

MISQ Archivist

Understanding Medication Nonadherence from Social Media: A Sentiment-Enriched Deep Learning Approach

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Abstract

Medication nonadherence (MNA) causes severe health ramifications and costs the U.S. healthcare systems \$290 billion annually. Understanding patients' MNA reasons is an urgent goal for researchers, practitioners, and the pharmaceutical industry to mitigate those health and economic consequences. Past years have witnessed soaring patient engagement in social media, making it a cost-efficient and rich information source that can complement prior survey studies and deepen the understanding of MNA. Yet, such a dataset is untapped in existing MNA studies due to technical challenges such as negative decision-making in long texts, varied patient vocabulary, and sparse relevant information. In this work, we develop **Sentiment-Enriched DEep Learning (SEDEL)** to address these challenges and extract MNA reasons. We evaluate SEDEL on 53,180 reviews of about 180 drugs and achieve a precision of 89.25%, a recall of 88.48%, and an F1 score of 88.86%. SEDEL significantly outperforms the state-of-the-art baseline models. Nine categories of MNA reasons are identified and verified by domain experts. This study contributes to IS research in two aspects. First, we devise a novel deep-learning-based approach for reason mining. Second, our results provide direct implications for the health industry and practitioners to design interventions.

Keywords: Sentiment-enriched deep learning, reason mining, social media analytics, health risk analytics, medication nonadherence