



Two-Stage Classifier for Detecting Campaign Negativity with Axis Embeddings in Persian Tweets

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Abstract

In elections worldwide, candidates often resort to negative campaigning due to pressure and the fear of failure. With the rise of social media platforms like Twitter, political discussions are now more accessible than ever. Given the vast amount of data generated, automated systems for detecting negativity in campaigns are crucial to understanding candidate strategies. In this paper, we propose a hybrid model for detecting negativity in campaigns using a two-stage classifier that leverages the strengths of two machine learning models. We collected Persian tweets from 50 political users, including candidates and government officials, and annotated 5,100 tweets published in the year leading up to Iran's 2021 presidential election. Our model first creates two datasets from the training set for two classifiers by calculating the cosine similarity between tweet embeddings and axis embeddings (the average of positive and negative embeddings). These datasets are then used to train the hybrid model. Our best-performing model (RF-RF) achieved a 79% macro F1 score and 82% weighted F1 score. Applying this model to additional tweets with the help of statistical models, revealed that a candidate's tweet publication timing does not affect its negativity. Still, the presence of political person names and organization names in tweets is closely linked to negativity.

Keywords: Campaign negativity, Two-stage classifier, Persian tweets, Axis embeddings

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