

## Summarizing Social Media Interactions: A Transformer-Driven Abstractive Approach

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### Abstract

The widespread adoption of social media platforms has profoundly redefined communication, enabling the seamless exchange of vast quantities of text, audio, images, and videos. These platforms serve as influential arenas for shaping public discourse, molding behaviors, and driving decision-making in business, political, and economic spheres. Among the diverse forms of content, textual data stands out as a particularly valuable resource, yet its analysis is often hindered by the informal, unstructured nature of social media interactions.

To navigate these complexities, Natural Language Processing (NLP) has emerged as an essential discipline, with abstractive summarization gaining prominence for its ability to transform voluminous user-generated content into concise, human-like narratives. This approach not only enhances understanding and engagement but also empowers businesses by extracting actionable insights from user feedback, fostering rapid trend identification, strategic agility, and enhanced responsiveness. The growing expectations for readability, coherence, and fluency in machine-generated outputs continue to drive innovation in NLP methodologies, especially in the dynamic context of social media content.

Despite these advancements, the ever-evolving nature of social media requires adaptive techniques to preserve semantic fidelity and linguistic precision. This research highlights the broader significance of text summarization in a data-driven era. Social media's central role in disseminating information, shaping public opinion, and providing behavioral insights underscores the critical importance of sophisticated summarization systems. Such tools not only assist users in navigating overwhelming information streams but also offer governments, businesses, and researchers' valuable perspectives on societal trends and dynamics.

This paper presents a cutting-edge framework for summarizing social media comments, leveraging fine-tuned Transformer-based models, particularly the pre-trained T5 architecture—an early Large Language Model. The proposed system is rigorously evaluated across multiple dimensions, including fluency, consistency, readability, and semantic coherence, providing a holistic assessment of its performance. The system excels in transforming large volumes of data into meaningful summaries, as evidenced by its strong performance across metrics like fluency, consistency, readability, and semantic coherence. By integrating the latest advances in abstractive summarization with state-of-the-art transfer learning techniques, this study addresses the growing demand for automated solutions capable of processing and extracting meaningful insights from the immense scale and complexity of social media data.