Bi-directional Search for a Shortest Path

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Research Experiences for Undergraduates (REU)
Computational Modeling Serving the City
Symmetry Helps: Bounded bi-directional dynamic programming for the elementary shortest path problem with resource constraints

- Giovani Righini, Matteo Salani (2006)
The Problem

- Find the shortest path through a graph
- Satisfy a set of constraints
  - Cost function
  - Multiple cost functions
  - More specific rules/ways to frame
- Example (My Project): How best to reduce pollution exposure for middle school students in NE Portland?
The Approach

● Dynamic Programming
● Search from both the end and start node
● Extending better solutions
● Using constraints to limit the number of paths searched
An agent-based model of coffeeshop crowdedness

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Modeling Ideas

● Tries to capture the time distribution of customers overall

● Two kinds of agents: shops and customers

● Gravitation towards shops based on proximity, crowdedness of shop, and tiredness of the customer

● Once in the shop there is a decrease of tiredness and an increasing random chance to leave and tiredness decreases
Red dots are coffeeshops and blue dots are agents