

Ant colonies help evacuees in disaster zones

April 16 2014

An escape route mapping system based on the behavior of ant colonies could give evacuees a better chance of reaching safe harbor after a natural disaster or terrorist attack by building a map of showing the shortest routes to shelters and providing regular updates of current situations such as fires, blocked roads or other damage via the smart phones of emergency workers and those caught up in the disaster.

Koichi Asakura of Daido University in Nagoya and Toyohide Watanabe of the Nagoya Industrial Science Research Institute in Japan have carried out successful simulations of the construction of navigational maps using this approach and report details in the *International Journal of Knowledge and Web Intelligence*. Following a major earthquake, tsunami, typhoon or other disaster it is crucial for those affected, including [emergency workers](#), to obtain and share accurate and timely information about the situation as it unfolds. Lives can only be saved if evacuation to safe areas and shelters is not stymied by blocked roads, fires and other problems.

The team's new system has two key features: First it utilizes the [smart phones](#) that are now ubiquitous across cities as networked, mobile sensors that can feed information back to emergency centers. The second feature exploits our understanding of the behavior of an ant colony. This provides a way to determine whether or not particular problems are recent or not, just as individual ants use pheromone trails, and the concentration changes in those pheromones to assess how recently a colony member left a particular signal and so find the optimal routes to and from the nest via food supplies. By using this approach to

analyze the data from myriad smart phones as evacuees head for shelter, it is possible to build an active navigational map using the phones' GPS and other tools.

The system circumvents the problem that would be almost inevitable during a disaster that closed circuit television (CCTV) cameras would be unreliable whereas sufficient numbers of wireless communication devices might remain active for sufficient time given a large enough number of service providers and communication towers spread widely across the disaster area. The next step will be to develop an ad hoc mobile networking system so that evacuees can themselves access these active maps rather than the present system that provides advice to emergency services for guiding evacuees. Such a network might also circumvent the problem of service provider outages by allowing individual smart phones to create a local network.

More information: "Construction of navigational maps for evacuees in disaster areas based on ant colony systems" in Int. J. Knowledge and Web Intelligence, 2014, 4, 300-313

Provided by Inderscience Publishers

Citation: Ant colonies help evacuees in disaster zones (2014, April 16) retrieved 2 May 2024 from <https://phys.org/news/2014-04-ant-colonies-evacuees-disaster-zones.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--