

Method for Coordinating Traffic Lights and Reducing Traffic Congestion

Patent Pending

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Description

Rush hour traffic congestion and long commutes are part of urban life in much of the world. Our invention is a traffic light control methodology, road geometry design, and hardware, which enables motorists, bicyclists and pedestrians to make every traffic light with a suitable road geometry. This method eliminates or minimizes traffic congestion by substantially reducing red light wait time while maximizing traffic flow. It reduces highway congestion by showing how to build uninterrupted roads parallel to highways. Briefly, we provide a framework for reducing highway congestion, reducing stops at red lights, and an insight on how to design/modify roads to best meet urban needs.

Problem Addressed

Using this method, a motorist going in any one of four orthogonal directions, traveling at a constant average speed and starting from any point on our system of roads, makes every traffic light regardless of how far the motorist travels. The system of roads supports the maximum possible vehicle flow at any point on the arterial road system. The system has the ability to adapt to traffic demand. During a traffic slowdown due to inclement weather or heavy traffic periods, as well as when traffic conditions are good, the method allows for an optimal adjustment in vehicular speeds to obtain maximum uninterrupted traffic flow. The invention is applicable to a system of alternate one- or two-way roads.

Advantages

- Invention gives travelers (motorists, bicyclists and pedestrians) feedback to make traffic lights.
- It improves vehicle, bicycle and pedestrian transportation and traffic flow by reducing red light stops.
- Cities or countries that cannot afford over/under passes can use this methodology to build roads that function like highways in the sense that vehicles make all traffic lights.





Figure 1: Depiction of a system of alternate one-way roads on a regular grid. The gray squares represent blocks; white lines are roads. Green arrows move at constant speed in the direction of the arrow, never stop, never collide, and are always moving through intersections. When a green arrow enters an intersection the traffic light turns green; as the tail leaves the intersection the traffic light turns red. A motorist traveling with a green arrow makes every traffic light. A road to traveler feedback device informs motorist of green arrow speed and vehicle position relative to the green arrow, which allows motorists to travel with a green arrow. The method also works with two-way roads and can be adapted to an irregular road grid.

- M. H. Friedman, B. L. Mark, "Green waves on a red sea: A method for coordinating traffic lights on a twodimensional network," under review by traffic journal.
- M. H. Friedman, B. L. Mark, "Green wave theory," in preparation.

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