

Mapping the Sensitivity of the Public Emotion to the Movement of Stock Market Value: A Case Study of Manhattan

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ABSTRACT:

We examined whether emotion expressed by users in social media can be influenced by stock market index or can predict the fluctuation of the stock market index. We collected the emotion data by using face detection technology and emotion cognition services for photos uploaded to Flickr. Each face's emotion was described in 8 dimensions the location was also recorded. An emotion score index was defined based on the combination of all 8 dimensions of emotion calculated by principal component analysis. The correlation coefficients between the stock market values and emotion scores are significant ($R > 0.59$ with $p < 0.01$). Using Granger Causality analysis for cause and effect detection, we found that users' emotion is influenced by stock market value change. A multiple linear regression model was established ($R\text{-square}=0.76$) to explore the potential factors that influence the emotion score. Finally, a sensitivity map was created to show sensitive areas where human emotion is easily affected by the stock market changes. We concluded that in Manhattan region: (1) there is an obvious relationship between human emotion and stock market fluctuation; (2) emotion change follows the movements of the stock market; (3) the Times Square and Broadway Theatre are the most sensitive regions in terms of public emotional reaction to the economy represented by stock value.

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