

## Detector-Free Method of Determining Profiles of Vehicle Arrivals at Signalized Intersections

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**Categories:**

- Civil Engineering

**Keywords:**

- Civil Engineering
- GPS
- Self-Driving Cars
- Sensors
- Traffic Control Systems

Both conventional and adaptive traffic signal controls use an arrival profile to determine the time within a signal cycle when a vehicle arrives at the local intersection after departing a coordinated upstream intersection. The development of such a profile conventionally requires the use of a vehicle detector at an upstream location to measure a vehicle's arrival. Connected vehicles are widely anticipated for future deployment. Others in the field are considering novel signal control algorithms based on connected vehicle data, but these require a relatively high level of market penetration (percentage of vehicles that are connected), such as 25 percent or more.

Researchers at Purdue University have developed a technology that replaces the use of a vehicle detector with analysis of vehicle trajectories obtained by using GPS-enabled mobile devices. Analysis of the trajectories determines when the represented vehicle crosses a virtual detection line, which allows for the sampling of vehicle arrivals over time. This method works with very low levels of market penetration, such as 1 percent or less. This technology allows for the implementation of responsive and adaptive control methods in traffic signal systems that currently lack a detection system. It will work with future connected vehicles as they increase their market penetration.

**Advantages:**

- Works with traffic signal systems that lack a detection system
- Eliminates the need for detection systems, saving the cost of such systems
- Works with a very low level of market penetration
- Will work with future connected vehicles

**Potential Application:**

- Traffic control systems
- Traffic signal systems

-Traffic management software

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**Intellectual Property:**

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