Graphical User Interface Development for Coordinated Ramp Metering System

Develop a user-friendly Graphical User Interface software for Caltrans to manage freeway corridors traffic in California.

WHAT IS THE NEED?

Although freeway ramp metering (RM) has been widely used for California highways for traffic management and control, they are mostly Local Responsive Ramp Metering (LRRM). LRRM determines RM rate only based on the information from its immediate upstream mainline traffic detectors. Therefore, the traffic throughput along the freeway corridor is not optimized.

A previous project funded by California Department of Transportation (Caltrans) Division of Research, Innovation and System Information, focused on field test of Coordinated Ramp Metering (CRM) on the State Route (SR) 99 North Bound (NB) section near Sacramento. The overall corridor traffic efficiency (or average speed) was improved by 7.25% in morning peak hours.

After the project was completed, Caltrans District 3 Regional Traffic Management Center’s traffic engineers made the following request:

a. To continue using the CRM control as the daily operation for the SR99 NB corridor; and

b. To develop a Graphical User Interface (GUI) for the CRM algorithm so that Caltrans freeway traffic engineers can easily apply it to other freeway corridors.

WHAT ARE WE DOING?

The project team will build a user-friendly GUI capable of hiding all the complications of the mathematical algorithms. With this GUI, Caltrans Freeway Ramp Metering traffic engineers can set up the system to control a freeway corridor using the CRM strategy by simply inputting a set of traffic parameters manually or from a file, which include:
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