Introduction

- **Goal**
  - Suggest and verify an Intelligent Traffic Management service that reduces traffic congestion and introduces a prioritization scheme that allows public transport vehicles and emergency vehicles to pass through traffic at a higher rate than other traffic.
  - **State of the Art**
    - Route prediction is not used in any other traffic management protocol.
    - Estimated times of arrival and route predictions do not usually adapt to individual driver travel behaviors.
    - Traffic simulation is often used to verify the performance of traffic within a geographical area.

Traffic Simulator

- Validate the Intelligent Traffic Management service.
- Allow comparison and evaluation of traffic light protocols.
- Simulation based on map of Dublin city center.
- Simulated traffic light protocols:
  - No traffic lights.
  - Timed light sequences.
  - Induced light sequences.
  - Intelligent Traffic Management service.

Intelligent Traffic Management service

- Independent onboard devices observe and learn a vehicle’s travel behavior over time.
- Each onboard device notifies in advance each traffic light controller of the vehicle’s estimated time of arrival and priority.
- Traffic light controllers use summed priorities on each intersecting road to determine which road gets a green light, and for how long.

Research Challenges

- Learning and representing travel behavior.
- Model expected traffic congestion levels.
- Prioritizing public transport vehicles and emergency vehicles.
- Ensuring location privacy of private vehicles.

Route Prediction

- Vehicle travel behavior observed and learned over time.
- Estimated times of arrival at a given traffic light become more accurate as the vehicle approaches.
- When estimated time of arrival is within a threshold time and confidence levels are high the traffic light is alerted.

Conclusion

- In order to prioritize vehicles, each traffic light needs to know the priority of each approaching vehicle, whether by road-side sensors or independent onboard devices.
- Accurate estimated times of arrival can be made by ubiquitously observing, learning, and analyzing vehicle transport behaviors over time.
- The Intelligent Traffic Management service could help reduce traffic congestion on Irish roads, while also allowing public transport vehicles and emergency vehicles to pass through traffic at a higher rate.

Further Information

- Contact Information
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