

DALI: An Autonomous, Cooperative, Agent-Based Traffic Control System

Abstract

Traffic congestion costs each US household \$1,377 annually and the US economy \$88 billion, a figure that could triple when factoring in fuel price hikes, productivity loss, and safety costs. Additionally, the escalating severity of congestion has adverse impacts on the environment and public health.

In this talk, I will introduce DALI (Distributed Agent-based Traffic Lights), an innovative, AI-driven Traffic Control System (TCS). DALI transforms existing TCSs into intelligent systems without the need for additional hardware investments. Deployed across 13 intersections in Richardson, Texas, DALI has proven effective in alleviating congestion.

The talk will start with an overview of DALI's approach, followed by a presentation of the system's core architecture and algorithms, along with its simulation on a digital replica of Richardson's road network. Then, the deployment process of DALI will be discussed, including the evaluation results. Finally, the talk will conclude with insights gained from the transition of research from a simulation environment to the real world.