CS/SDP 262 Computational Social Science

Fall 2020

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Title: "Effect of Social Media on Entrepreneurs in a Pakistan's Society"

Purpose: The purpose of this model is to simulate how a social media affects the stress levels of a social media entrepreneur

> **Storyline:** 'Alina is a shy 15-year-old teen with a passion of singing and playing guitar. She recently joined Instagram when her friends insisted her by showing the profiles of young influentials who showcase their talents and become famous on social media, but deep down she knew she was doing it to not be left out. This was just an addition to the plethora of social Medias she is part of. With the first music video, she posted on Instagram her life turned into a nightmare. She was subjected to all sorts of comments in school and on social media platforms. She was bullied to an extent that she begged her mom to homeschool her. Alina was called "fat" and "ugly" at first and then it turned into people calling her a "slut" long before she even understood the meaning of the word. When she had her hair cut because she wanted to feel good about herself, the name-calling changed to "pretty boy". This is the extent of what social media can do to entrepreneurs who use social media for spreading their talent. We will explore how the mental health of young entrepreneurs gets affected by social media in our project.

1. Entities, State Variables and Time

a. Agents: Agents represent individuals in a 2D grid and are randomly positioned. They represent users of a social media. Some of them are entrepreneurs.

Agents are characterized by the following attributes:

- **influencer?:** A boolean attribute that tells an agent's entrepreneurship status. True if an agent is an entrepreneur, false otherwise.
- **color:** An agent is colored magenta if it is an entrepreneur, otherwise green
- **stress-threshold:** Ranges between 0 and 100 and tells the stress levels of a user. If it goes above 80 an entrepreneur stops being an entrepreneur

- **become-influencer:** Ranges between 0 and 100 and tells the threshold of an agent wanting to become an entrepreneur. If it goes above 90 an agent will become an entrepreneur.
- **friends:** Ranges between 0 and number of agents. It is the number of friends/connections an agent has.
- **age:** The age of the user. It is randomly set between 18 and 40.
- **followers:** The number of followers an entrepreneur has. It is the number of links an agent with influencer? = true has.

b. Time: one tick represents one week's time.

2. State/Global Variables

- **num-users:** The number of total users. Set as a slider between 0 and 1000. Default is 200.
- **percent-entrepreneur:** Number of entrepreneurs at the start of the simulation. Set as a slider between 0 and 100. Default is 5.
- **stop-it-weeks:** The number of ticks after which the simulation should stop. Set as a slider between 1 and 100. Default is 250. Each tick is a weeks' worth of time.
- **num-friends:** Max number of friends an agent can have at the start of simulation. Set as a slider between 0 and num-agents. Default is half of num-agents.

3. Process Overview and Scheduling

At every step these steps are taken:

- Agents age by a year after every 56 time ticks i.e. an year
- The procedures influencer-follow, stress, and end-entrepreneur are called on every entrepreneur to check if it will stop being an entrepreneur.
- The procedures follow-new, influence, and become-entrepreneur are called on every user to check if it will become an entrepreneur.
- All users add friends based on the criteria described in section 9.

4. Sensing

All the agents know which of the them are the influencers. This way they then decide to follow them or not and later on become influencers themselves.

5. Interaction

Agents add each other as friends at every time step based on their age and stress-threshold

6. Stochasticity/Randomness

a. Location of agents is randomized

b. Entrepreneurs are randomly selected at the start of the simulation

c. The age of the users is set randomly between 18 and 40.

7. Setup and Initialization

- Agents are created and randomly placed in the environment and given the shape “person”.
- All agents are given the color green and their influencer? attribute is set to false and their stress-threshold is set to 0
- Friendships are created randomly by using the num-friends attribute
- They are given an age between 18 and 40
- A random number between 0 and 100 is generated and used to make percent-influencer number of influencers.
- If they are of age more than 34 or age less than 21 and they are an influencer then their stress-threshold is set at 50
- Links are created between social media users and the entrepreneurs. An agent is connected to a random amount of entrepreneurs
- They are given colors, green for users, magenta for entrepreneurs

8. Outputs

A time series plot showing how many entrepreneurs are there in the entire population

9. Processes

- **become-entrepreneur:** An agent becomes an entrepreneur depending on the attribute become-influencer. If the agent’s become-influencer is more than 90 then it becomes an influencer. Their color is converted to magenta and its stress-threshold is set at 50.
- **end-entrepreneur:** An agent stops being an entrepreneur depending on the attribute stress-threshold. If the agent’s stress-threshold is more than 80 then

it stops being an influencer. Their color is converted to green and its stress-threshold is set at 0.

- **stress:** The stress-threshold of an entrepreneur is increased by 10 if it has more than 50 followers and more than 100 friends.
- **influence:** The become-influencer of a user is increased by 1 here if it is following more than 10 entrepreneurs and has more than 50 friends.
- **add-friend:** Agents add 1 agent as friend based on their age and stress-threshold. If their age is between 18 and 35 and stress-threshold is below 70 they will add one new friend.
- **influencer-follow:** An influencer decides to follow other influencers at each step based on its own attributes. If its stress-threshold is lesser than 80 and has more than 50 friends it will follow another influencer i.e. create a link with it.
- **follow-new:** A user decides to follow an influencer based on its attributes. If it has become-influencer more than 40 more than 50 friends then it will follow a new influencer i.e. create a link with it.

10. Observations and Assumptions: The variables made in the model are made in such a way that they represent a real-life scenario. For example, the stress-threshold increases at a much larger rate than the become-influencer as in real-life an entrepreneur would feel more stressful quickly then a user wanting to become an entrepreneur. In the long run we noticed that the number of entrepreneurs becomes stable and does not change but it increases drastically at the start. This is because it is easy to influence others into becoming something when they observe it themselves but over time it stops being a trend and the number of that thing (entrepreneurs here) stabilizes.