLMs work well to accurately analyze diagram types (F1-score 82.49 %), 3D effects (F1-score 98.55 %), axes labels (F1-score 76.74 %), lines (RMSE 1.16), colors (RMSE 1.60) and legends (F1-score 96.64 %, RMSE 0.70), while they cannot reliably provide feedback about the image quality (F1-score 0.74 %) and tick marks/labels (F1-score 46.13 %). Among the employed VLMs, Qwen2.5VL performs best, and the summarizing prompting strategy performs best for most of the experimental questions. It is shown that VLMs can be used to automatically identify a number of potential issues in diagrams, such as missing axes labels, missing legends, and unnecessary 3D effects. The approach laid out in this work can be extended for further aspects of data visualization.

광고 섹션

AD

이곳에 광고가 들어갈
자리입니다.
광고 문의: your_ad_contact@example.com

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