

[[]RQ4] If external aids are available, which role of digital volunteers will enhance the disaster community resilience better between passive and active information sharing?

Effects of Social Media on the Voluntary Sharing Behavior for Disaster Relief

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3. Methods

- We developed an **agent-based model** based on theories and case studies about prosocial behaviors (inequality aversion) in a disaster
- Model description
- Network: 11 x 11 grid structure (121 agents)
- Fraction of the social media users in a community (0~100%)
- Individual social network:
- Four immediate neighbors (default)
- Situational awareness: Knowledge about additional acquaintances through social media (0~100%)
- Probabilistic choice model to decide whether to donate or not

 $\exp(\eta * E(U_{donate}))$

- $\exp(\eta * E(U_{donate})) + \exp(\eta * E(U_{not donate}))$ • Disaster: Randomly chosen disaster-affected people loose half of their resources
- at the beginning (0~100%)
- Simulations: 50 runs, 100-time steps



4. Results and Discussion

- [RQ1] As the fraction of social media users expands, can it increase the voluntary sharing behavior among potential help-donors? Constant ORPs scenario can transfer more reliefs and allocate reliefs more
 - equally than Diminishing ORPs scenario • In Diminishing ORPs scenario, the more social media users does not guarantee
 - the higher level of cooperation



- [RQ2] As the use of social media enhances people's situational awareness, can it reduce the level of inequality in the distribution of relief goods among people? Enhanced situational awareness can increase the efficiency of relief sharing
 - Up to the threshold (~ 20%), situational awareness can decrease the inequality



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because the ratio of transferred reliefs is decreased while Gini index is lesser



- Our results reveal that the use of social media generally enhances the quantity and equity of voluntary relief sharing but not always
- Information exchange through social media is important not only because of the increased matching possibility between help-donors and help-seekers but also because of the enhanced situational awareness that promotes inequality-aversion
- Implications on disaster management using social media 1) Making sub-groups of social media-based network 2) Enhancing situational awareness up to the threshold
- Behavioral experiment using Amazon Mturk
- i.e, Houston and Denver, TX
- Dynamic change of social network according to time and location
- Socio-economic contextual factors (resource distributions, resource types)
- Mixed other-regarding preferences (altruism, selfish, social welfare)





Future steps