Development of an Agent Based Model to Optimize Restoration Strategies and a Case Study of “Future” Hurricane Sandy

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Introduction
In August 2011 and October 2012 Hurricanes Irene and Sandy caused $13.5 billion and $65 billion of damage in the United States. The restoration times for these storms were 10 and 11 days, respectively for Connecticut. It remains a question whether different restoration strategies or more resources could have improved the restoration process.

Methods
An agent based model (ABM) is a computer modeling technique comprised of agents who are given certain behavioral rules and operate in a given environment. ABMs allow the user to simulate complex systems by varying user-defined parameters to study emergent, unpredicted behavior. This model could be used to justify decisions made in a restoration process or to see if increased resources can improve the estimated restoration time.

Input Data
Eversource provided the number of crews working, storm restoration curves, power line and area work center locations. The road network of Connecticut was obtained from the UConn Map and Geographic Information Center. Dijkstra’s search algorithm calculates the optimum path to the next outage along the road system.

Future Work
We are working on combining the ABM with the outage predictions from the Wanik et al. 2018 paper titled “A Case Study on Power Outage Impacts from Future Hurricane Sandy Scenarios” to study how climate change can impact the restoration time of storms, and therefore the resources needed for reasonable restoration.

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