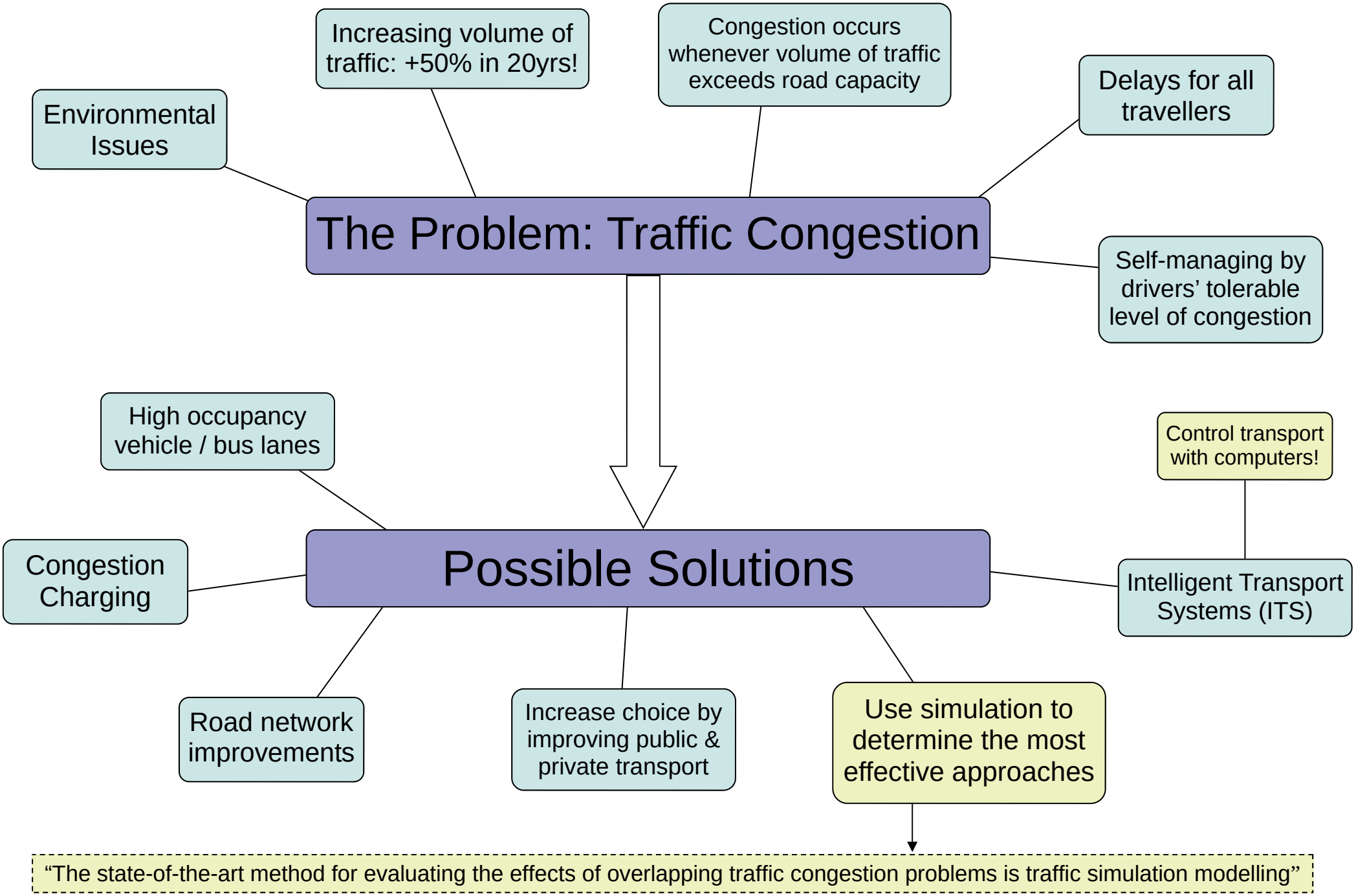

Increasing volume of traffic: +50% in 20yrs!
Congestion occurs whenever volume of traffic exceeds road capacity
Environmental Issues
Delays for all travellers
The Problem: Traffic Congestion
Self-managing by drivers' tolerable level of congestion
High occupancy vehicle / bus lanes
Control transport with computers!
Congestion Charging
Possible Solutions
Intelligent Transport Systems (ITS)
Road network improvements
Increase choice by improving public & private transport
Use simulation to determine the most effective approaches
"The state-of-the-art method for evaluating the effects of overlapping traffic congestion problems is traffic simulation modelling"

Aims of Project

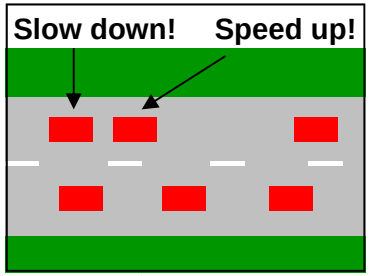
To develop a prototype traffic simulation tool using multi-agent systems

General aims: *It should…*

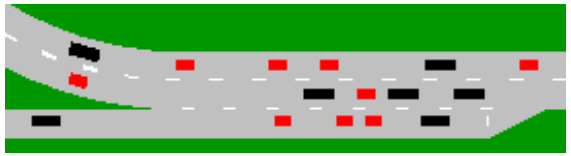
- Be easy enough for anyone to use.
- Be able to evaluate various congestion remedial solutions (i.e. HOV lanes).
- Include macroscopic results in graph form (i.e. average speed, flow, density).
- Be able to easily import the map of the road network and other features.
- Model different classes of vehicle and drivers with different behaviours.
- Model / simulate vehicle interactions and traffic control mechanisms with a fairly good level of realism by building on approaches found to be effective by respected authors.

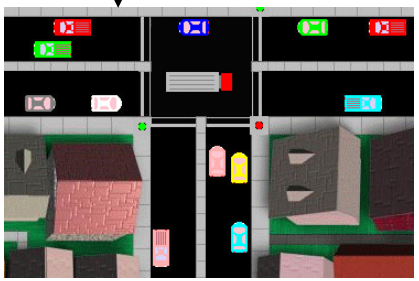
Traffic Simulation

- Macroscopic Simulation
  - Model traffic flow with mathematical models
- (Techniques)
- Microscopic Simulation
  - Model vehicles individually
- Car following functionality

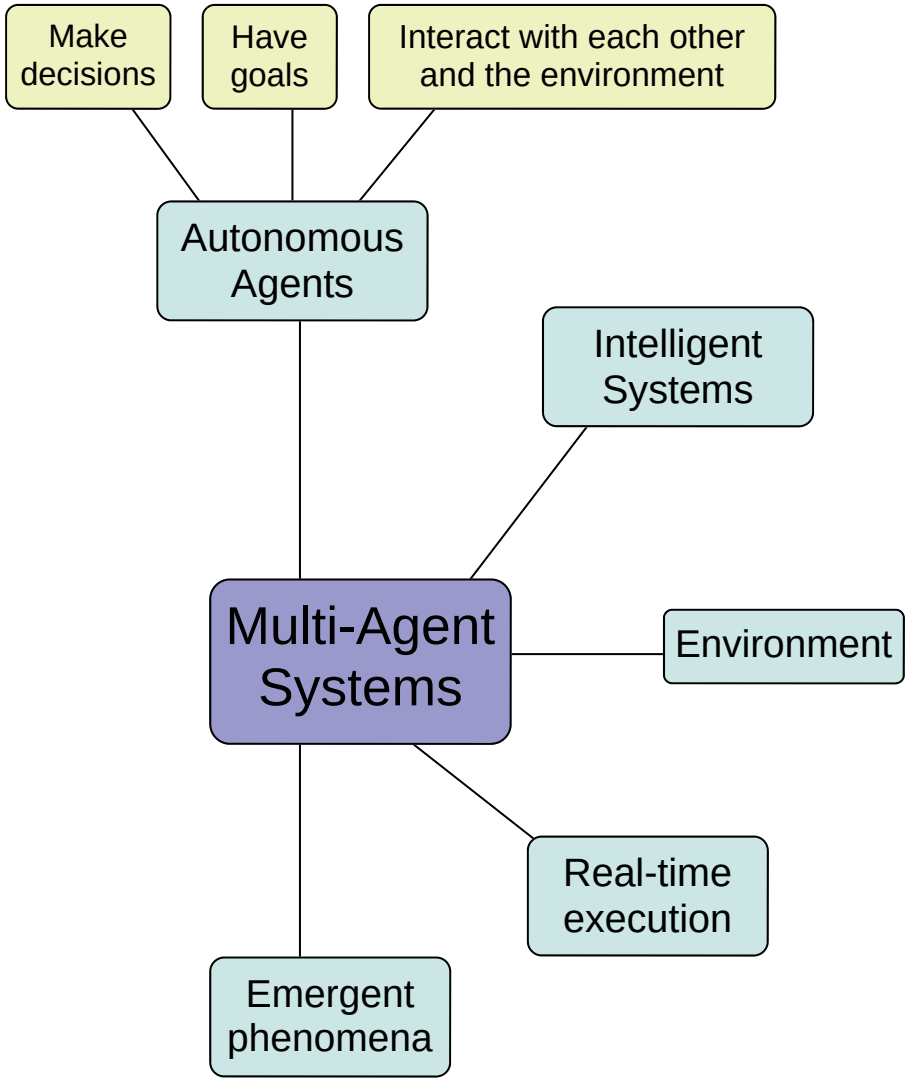


- Lane changing functionality
  - Overtaking
  - Turning at a junction
  - End of lane or obstruction
- Intersection Control
  - Roundabouts
  - Traffic Lights
- Scenario
  - Highway
  - Urban





- Modelling
  - Collisions
  - Buses
  - Pedestrians, Cyclists
  - Cars
  - Road Network Links & Nodes
  - Drivers
- Applying Traffic Rules
  - Speed limits
  - Right of way



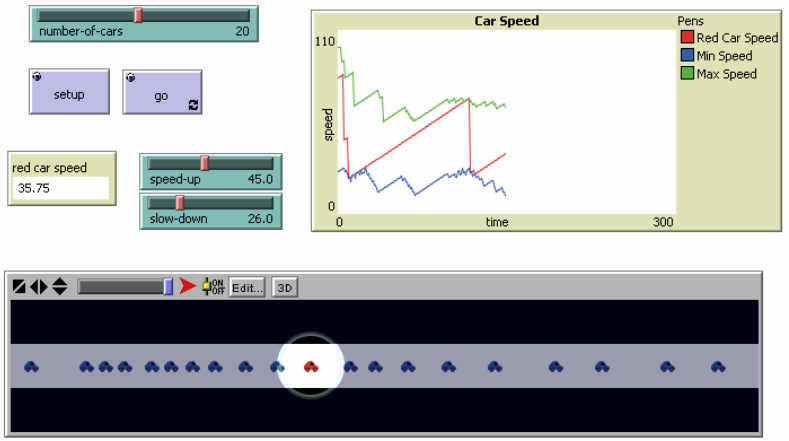
NetLogo Modelling & Simulation Environment

NetLogo is a simple but powerful multi-agent simulation environment written in Java.

It allows the designer to focus on the **properties** and **behaviours** of the **environment** and **agents** rather than be drowned in complex code.

Agents are programmed in terms of how they **interact** with each other and the environment, for example one might ‘ask’ the agent in front to move.

It allows you to create an **interface** for each model with inputs (sliders etc) to alter variables and outputs (graphs) to analyze **emergent behaviour**.



NetLogo “Traffic Basic” sample model