The Effectiveness of Social Media in Timely Disaster Communication

Chongdan Pan, Hang Chen, Chia-Hsun Chang, Yun Lee
University of Michigan – School of Information

Introduction

The Ohio train derailment on February 3rd, 2023, was a shocking disaster, but it did not gain public attention until 10 days later. To contribute to better disaster communication, our research focuses on three questions:

1. How did the public attention towards the disaster develop over time?
2. Were residents of high-risk areas adequately informed about the disaster?
3. How does social media activities relate to public attention during a disaster?

Methodology

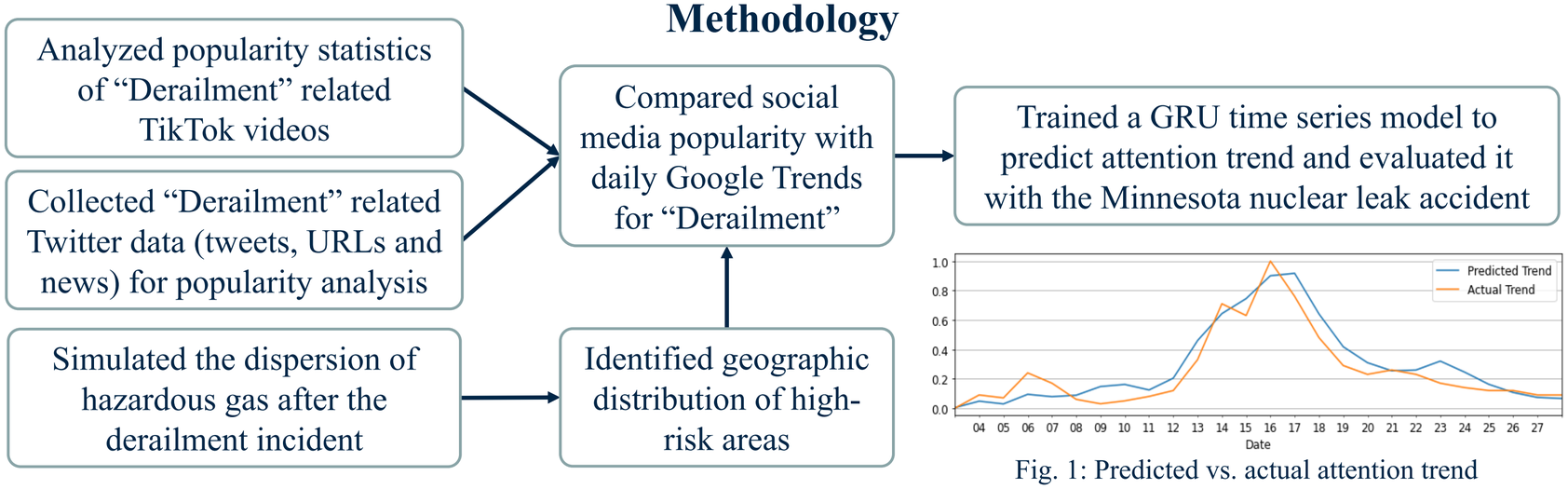

Fig. 1: Predicted vs. actual attention trend

Primary Findings

The late peak of attention (Fig. 2) indicates that **social medias failed to timely inform the public of the disaster.**

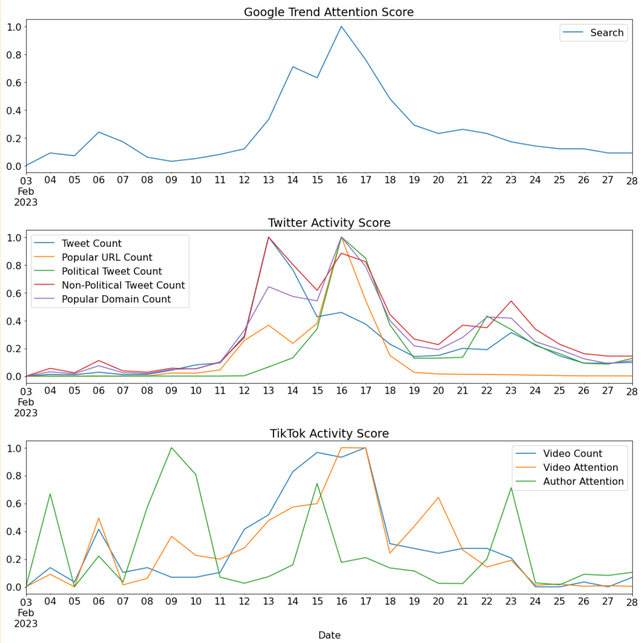

Fig. 2: Daily social media activities and general attention trend

Our Time Series feature analysis (Fig. 2 & 3) suggests that **popular TikTok videos were timelier but did not gain much attention while Tweets and news had impact but lagged, especially political ones.** Combining those factors effectively drove public attention, as evidenced by our model's ability to accurately predict public's interest in the nuclear leak accident.

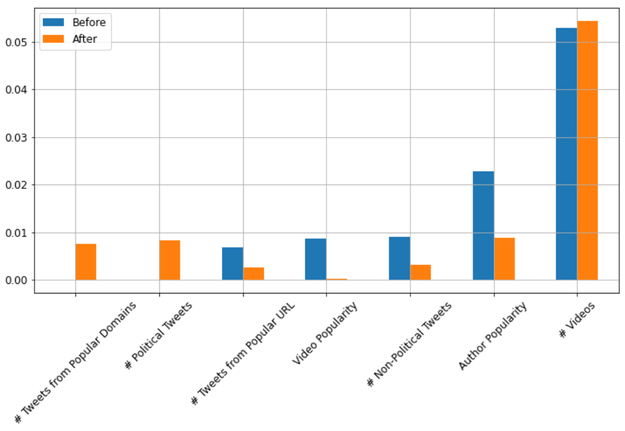

Fig. 3: Feature importance before and after the major spread of related information

The low R^2 (Fig. 4) due to **the discrepancy** between the daily geographic distribution of simulated hazard and actual attention trend (Fig. 5) implies **a lack of awareness in the high-risk areas.**

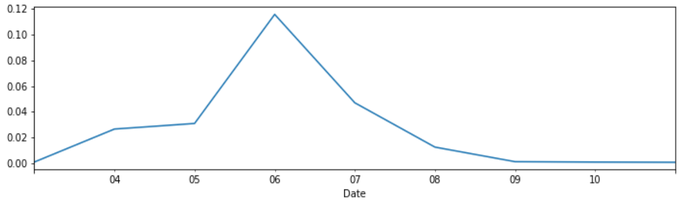

Fig. 4: R^2 of daily comparison

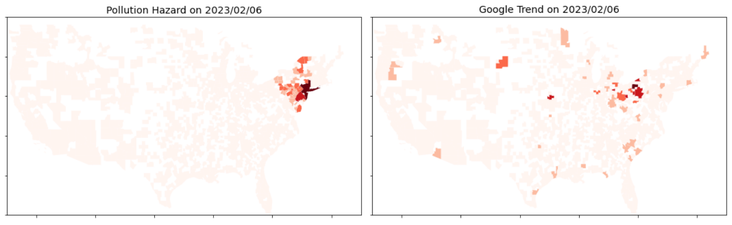

Fig. 5: Geographic Comparison Example

Significance

Our research emphasizes the importance of public attention towards those affected by disasters, such as the East Palestine community.

We stress the timeliness of social media for effective information dissemination during disaster situations.

Our proposed method of comparing simulated risk distribution with the actual attention trend effectively estimates people's awareness of the risk, which is critical in disasters management.