Smart Transportation Infrastructure and the Future of Mobility

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INTERSECTIONS ARE DUMB

Unnecessarily disrupt traffic flows

• Congestion costs US Cities $160B annually in time and fuel
• Drivers spend 40% of their time on surface streets idling

Programmed for average conditions

• Actual conditions vary greatly and change over time

Only use sensors in mundane ways

• Traffic signal control intelligence has not advanced in 40 years
Goal: Real-time optimization of complex road networks

Technical Approach:

Collaborative Online Planning

– Decentralized control

– Coordinated Action
In the Field:
– 26% reduction in travel times
– 30% fewer stops
– 40% less time idling

Rapid Flow Technologies founded in 2015 to commercialize tech.
Connected vehicles are coming ...
Integration of Signal Control with Connected Vehicle Technology

- V2I will transform real-time sensing
- Is there anything we can do in the shorter term?
Route Sharing

Basic Concept

- Connected Vehicle (CV) shares its route with the network
- Intersections incorporate this information into local optimization
Smart Transit Priority

Basic Concept:

– Bus shares real-time information with intersections
– Intersections combine this info. with bus’s schedule to improve on-time reliability and reduce congestion
Safe Intersection Crossing

**Concept:** A smartphone app that allows pedestrians to interact directly with traffic signal system

**Capabilities**

- Personalized crossing time
- Active monitoring
- Anticipation of arrival time to streamline crossing
The PedPal Prototype
PHAENON Sensor Networks

• Measure real-time traffic conditions for:
  – Incident detection
  – Congestion due to cruising for parking
  – ...

Low-cost automatic vehicle identification (AVI) sensors

Dense, ubiquitous sensor network deployments

Reconstructed vehicle routes
Autonomous Vehicles