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AUTOMATED INCIDENT RESPONSE AND INVESTIGATION AFTER VEHICULAR COLLISIONS AND INCIDENTS

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ABSTRACT

Techniques are described herein for leveraging connected vehicles and in-vehicle telemetry to collect evidence for investigations. When an incident occurs, all vehicles within an observation range of the incident and a time period leading up to the incident upload their anonymized but traceable telemetry data to the cloud. Investigators then use this data to re-create the incident in a simulation based on the uploaded telemetries. Furthermore, if eyewitness accounts are needed, law enforcement or investigators can follow-up with the occupants of each vehicle based on the source of the telemetry.

DETAILED DESCRIPTION

Incident response and investigations can be some of the most time consuming events for law enforcement. They need to collect eye witness accounts, inspect vehicles, and reconstruct events leading up to a vehicular collision. Additionally, research has shown that human judgement and memory can be biased due to a number of factors. This composition of systems helps solve the collection, investigation, and reporting of incidents using telemetry from connected vehicles. This can help reduce the time spent on investigations and help reduce human bias in the process.

This system relies on connected vehicles, cloud based systems used to collect or coordinate the collection of telemetry data for local, state, and federal law enforcement agencies, a key escrow used to help protect data and privacy using a form of asymmetric cryptography, and a cloud based application that can download the telemetry and reconstruct the incident on demand.

As connected vehicles transit roads and highways, they are envisioned to share information to help coordinate their movements, share media or content related to travel conditions and traffic, and under certain circumstances collaborate to help improve the flow of traffic and emergency vehicles. In the event of an incident proximal vehicles are immediately aware, and they can begin disseminating relevant information to divert the

flow of traffic. This system leverages this messaging state and seeks to take an additional step to report relevant information to law enforcement (e.g., current vehicle telemetry, proximal vehicles, etc.).

When an incident occurs, vehicles within proximity of the incident can broadcast the event, and this entails triggering the generation of a machine readable report capturing a snapshot of observed events leading up to the incident. The vehicles use a combination of date, time, and geo-location information which may be used to name the report. The vehicles are connected, so they should all have a synchronized relative time. Upon receiving the broadcast message, the vehicles produce a report for evidence.

The report may include vehicles in the vicinity (e.g., electronic unique identifiers, captured license plates, etc.), velocity, weather/road conditions, etc. The report is scrubbed of all personally identifiable information apart from the vehicle unique identifier, local registration identifier, etc., and then encrypted using an asymmetric cryptography system like escrowed public keys system managed by manufacturers and law enforcement agencies. Once encrypted, the report is uploaded to a cloud service used by the local law enforcement agency.

When the law enforcement agencies are notified of the incident, they can begin initiating requests from their local cloud service to import the information into another that assembles the information and populates a simulation detailing the position and velocity of each car in the vicinity. This simulation serves as a court record for evidence, identifies relevant and potential eye witnesses, and helps expedite the on-site investigations and clearing of vehicular incidents.

Figure 1 below illustrates a snapshot of vehicles communicating on a highway.

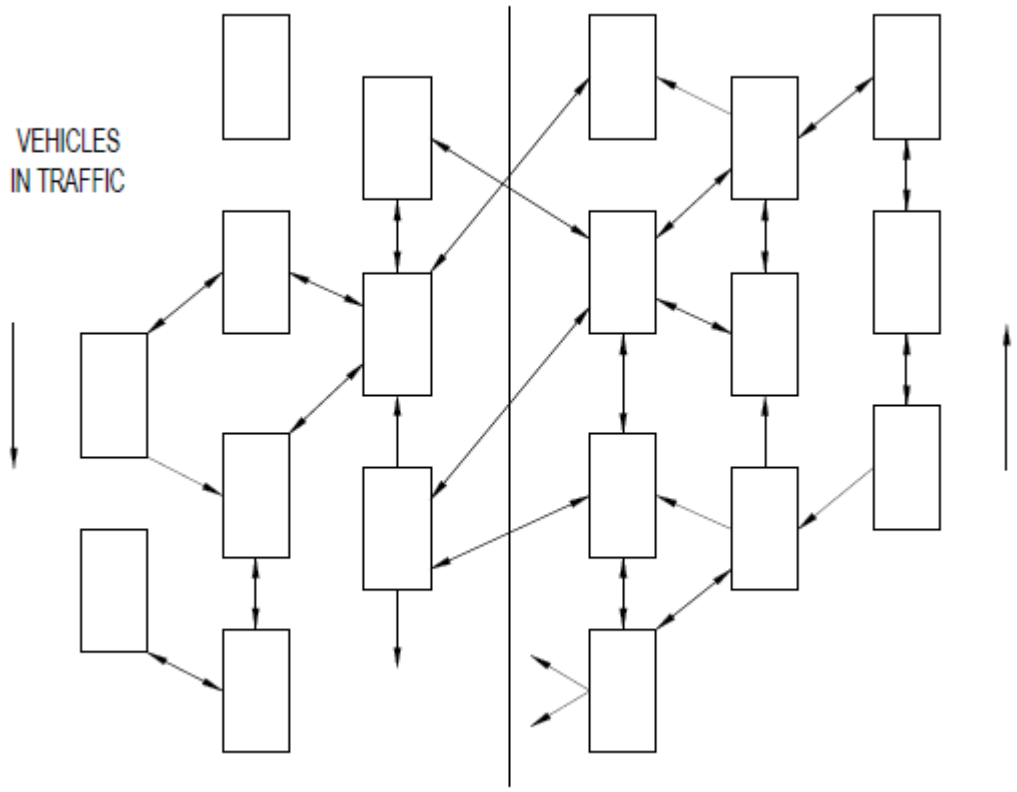

Figure 1

Figure 2 below illustrates an incident on the highway that triggers broadcast and negotiation for upload.

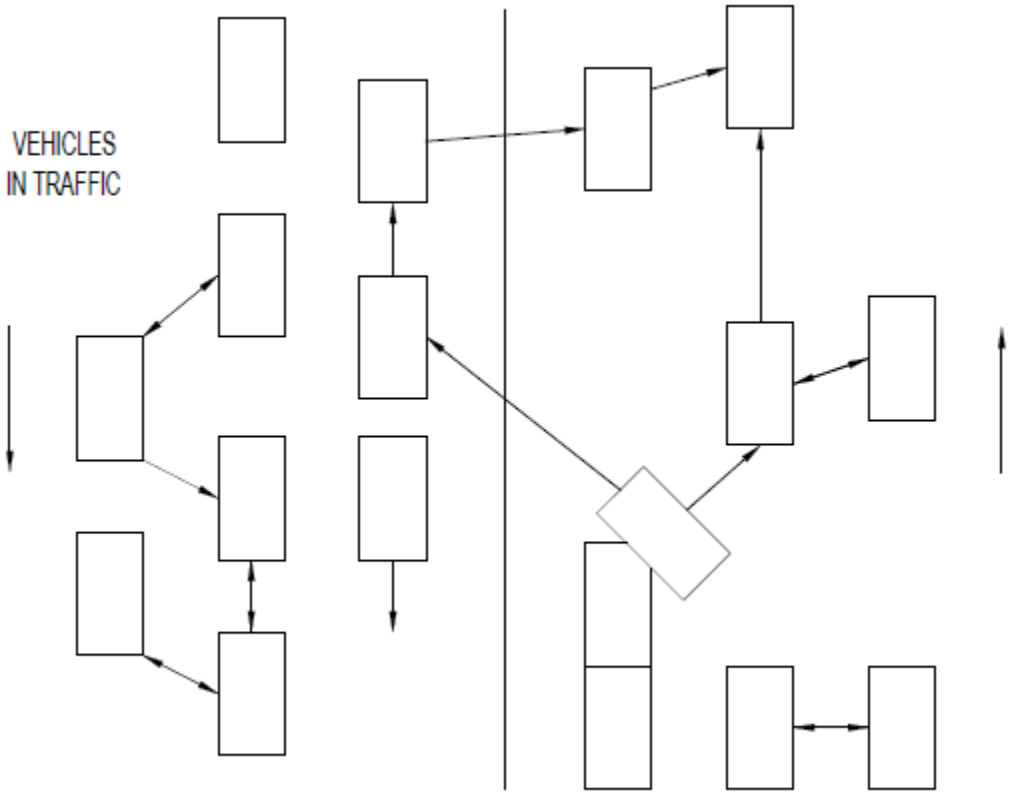

Figure 2

Figure 3 below illustrates a post negotiation vehicle upload to a telemetry collection service.

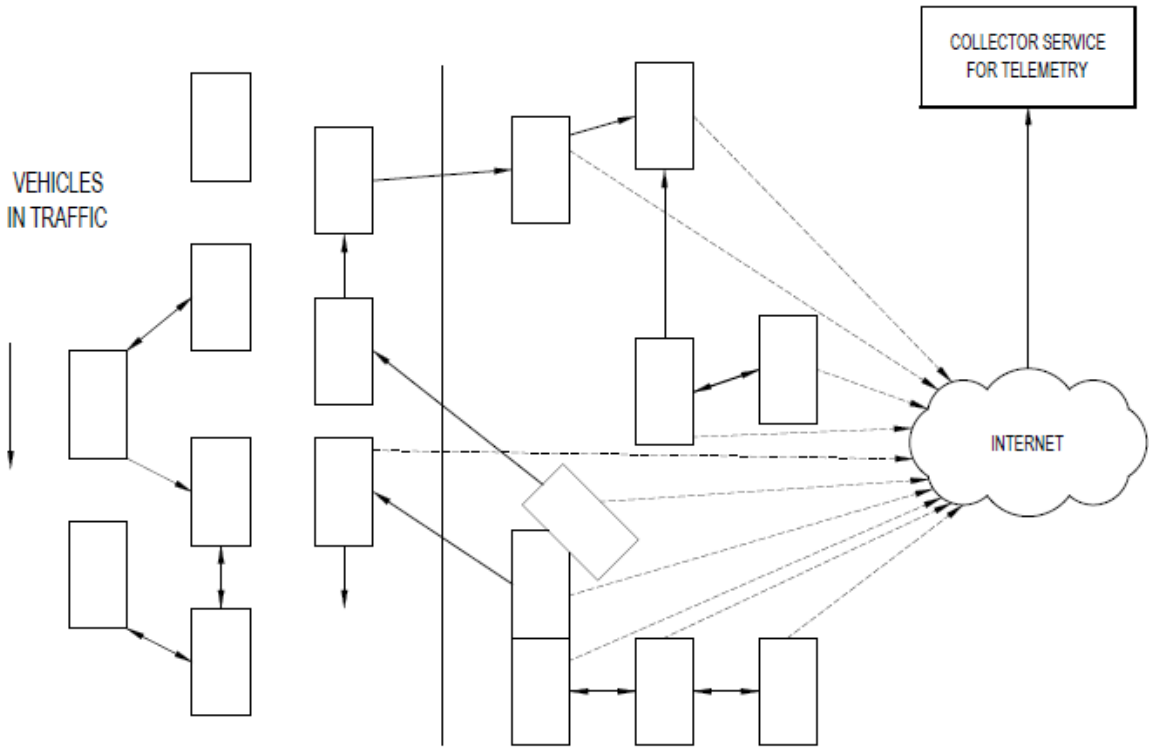

Figure 3

Figure 4 below illustrates how a law enforcement organization downloads the telemetry data, reconstructs the scene, and simulates the conditions.

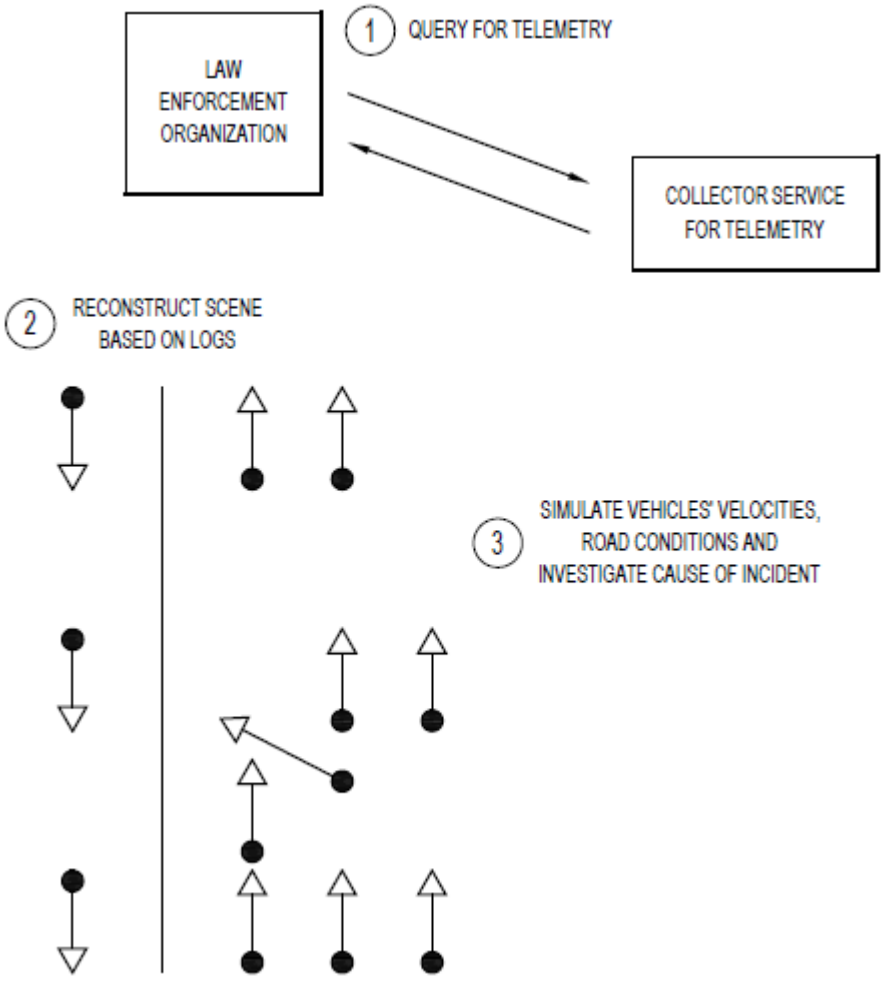

Figure 4

In summary, techniques are described herein for leveraging connected vehicles and in-vehicle telemetry to collect evidence for investigations. When an incident occurs, all vehicles within an observation range of the incident and a time period leading up to the incident upload their anonymized but traceable telemetry data to the cloud. Investigators then use this data to re-create the incident in a simulation based on the uploaded telemetries. Furthermore, if eyewitness accounts are needed, law enforcement or investigators can follow-up with the occupants of each vehicle based on the source of the telemetry.