

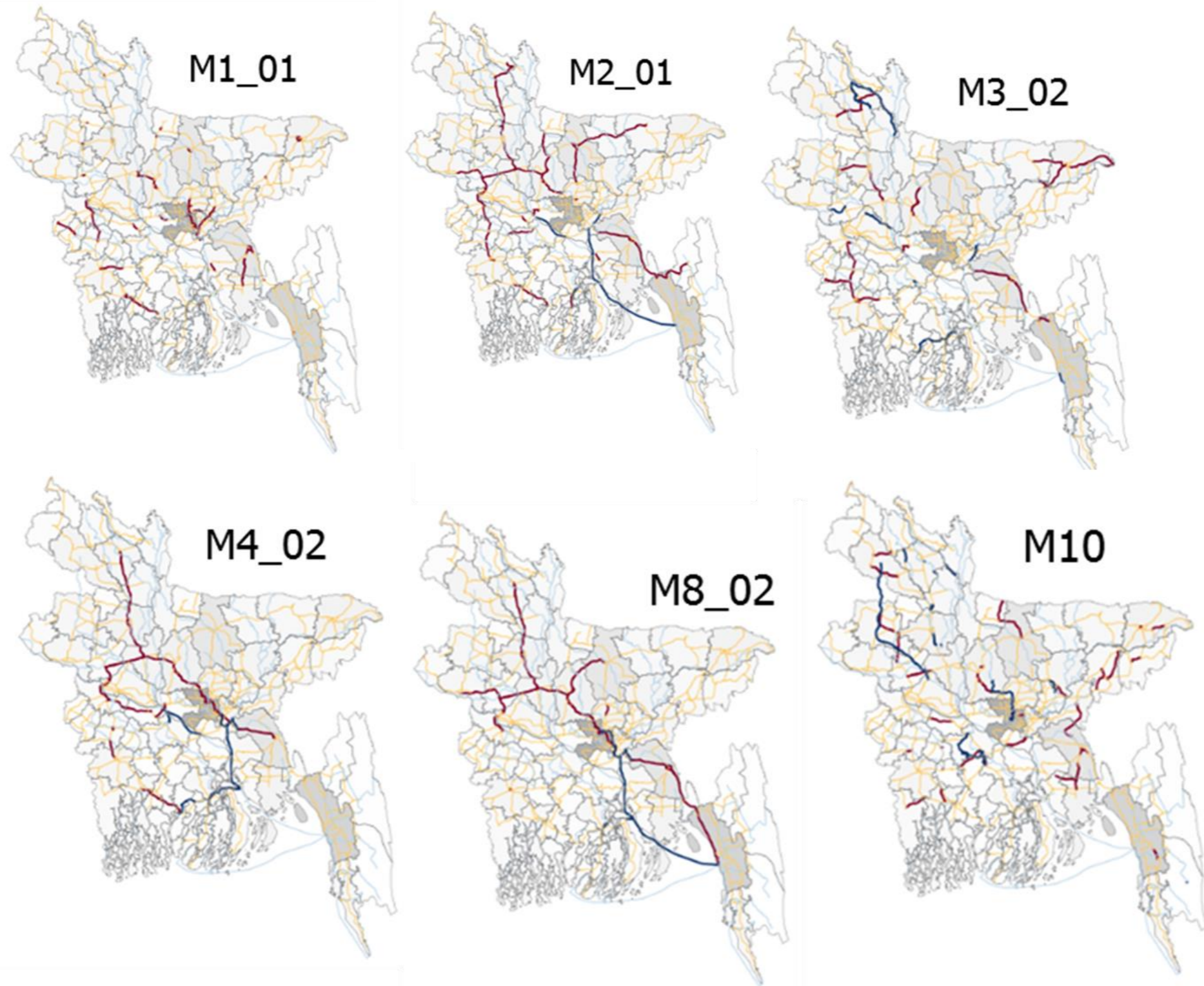
Criticality and vulnerability assessment of the multimodal transport network of Bangladesh

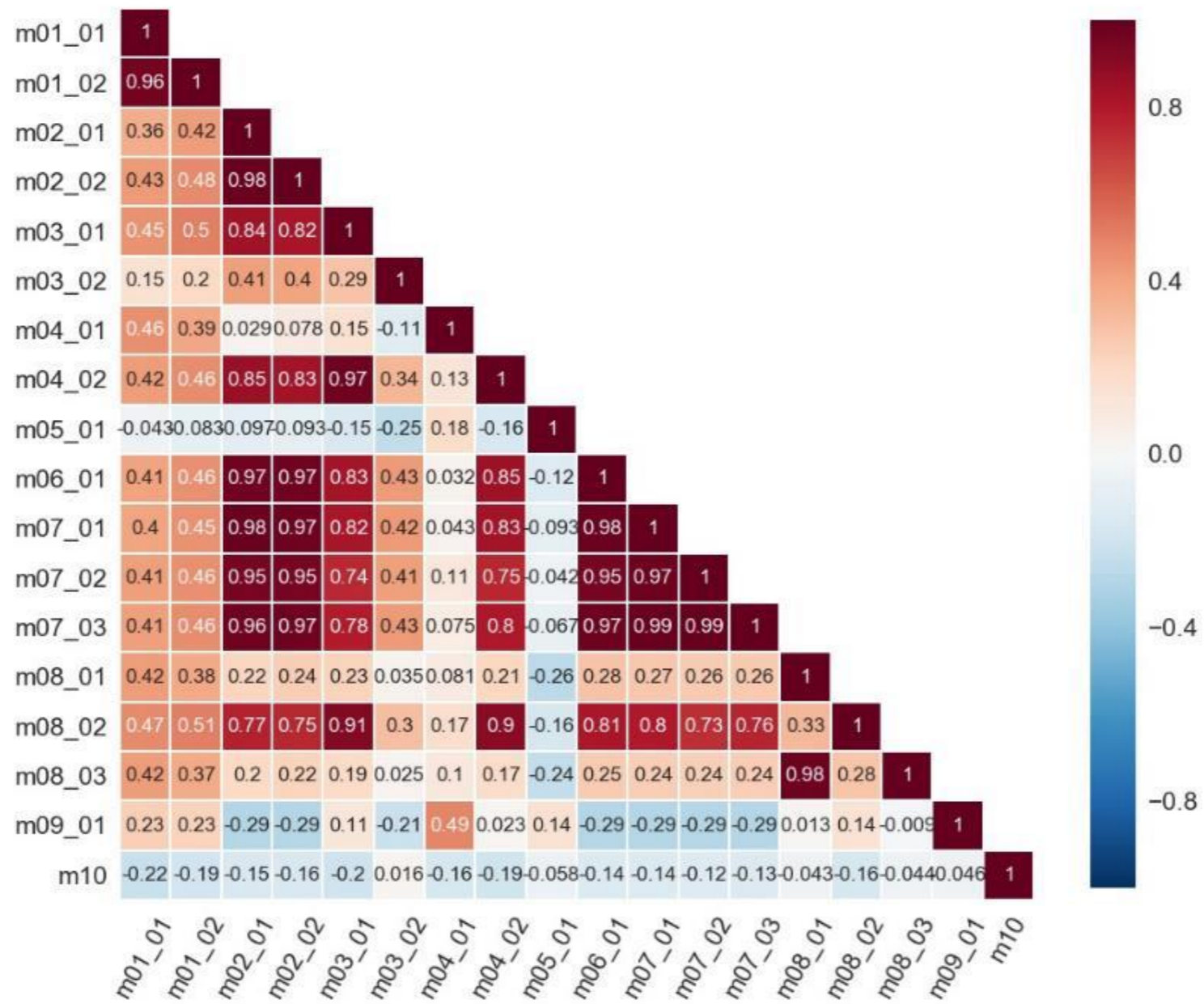
Jan Kwakkel

Objectives

- **Understanding the criticality of the transport network**
ranking each transport network segment based on its relative importance for the functioning of the system
- **Evaluating the vulnerability of the transport network**
how is system functioning affected when multiple links in the network are simultaneously disrupted
- **Exploring the impacts of different investment options under deep uncertainty**
how is system functioning changed due to interventions

Criticality analysis





Vulnerability analysis

CentroidRoutesApp

CentroidRoutes

33:56:15.000 0000:00:00.000

0.1 0.2 0.5 1 2 5 10 20 50 100 200 500 1K ∞

ID [dropdown] black brown red orange yellow green blue magenta gray white

Waterway: [checkbox] Waterway [checkbox] WwTerm [checkbox] WwTermId [checkbox] N-Roads [checkbox] N-RoadId [checkbox] R-Roads [checkbox] R-RoadId [checkbox] Z-Roads [checkbox] Z-RoadId [checkbox] Bridge [checkbox] BridgId

GIS Layers [checkbox] Roads [checkbox] Railways [checkbox] Rivers [checkbox] WFP-water

Transport [radio] None [radio] Garment [radio] Textile [radio] Food

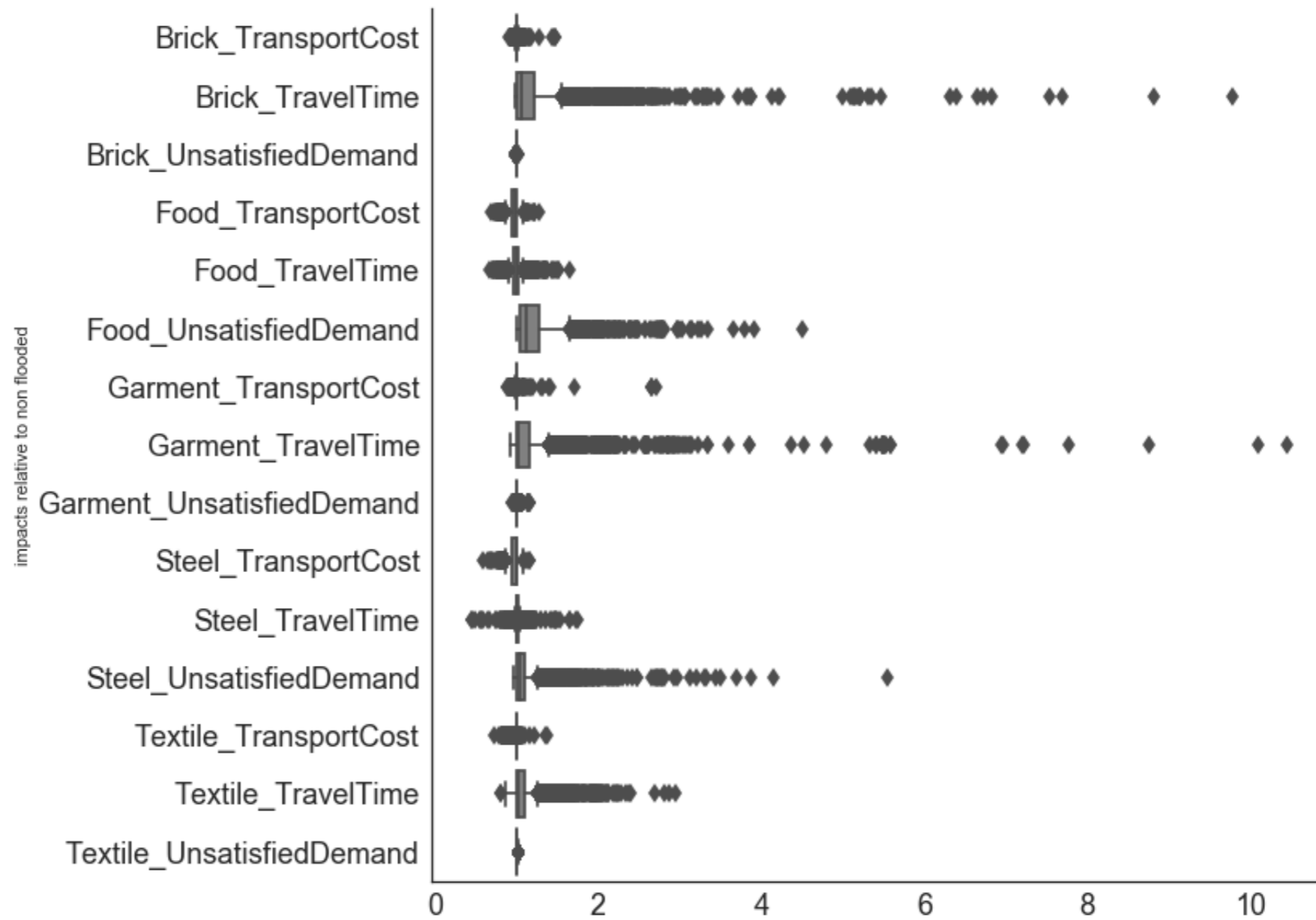
animation console settings

OTSSimTimeDouble [time=122276.000s(POSIX)]

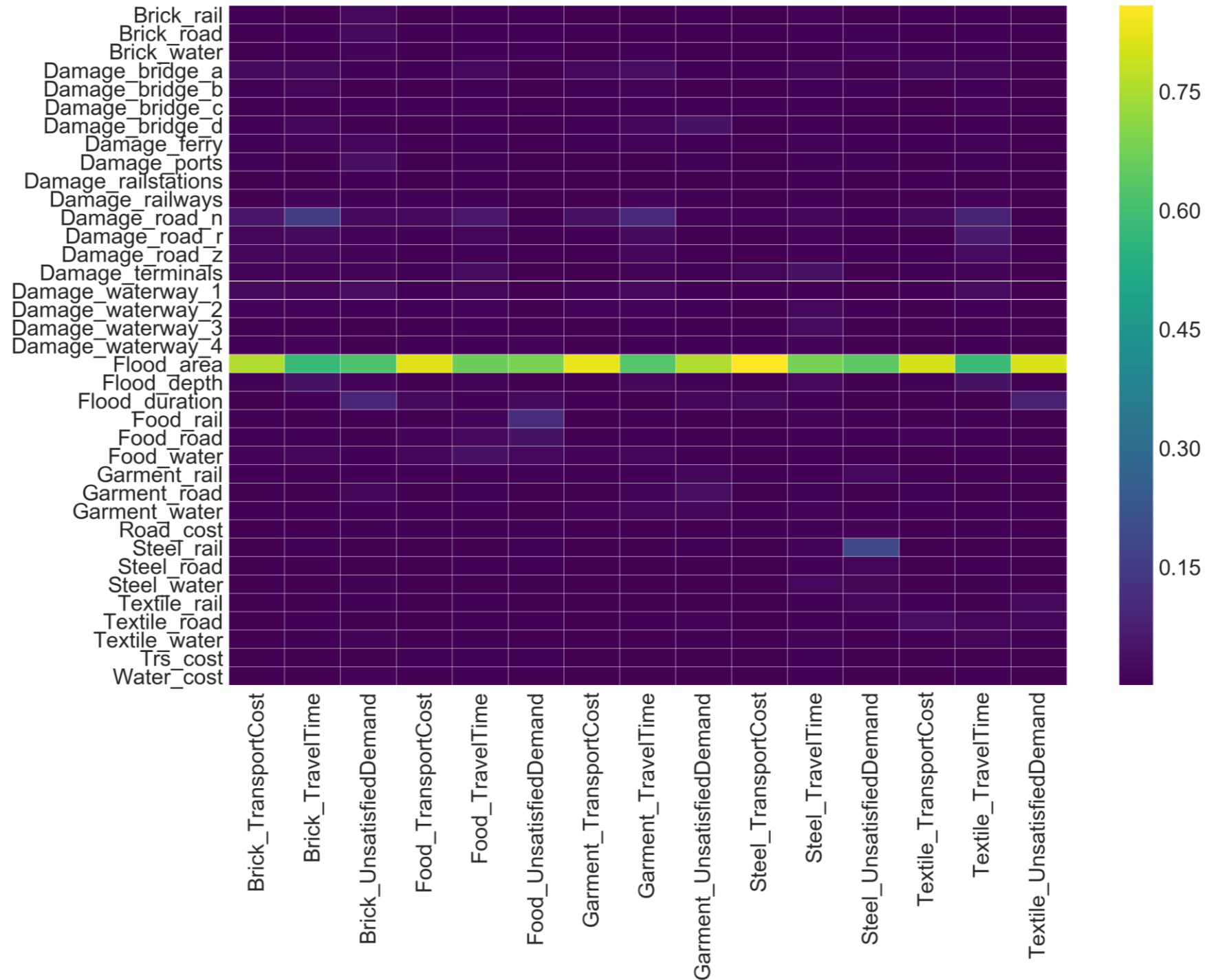
Nov 14, 2017 3:15:28 PM

The screenshot displays the CentroidRoutesApp interface. At the top, the title bar shows 'CentroidRoutesApp' and system icons for network, battery (70%), and time (Tue 15:15). Below the title bar, the application window title is 'CentroidRoutes'. The main interface features a toolbar with play, pause, and refresh icons, a zoom slider ranging from 0.1 to 1K, and a timer showing '33:56:15.000' and '0000:00:00.000'. A legend at the top allows for color selection for different node types: black, brown, red, orange, yellow, green, blue, magenta, gray, and white. On the left, there are several panels: 'Waterway' with checkboxes for 'Waterway', 'WwTerm', 'WwTermId', 'N-Roads', 'N-RoadId', 'R-Roads', 'R-RoadId', 'Z-Roads', and 'Z-RoadId'; 'Bridge' with checkboxes for 'Bridge' and 'BridgId'; 'GIS Layers' with checkboxes for 'Roads', 'Railways', 'Rivers', and 'WFP-water'; and 'Transport' with radio buttons for 'None', 'Garment', 'Textile', and 'Food' (which is selected). The main map area shows a geographical map of Bangladesh with numerous nodes labeled with letters (e.g., Burimari, Sonamosjid, Chittagong) and connected by lines. The map is color-coded according to the legend, with many nodes appearing in yellow and orange. At the bottom, there are tabs for 'animation', 'console', and 'settings', and a status bar showing 'OTSSimTimeDouble [time=122276.000s(POSIX)]'. The system tray at the very bottom shows the date and time 'Nov 14, 2017 3:15:28 PM' along with various application icons.

Vulnerability analysis



Feature Scoring



Interventions

