



Disaster Relief: Integrating Human Expertise & Models

Jensine Wagner '25

Faculty Advisor: Dr. Kousen

Department of Computer Science, Trinity College

Introduction

Hurricane response requires quick, effective coordination of people and resources.

This project introduces a dynamic simulation that models disaster scenarios to help explore life-saving strategies, like placing shelters, dispatching rescue workers, and minimizing casualties.

Key Features of the Simulation

- Interactive Placement: Users can place buildings and define scenarios.
- Danger Zone Simulation: Represents an active threat areas with trapped civilians.
- Rescue Units: Move autonomously to save people and return to stations.
- Shelter Limits: Tracks and enforces shelter capacity.
- Time Tracking: Measures simulation time

Simulation Use Cases

This model supports flexible scenario-building for researchers and emergency planners. Key applications include:

- Scenario Testing

This allows users to test assumptions, compare strategies, and refine response tactics in a controlled environment.

- Urban & Disaster Planning Support

The model can assist city planners and emergency management professionals

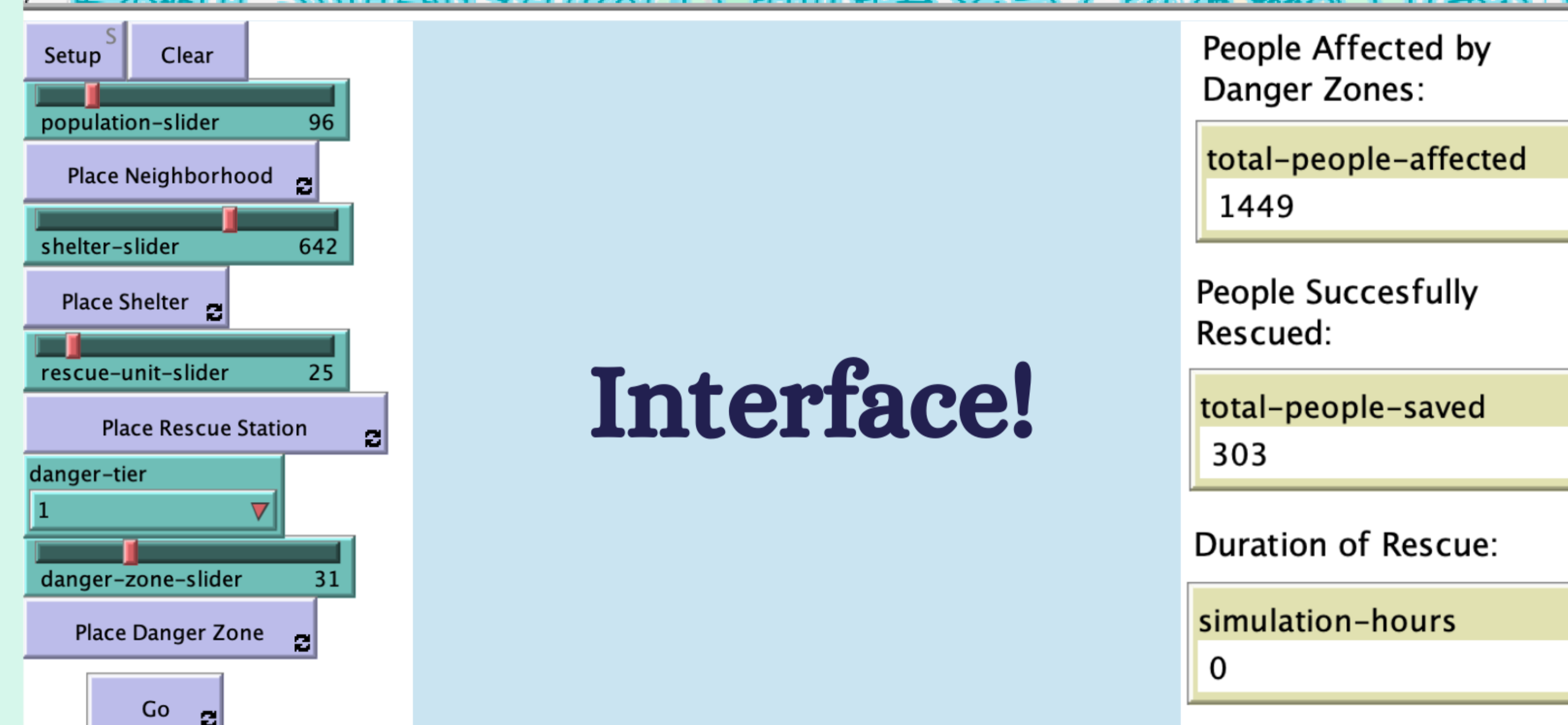
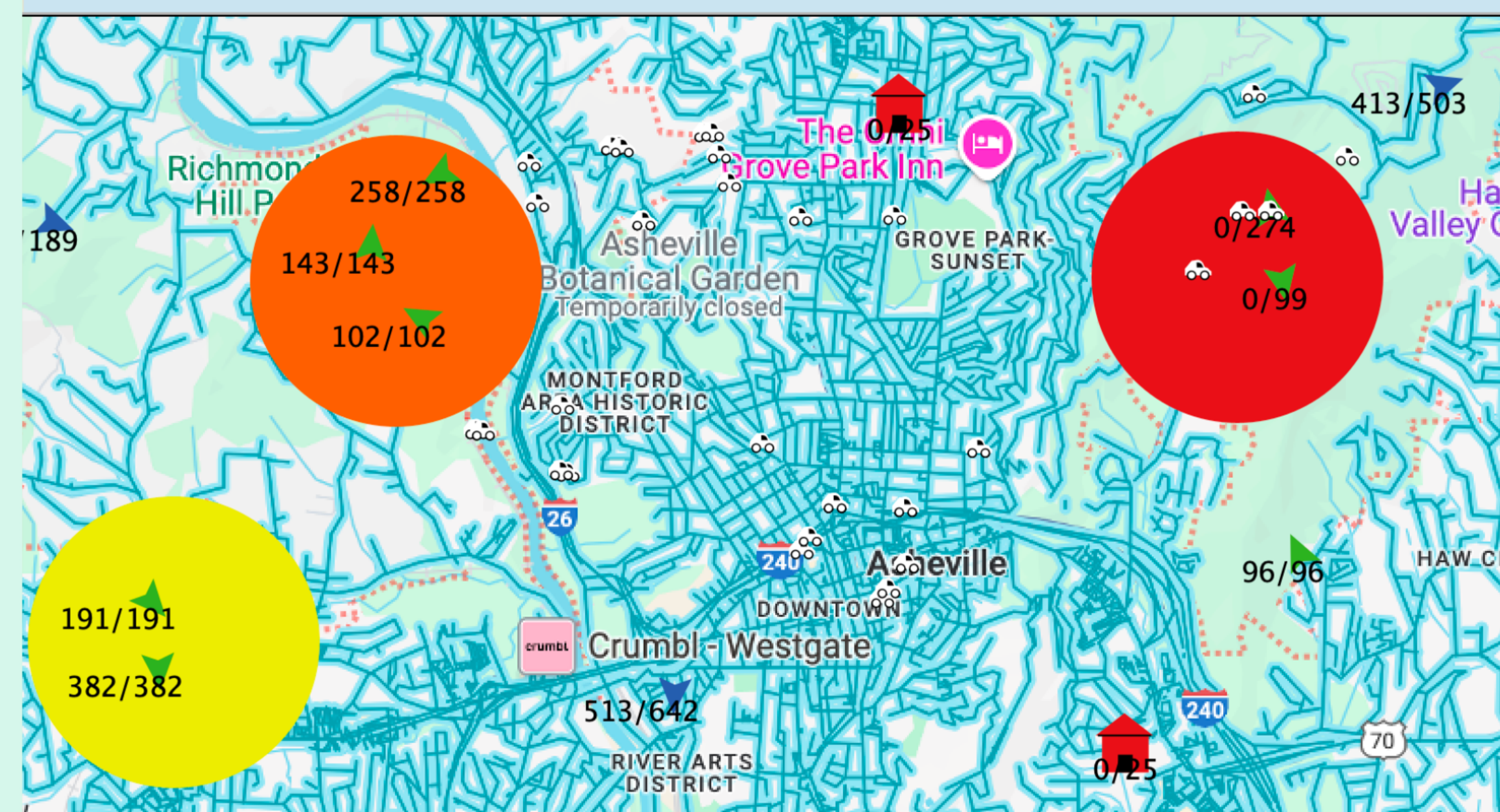
Methodology/Technology

Developed using NetLogo, a platform for building agent-based models that simulate complex systems over time.

- Uses a grid-based environment where users configure disaster scenarios
- Rescue logic:
 - Rescue units → danger zones
 - Rescued individuals → available shelters

Data collection includes:

- Total number of people rescued
- Average rescue time per individual
- Total simulation duration
- Casualty count (unrescued individuals)



Future Work

- Make the danger zone dynamic, changing shape, location, or severity over time.
- Integrate weather or traffic overlays to influence rescue paths.
- Build an export function so data from simulations could be analyzed in R or Python.

Acknowledgements

This project was supported by:

- Dr. Kousen, Senior Thesis Advisor
- Will Deter, Emergency Management Specialist and project consultant