Modeling of Traffic Patterns on Highways

Jordan Hurley 2005-2006
Computer Systems Lab

Abstract

With the population shift to suburbs and the overall increase in population, the transit systems built as recently as 15 or 20 years ago have become problematic because they do not have enough space.
Traffic jams form and dissolve, even when there are no accidents. The capability to model these situations would enable persons to predict these sorts of events, and thus the situations could be avoided, leading to a decrease in travel time even as overall volume increases.

Background

Most previous studies in traffic have been aimed at comparing the flow of cars to fluid dynamics. While that makes for a good approximation, the actual flow is different, because the molecules in fluids do not have minds of their own, and all have the same properties. A new model must be created to accurately simulate true traffic flow.

Methodology

Using NetLogo as a modeling tool, the project creates new cars at the left side and has them disappear at the right. Individual characteristics are given to each car., including speed, speed limit, and a patience value that reflects the likelihood to change lanes. An effort to create an efficient, accurate simulation of lane changing required extensive trials, and is close to being perfected. The cars use the environment around them in an effort to move to the right of the screen at speed and without crashing.