An Intelligent Control System for Detecting and Progressing Platoons at Isolated Traffic Signals

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Research Objectives

- Develop a Platoon Identification and Accommodation (PIA) system
 - Detect approaching platoons
 - Progress platoons without adversely affecting conflicting movements
- Test PIA prototype at 2 sites



System Requirements





Progression Mechanism Selection







Development and Testing Stages

- Test using HITL simulation
 - Controller-in-the-loop
 - Cabinet-in-the-loop
- Conduct field-test
 - Shadow mode
 - Full operation mode







PIA Algorithm





PIA Algorithm Illustration





Initial Field Tests/Refinements

- Approach speed: 65 mph
- Detection: ILD
- Advance Detection 1000 ft.
- 1-Lane in each direction
- 27-30 trains per day







Field Observations

- Platoon detection accuracy was 100%
- Platoon progression
 - Did not interfere with train preemption
 - Unconstrained operation
 - Best for priority movement
 - Some negative impact on conflicting movements
 - Constrained operation
 - Degraded ability to progress platoons
 - Improved operation at conflicting approaches



Second Field Test

- Approach speed: 35 mph
- School zone: 25 mph
- Detection: Video-based; 700 ft
- 2-Lane in each direction









Field Observations

- Video detection not as good as loops
- System worked well when no detection errors
- Did not compromise pedestrian safety



Work in Progress

- Hardware classifier replaced by a software classifier
- Standardized for TS-2 cabinets
- System expanded to handle 2 directions
 - Using preempts and holds
- Real-time performance measures added
- Adaptive functionality added
- To be tested at two sites



Concluding Remarks/Questions

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