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A computational approach for examining the roots and spreading patterns of fake news: Evolution tree analysis

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## ACCEPTED MANUSCRIPT

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## Abstract

To improve the flow of quality information and combat fake news on social media, it is essential to identify the origins and evolution patterns of false information. However, scholarship dedicated to this area is lacking. Using a recent development in the field of computational network science (i.e., evolution tree analysis), this study examined this issue in the context of the 2016 US presidential election. By retrieving 307,738 tweets about 30 fake and 30 real news stories, we examined the root content, producers of original source, and evolution patterns. The findings revealed that root tweets about fake news were mostly generated by accounts from ordinary users, but they often included a link to non-credible news websites. Additionally, we observed significant differences between real and fake news stories in terms of evolution patterns. In our evolution tree analysis, tweets about real news showed wider breadth and shorter depth than tweets about fake news. The results also indicated that tweets about real news spread widely and quickly, but tweets about fake news underwent a greater number of modifications in content over the spreading process.

*Keywords:* Fake news, evolution tree analysis, computational social science, misinformation, network analysis

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