C1 Loop Detector Reader/Analyzer

Develop an inexpensive tool to diagnose loop problems and collect accurate data for evaluating vehicle detection system.

WHAT IS THE NEED?

According to California Department of Transportation (Caltrans) Performance Measurement System (PeMS), the department-wide traffic database repository, approximately 30 percent of the data generated at the Caltrans’ roadside traffic detection stations is questionable in accuracy and therefore unusable.

Due to the challenges of determining the causes for the inaccuracies, the problem has remained unsolved over the last decade, during which time considerable effort was spent with little improvement to the malfunctioning stations.

WHAT ARE WE DOING?

The objective of this project is to develop the ability to collect 100% of the real-time data flowing through Caltrans controller cabinets, validate the data, and make it available for both existing and anticipated new Caltrans applications.

Freeway applications:
- The data can be aggregated and fed into Caltrans PeMS via eXtensible Markup Language. This raw data is 2 to 3 orders (more accurate data) of magnitude more resolved than the data currently available in PeMS.
- Real-time detector diagnostics based on this high-resolution data developed by past research can distinguish if the detector, splice, or loop are going out of calibration.

Data Validation:
- Data is validated to American Society for Testing and Materials International D2532 standards using Videosync, which syncs the real-time data with real-time video.
The prototype developed can catch the smallest intermittent error. It is also small, cost-effective, and user friendly; which can be widely deployed and untrained field staff can easily operate it.

WHAT IS OUR GOAL?

The project's goal is to develop effective tools and techniques to diagnose and troubleshoot detection station malfunctions, thus allowing Caltrans to repair as many of the unreliable units as possible.

WHAT IS THE BENEFIT?

The C1 Loop Reader/Analyzer collects traffic data, which is used to evaluate new vehicle detection systems. This, in turn, enables Caltrans to select the most reliable vehicle detection system. A reliable and accurate vehicle detection system can direct traffic more efficiently and effectively, and ultimately improve traffic flow.

WHAT IS THE PROGRESS TO DATE?

A “Deployable Prototype C1 reader” with Raspberry Pi as data storage has been assembled. It consists of a flex cable that connects each C1 pin, and a Printed Circuit Board that converts this data to TCP/IP and sends it to a web server.

Staff from the Office of Traffic Operation Research had traveled to District 2 at Clear Creek Road to collect data for evaluating the Wavetronix radar.