



Caltrans Division of Research,
Innovation and System Information

Research



Results



Transportation
Safety and Mobility

Development of Micro Wireless Sensor Platforms for Collecting Data of Passenger-Freight Interactions

Developed and tested a new wireless detector and machine learning algorithm to classify vehicle types.

WHAT IS THE NEED?

Traditionally, pavement inductive loop sensors are used to collect real time traffic data for passenger and freight vehicles in roadways. This method, however, is expensive to install and maintain, and also requires an electronic control unit connected to the inductive loop.

WHAT WAS OUR GOAL?

Develop a wireless sensor that reduces the installation cost of detecting and classifying passenger and freight vehicles compared to installing the cables for inductive loops.

WHAT DID WE DO?

Used the miniaturization of RF radios and low power micro-controllers to develop a wireless Micro-Electro-Mechanical System (MEMS) sensor. Developed a machine learning algorithm to classify vehicles. Installed the machine learning algorithm on an electronic control unit. Ran experiments with the sensor and the electronic control unit to collect and generate traffic data such as vehicle presence, speed, and classification.

WHAT WAS THE OUTCOME?

The machine learning algorithm was able to produce correct classification rates nearing 100%. Through the use of multiple sensors, the control unit can calculate and extrapolate the speed and level of congestion of the area where the sensors are installed.

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Project Title:

Development of Micro Wireless Sensor Platforms for Collecting Data of Passenger-Freight Interactions

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

WHAT IS THE BENEFIT?

The MEMS system provides a means to classify vehicles in a cost effective manner, saving the state money while providing planning information on interactions between freight and passenger vehicles.

IMAGES

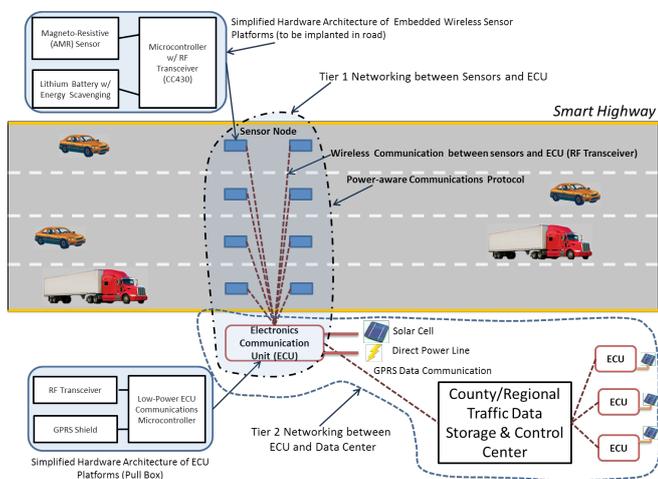


FIGURE 1: Proposed Architecture for Smart Road Sensing Networks

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