Specification Requirement Document

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Introduction

We are going to simulate an intelligent transportation system aimed at limiting the emission within cities.

Specifications

Control

Sensors

- Emission Beacons

  Emission sensors that have a network connection to the system around the city used to calculate an average of the pollution in the city.
  The number of beacons per city will depend on the area of the city.
  The number can be calculated using an area metric like density (number of beacons per square meter).

- Car radar

  Radars will be used to estimate the traffic volume between the cities at least one at the start of each side of every road between cities

Actuators

- Automated / Electric road gate

  Closing and opening roads coming or leaving from the city. One for each side of every road between cities

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Plant

The plant is a graph model of cities where the nodes are the cities and the directed edges are highways connecting cities.

Cities (Nodes)

Every city node simulates the pollution currently in the city using a stochastic model for the internal traffic and infrastructure and the pollution from the vehicles going into and out of the city.

Highways (Edges)

Every edge simulates the throughput of cars and/or pollution from the vehicles moving on the route. The edge also has two "opened" states that determine if the city on either sides allows vehicles at the moment.

Notes

- The model can be scaled to fit inside a single city where edges and nodes would represent roads and crossroads respectively.
- The model can also be used as a load balancing model with minimal changes.