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Full Diffusion History Reconstruction in Networks
AzTE Case # M16-047P

Inventors

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Background

The diffusion process in networks can be used to model many real-world processes, such as the spread of diseases, the propagation of a computer virus, and the propagation of information through a social network. Analysis of diffusion models can provide answers to important questions about epidemic-type phenomena. This makes it possible to trace networks back to the source or predict patterns in future scenarios. However, it is very expensive and difficult to monitor every node in the entire network and create a complete diffusion trace. Therefore, a simple, inexpensive, and accurate method is needed to map diffusion in networks.

Invention Description

Researchers at Arizona State University have invented a method to reconstruct the diffusion history from partial diffusion data. A snapshot of network data can be used to reveal the history as opposed to multiple snapshots at multiple times. To do this, the invention uses the Susceptible-Infected model instead of the independent cascade model. This enables the system to work accurately and more efficiently with less data.

Intellectual Property Status:
Pending

Potential Applications

- Disease Surveillance
- Malware & Antivirus Software
- Network Security
- Social Media

Contact

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Benefits and Advantages

- **Innovative** - New approach to identifying the source through analyzing the network.
- **Reduced Complexity** - Simpler method with less data required.
- **High Accuracy** – Uses less data to achieve higher accuracy than current methods.
- **Less Expensive** – Reduces costs by eliminating the need to monitor every node throughout the entire diffusion process.