Evaluation of a Bus-Based Pedestrian and Bicyclist Collision Warning System: Mobileye Shield+

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Overview

• What’s the problem?
• Mobileye Shield+ system
• Texas A&M pilot test and evaluation
  • Evaluation protocol
  • Results: Detection accuracy
  • Results: Bus driver feedback
  • Results: Hot spot map for collision alerts
What’s the problem?

• Need to improve pedestrian and bicyclist safety near buses
  • Large blind spots (especially when turning)
  • Operate in space-confined urban environments
    • Lots of street-side activity
    • Pedestrians in crosswalks or standing at intersection corners
    • Bicyclists in bike lanes or shared traffic lanes
Mobileye Shield+

• Pedestrian and bicyclist detection based on 4 cameras and machine vision
Mobileye Shield+

• Easily retrofit on existing buses
• Does not require DSRC with peds/cyclists
• Provides visual and auditory warnings

Source: Mobileye
Texas A&M Pilot Test and Evaluation

• Install on busiest bus route through central campus
• 6-week pilot test, 4-week follow-up
• Evaluate accuracy of detection system
• Interview drivers for qualitative feedback
Detection Accuracy

• Manually reviewed archived video
• Estimated proximity of peds/cyclists to bus
• Calculated false alarm rate
Driver Feedback

- Interviewed 10 drivers
  - Overall effectiveness
  - System detection accuracy
  - Visual warnings
  - Auditory warnings
  - System improvements
### Results: Detection Accuracy

- 0% false alarm rate for initial pilot
- 37 collision alerts in 27 operating days

<table>
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<tr>
<th>Road User</th>
<th>Number of Collision Alerts by Proximity to Shield+ Bus</th>
<th>Subtotal</th>
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<tbody>
<tr>
<td></td>
<td>0-5 feet</td>
<td>5-10 feet</td>
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<tr>
<td>Pedestrian</td>
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<td>Bicyclist</td>
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<td>Skateboarder</td>
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<td>Motorcyclist</td>
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<tr>
<td><strong>FALSE ALARMS</strong></td>
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Results: Detection Accuracy

• 10% false alarm rate for follow-up
• 40 collision alerts, 4 were false alarms

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<tr>
<td>FALSE ALARM</td>
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Results: Driver Feedback

• Most liked the system, thought it was effective and gave helpful reminders
• A few experienced drivers questioned its value: “it never warned me of something that I hadn’t already seen”
• Most drivers wished that the system could operate in low light (it does not), when their vision is challenged
• Mixed opinions about whether the collision warnings gave drivers enough time to react
Results: Hot Spot Map
Acknowledgments

• Project Partners
  • Transportation Services, Texas A&M University
  • Mobileye and Rosco Vision Systems

• TTI Team Members
  • Pete Koeneman
  • Katie Turnbull
Does technology PREVENT or CAUSE pedestrian and bicyclist injuries?

Yes to both
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