Planning, Policy and Programming

Congestion Reduction via Personalized Incentives

Reduce congestion by providing customized incentives and alternative routes to drivers in real-time using smart devices and a centralized controller.

WHAT WAS THE NEED?

With rapid population growth and urban development, traffic congestion has become an inescapable issue, especially in large cities. Many congestion reduction strategies have been proposed in the past, ranging from roadway expansion to transportation demand management. Congestion pricing has also been used as a negative reinforcement for traffic control. In this project, we study an alternative approach of offering positive incentives to drivers to take alternative routes.

WHAT WAS OUR GOAL?

The goal of this research was to reduce congestion through personalized incentives via communication between smart devices (cell phone) and a central traffic planner.

WHAT DID WE DO?

The research team developed and tested a real-time, traffic prediction and incentive-offering method using individuals' routing and aggregate traffic information on smart devices via simulation based on real data. The team evaluated the performance of the proposed method using data from the Los Angeles area. The University of Southern California, Archived Data Management System (ADMS) is used in simulations. This system collects, archives, and integrates a variety of transportation datasets from Los Angeles, Orange, San Bernardino, Riverside, and Ventura counties.

Caltrans provides a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

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Research Results

WHAT WAS THE OUTCOME?

The experiments showed the proposed framework can lead up to 27% decrease in the total carbon emission of the network during rush hour times. In this work, the incentives are only offered to alter routing decisions of the drivers.
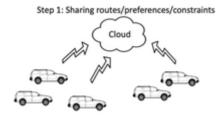
WHAT IS THE BENEFIT?

The benefits of the research included the following:
1. Reduce traffic congestion and improve routing efficiency by offering personalized incentives to drivers; and
2. Avoid the creation of new congestion on the transportation network.

LEARN MORE

For more information, see the report on the below link: https://escholarship.org/uc/item/5b82168n.
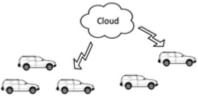
IMAGES

Figure 1: Proposed method: In the first step, drivers share their routes, preferences, and constraints. In the second step, the central controller suggest incentives to drivers to alter their routes
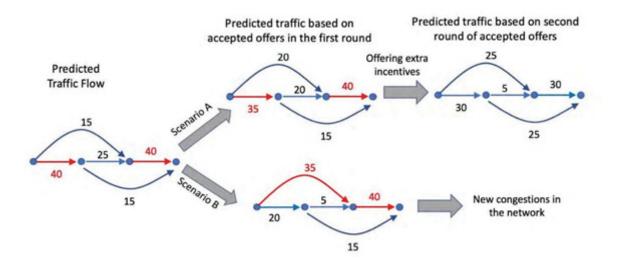

Figure 2: Two different incentive offering strategies with two different outcomes. Scenario B leads to the creation of new congestions in the network. The number on each edge shows the number of cars on that particular road/edge. The red edges show the congested roads.