Agent based simulation of warning channel impacts

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Forecasting and simulation has become increasingly important in crisis management. Especially the behavior and reaction of the population gains more and more attention in order to improve crisis management. We present a new tool that simulates the impact of different warning and alerting channels in the population. This tool is developed as part of Alert4All, which intends to further the warning of the population and support crisis management organizations.

The simulation uses an agent based model, incorporating theories from the "Crisis Perception Model", "Validity Claims", "Cultures and Organizations" and "Social Cognitive Theory". Additionally, a previous study on impacting factors of warning messages on human behavior is included. In the simulation, each individual agent can assume one of four states (received, threat perceived, believed, acted). These states can be changed by propagation of warning or alert messages towards the population, sourcing from simulated "official" channels (e.g. sirens, radio or TV) but also informal channels ("spreading" of information between individuals).

Experts from crisis management organizations are involved in the development of this tool by giving input and feedback on issues like use cases, relevant modeling and simulation functionalities and usability. The experts perceive the simulation tool to be helpful in two main areas: in the planning and preparation of alerting plans and for the selection of an efficient warning channel mix in a time critical warning situation. In order to create an optimal user experience, a user-centered design methodology was used. This was done in form of usability workshops and feedback sessions.

In the current final stage of the project, experts from crisis management organizations evaluate the simulation by hands-on prototype testing. Furthermore, an integration process into the Alert4All crisis management system is currently in development, contributing to an integrated demonstration event.