

Information Dissemination and Opinion Dynamics within an Agent-based Model of Social Media Networks

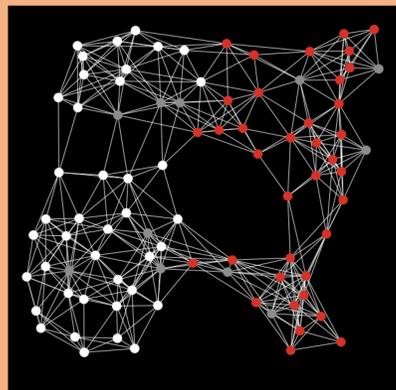
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Introduction

Social media networks are becoming dominant sources of information. This is even more evident as we enter an age in which even our national and world leaders are engaging with the public via social media. In a world where political leaders now have more followers on social media than some popular celebrities, it is crucial to study the impact that social media has on opinion dynamics and, subsequently, on decision-making. Agent-based modeling can provide a powerful tool for studying these phenomena.

Research Purpose

To develop an agent-based model of information dissemination and opinion dynamics on social media networks that fits with real-world social media usage.



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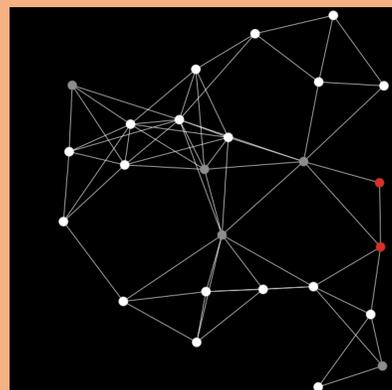
Literature Review

Prior studies have a variety of models to gain insights into information diffusion. The most common of these methods are epidemic-based models. Due to the many similarities between the spread of disease and the spread of information, these models work quite well. However, they have flaws:

- Increasing complexity when accounting for additional factors
- Lack of flexibility
- Lack of scalability

Utilizing agent-based models addresses these issues:

- They can be programmed to account for as many or as few factors as is beneficial for the study of information dissemination.
- They are flexible: once added, these functions can be turned off by the click of a button.
- Highly scalable: once a single agent has been designed, sliders can increase the population to any number that the computer can handle.



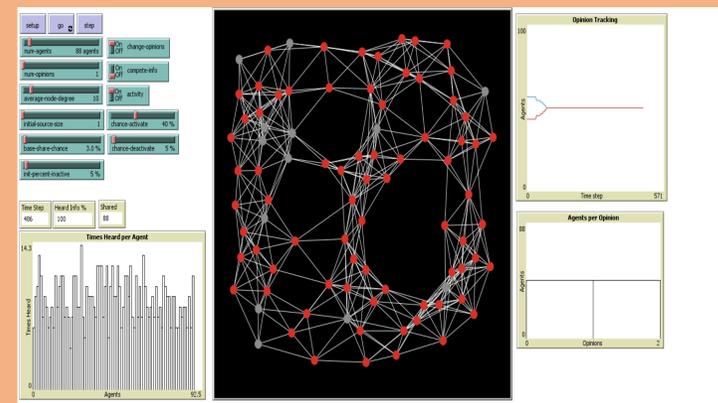
Methods

The model will be developed using the NetLogo model development environment. Agents within the model will have the following properties:

- A method for tracking the agents' opinions: This will consist of a bit string.
- Informed status: This will be a Boolean value that tracks whether the agent has received the information.
- Connections: The connections between agents will be determined by creating a slider within NetLogo that allows adjustment of the average degree of the nodes representing the users.

Agents will have the following behaviors:

- At each time step, agents that have received information will attempt to pass information to their neighbors.
- If user activity levels are turned on, then at each time step agents will have a chance to activate or deactivate to simulate being on or off line.
- At each time step, agents will have a chance to change their opinions based on how many times they have heard the new information and how long they have held their opinion.

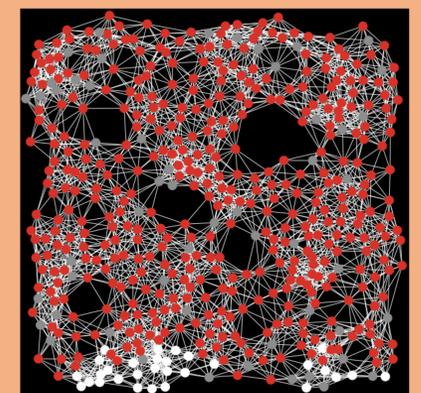


Expected Results

- An agent-based model can be created to fit information dissemination and opinion dynamics on social media networks as compared to statistical data from prior studies of social networks.
- Study of the model will provide insights into the effects of user activity levels and information dissemination patterns on the opinion dynamics of users.

Expected Implications

An agent-based model that fits with information dissemination and opinion dynamics will provide a useful tool for exploring how social media influences politics, economics, education and psychology among other possible areas of study.



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