

# Can Robots Drive?

Lane Following on a Miniature Mobile Robot

Raphael Cherney

Axel Ringh

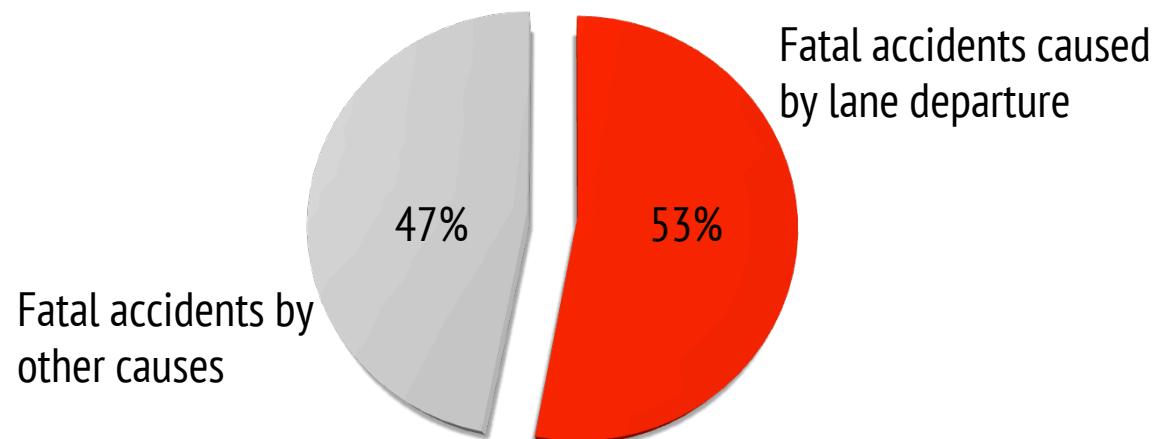
Isak Tjernberg

Assistant: Andrea Maesani



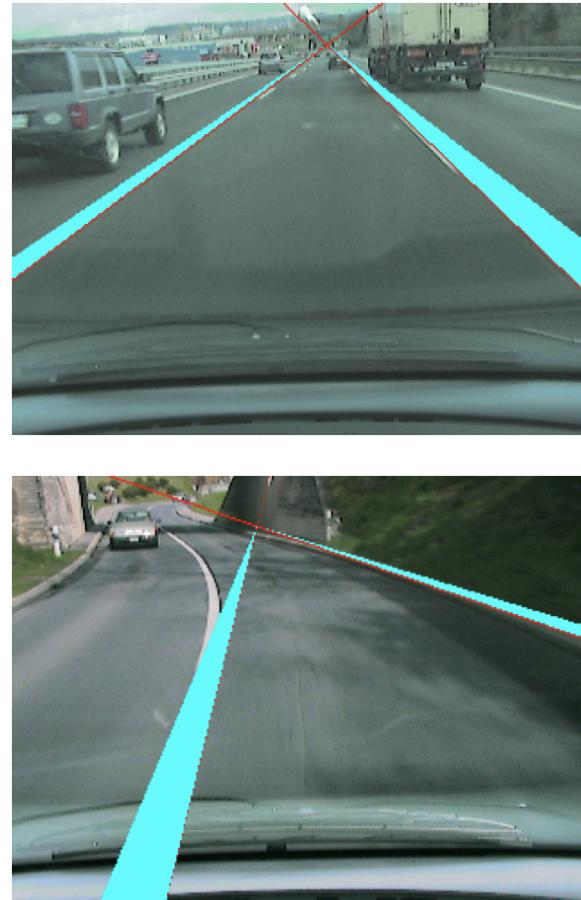
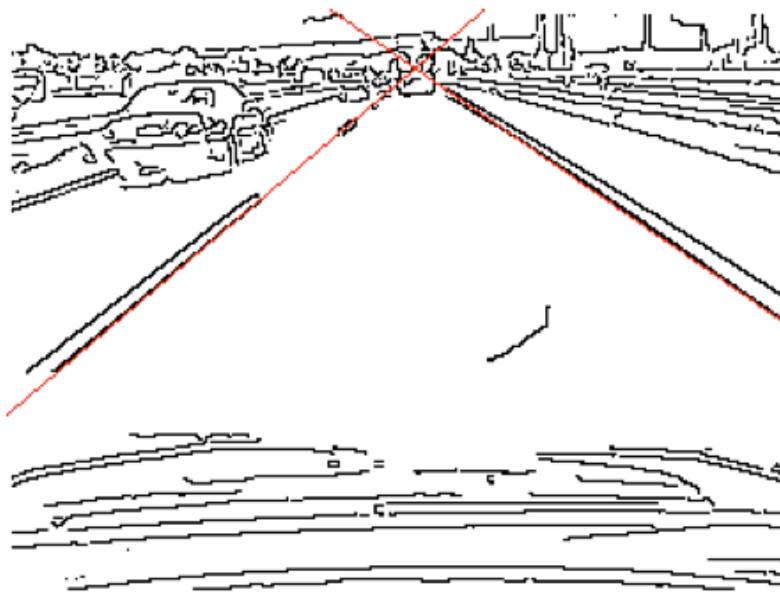
# INTRODUCTION

- Can a camera and computer make driving safer?
  - Lane departures cause large number accidents
  - Warn driver before leaving lane
- Investigate if a miniature mobile robot can use the same or similar techniques as larger vehicles to autonomously traverse an unknown path



# THEORY

- Edge detection and Hough transform to identify lane boundaries



K. Macek, B. Williams, S. Kolski, and R. Siegwart. *A lane detection vision module for driver assistance*. In In Proceeding of the IEEE/APS Conference on Mechatronics and Robotics, 2004.

# ROBOTICS PLATFORM

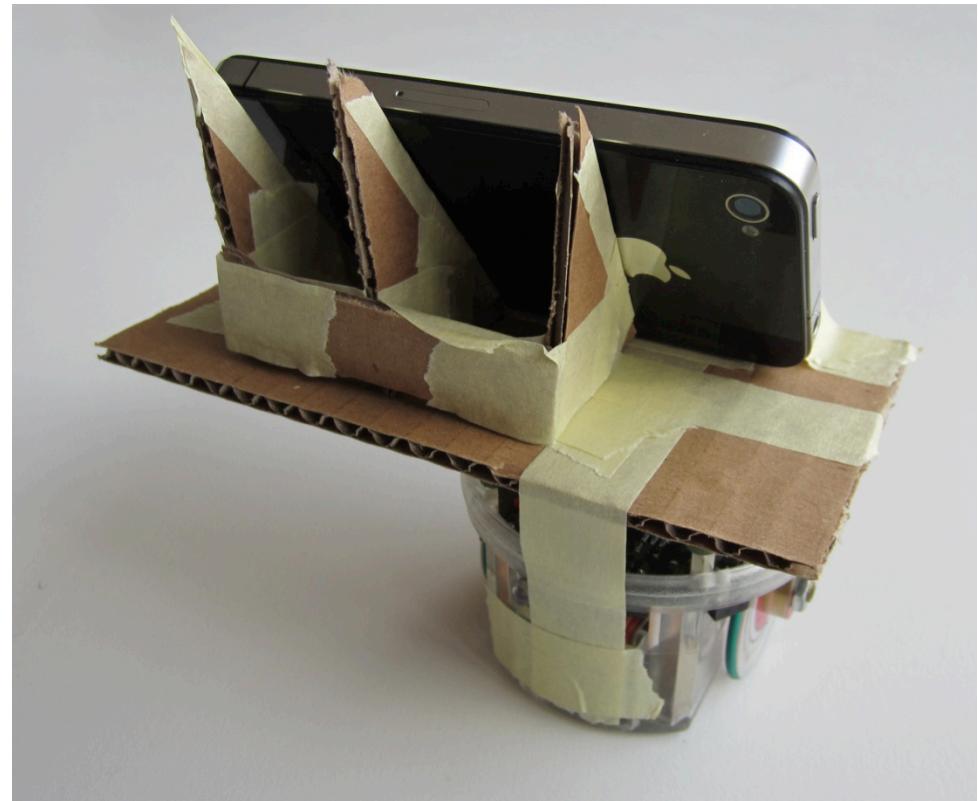
- e-puck
  - Bluetooth connection to PC
  - MATLAB image processing
- Camera difficulties



Mondada, F., Bonani, M., Raemy, X., Pugh, J., Cianci, C., Klaptoz, A., Magnenat, S., Zufferey, J.-C., Floreano, D. and Martinoli, A. (2009) *The e-puck, a Robot Designed for Education in Engineering*. Proceedings of the 9th Conference on Autonomous Robot Systems and Competitions, 1(1) pp. 59-65.

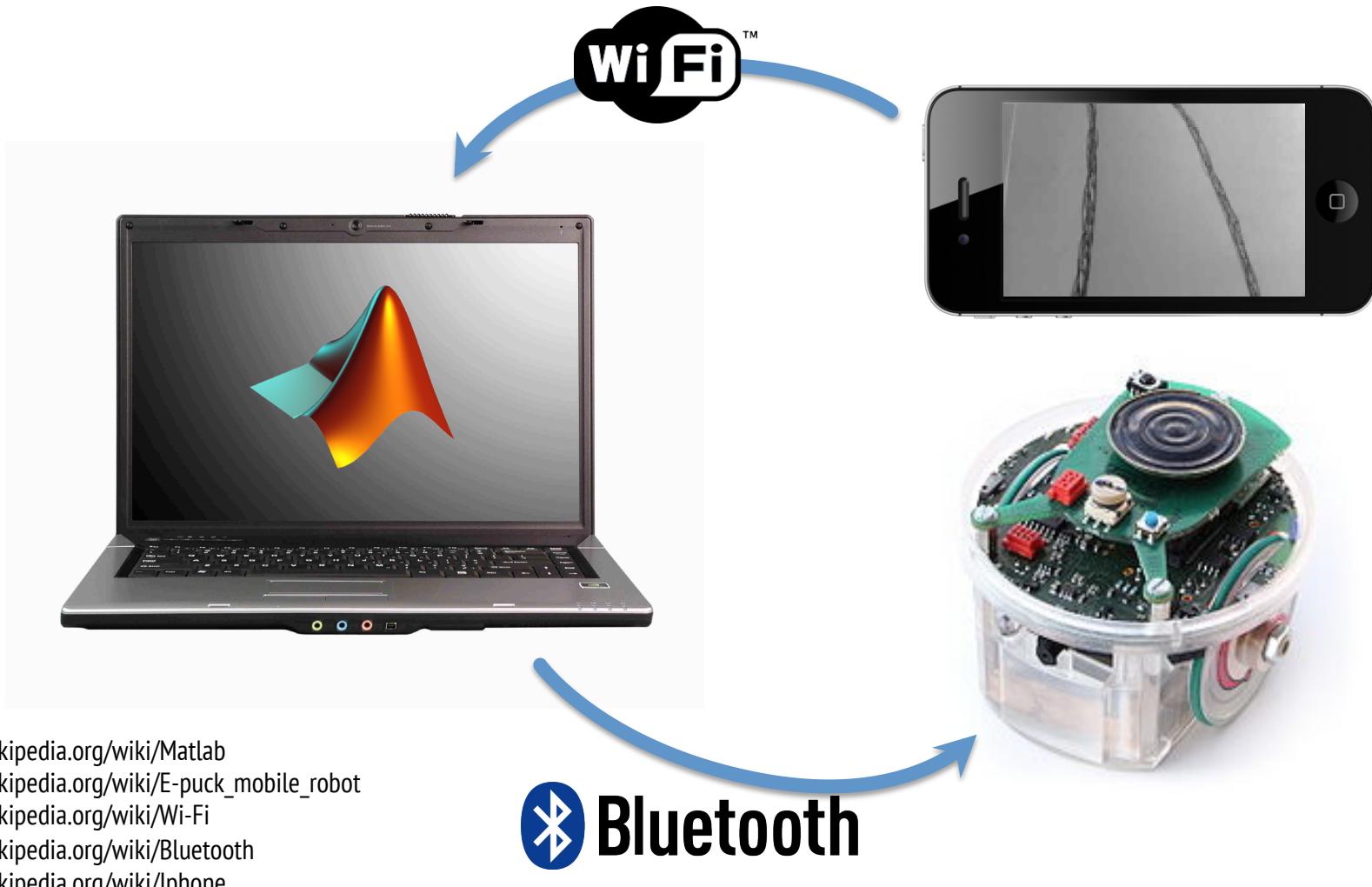
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- e-puck
  - Bluetooth connection to PC
  - MATLAB image processing
- Camera difficulties
- Solution



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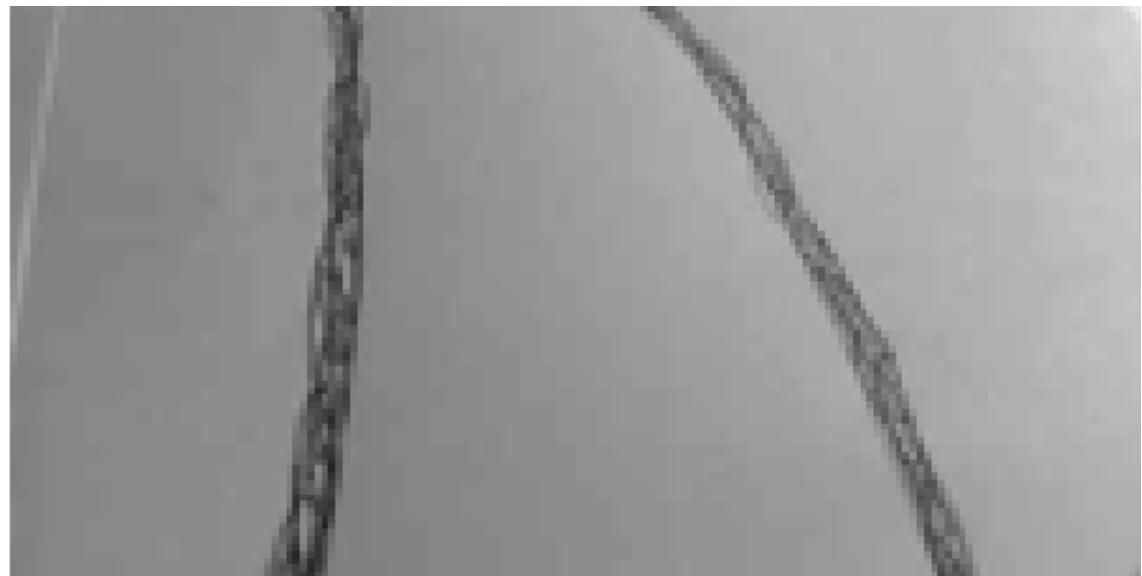


# IMPLEMENTATION

- Capture image
- Canny edge detection
- Hough transform
- Update edge model
- Update wheel speeds

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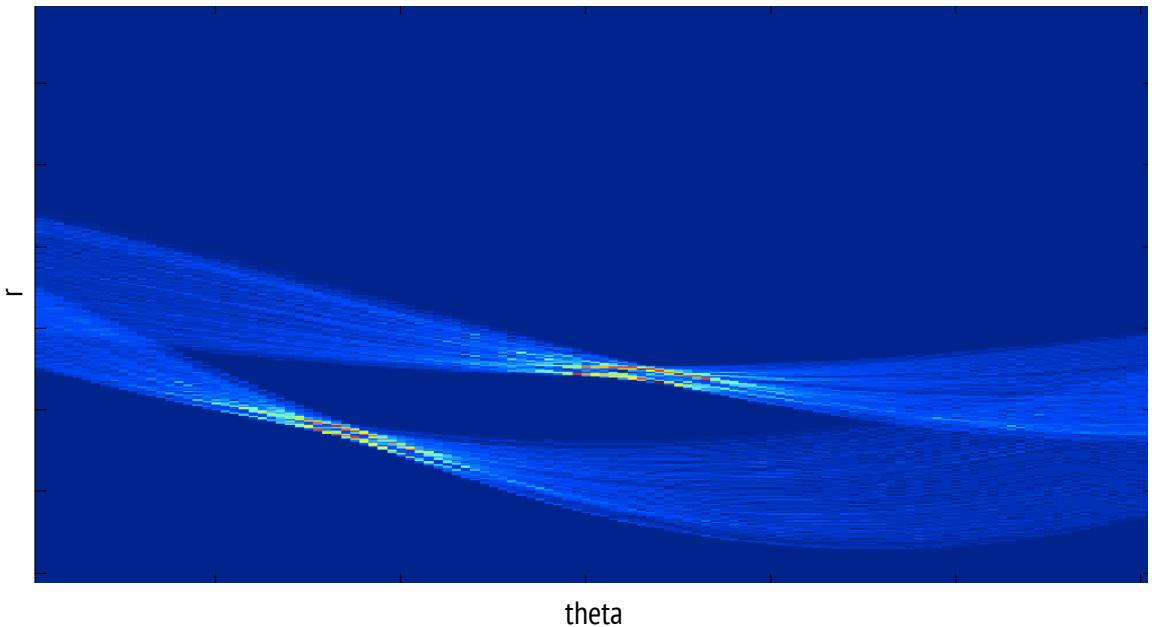
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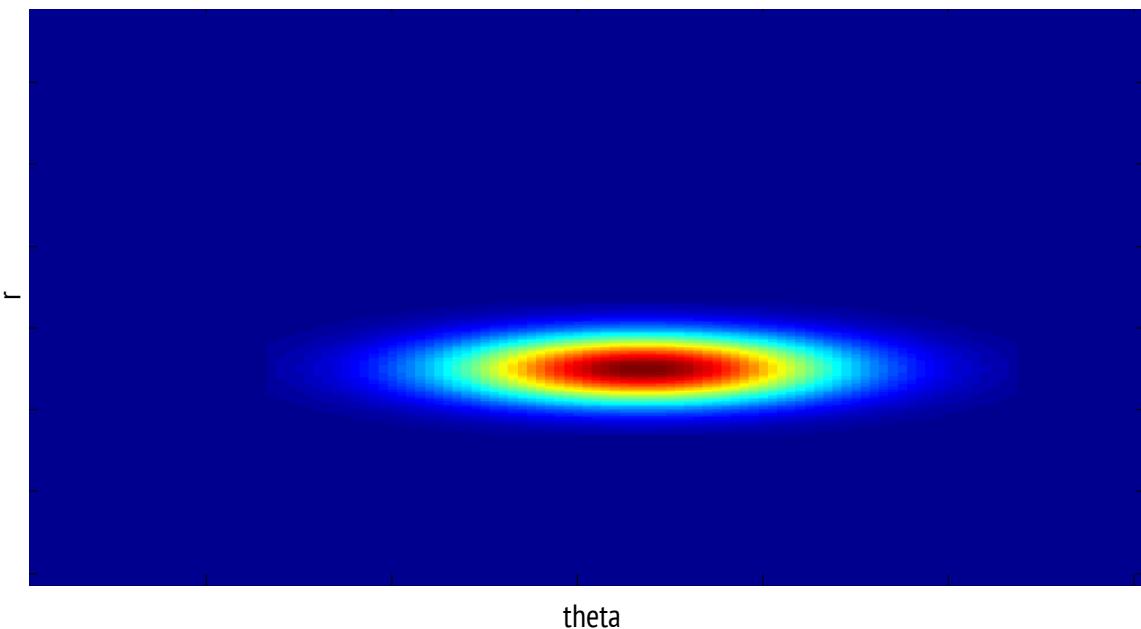
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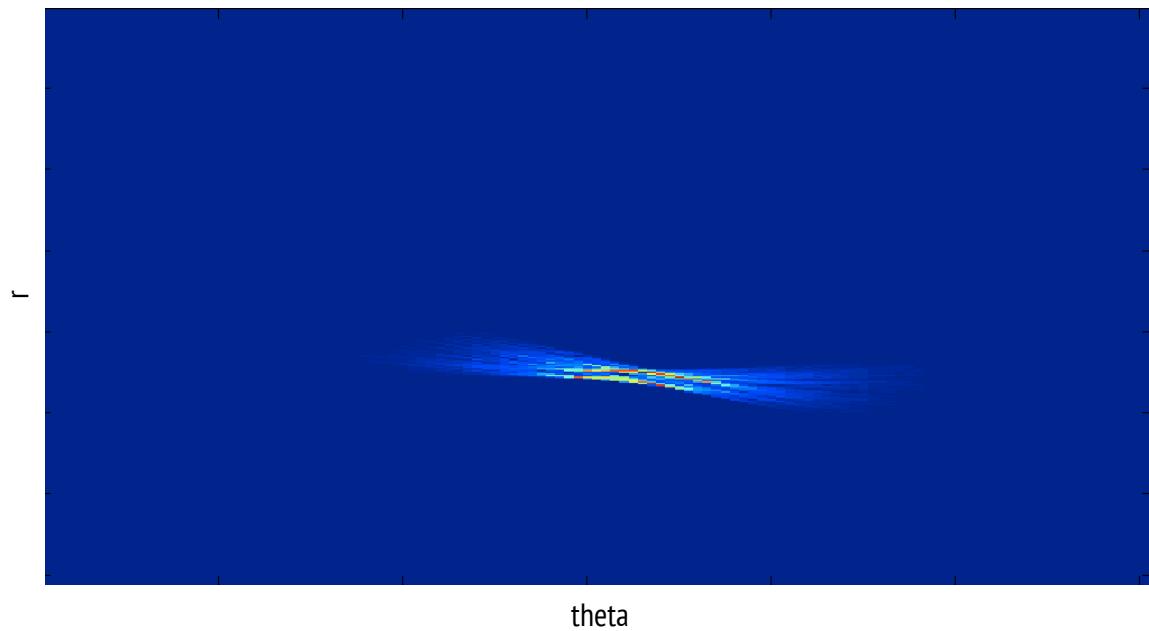
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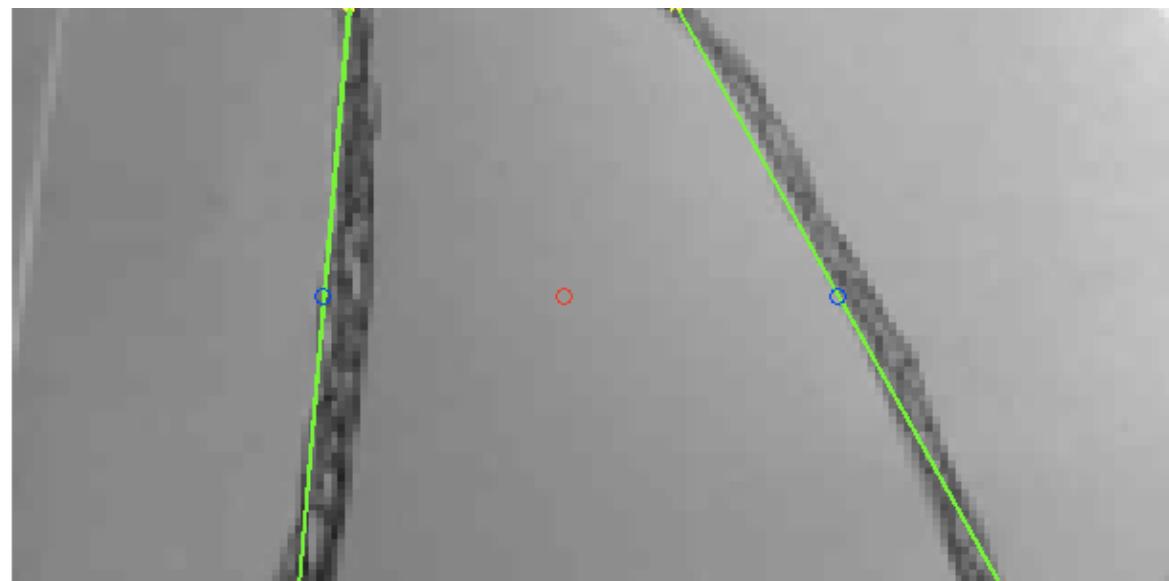
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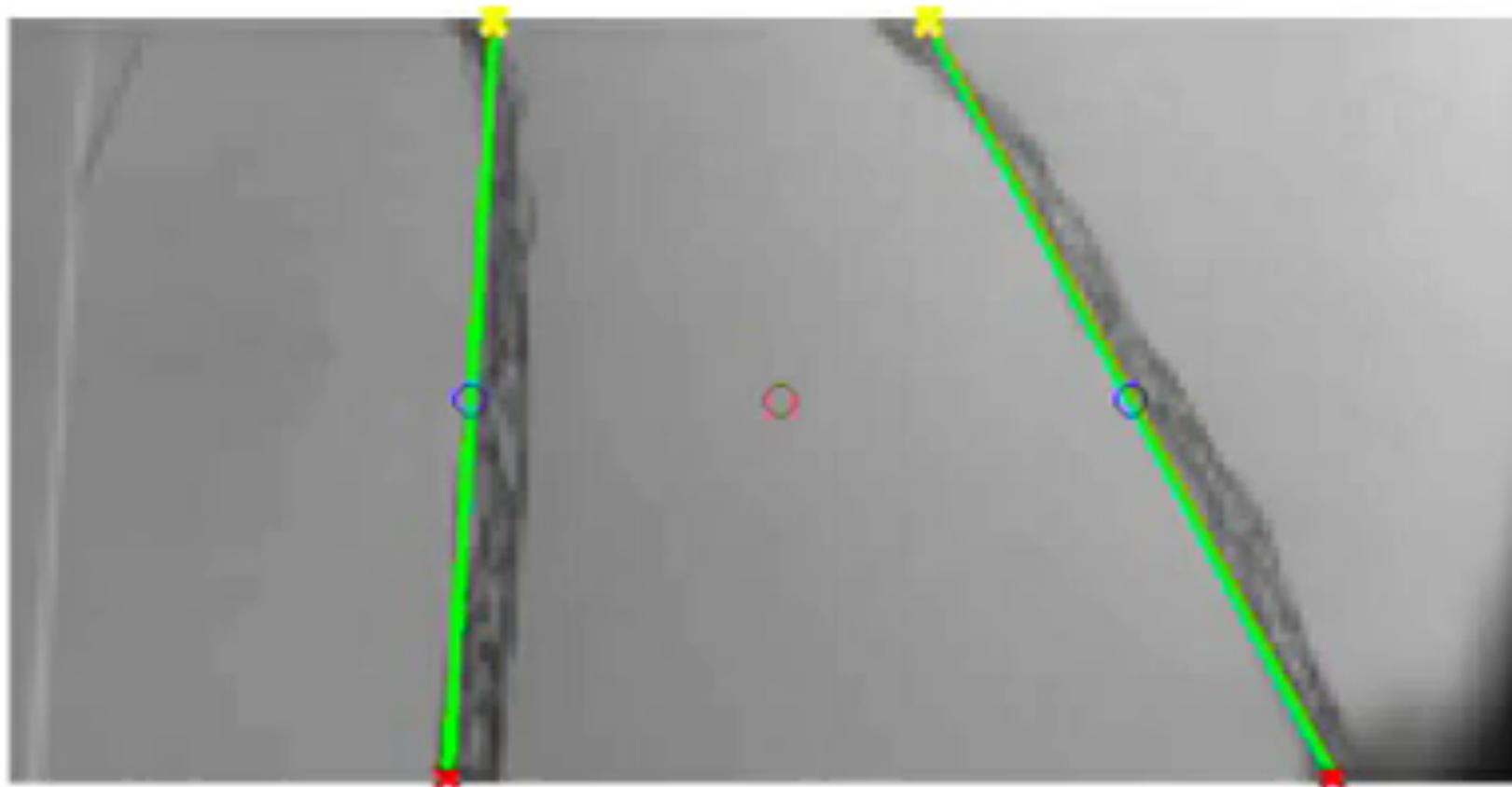


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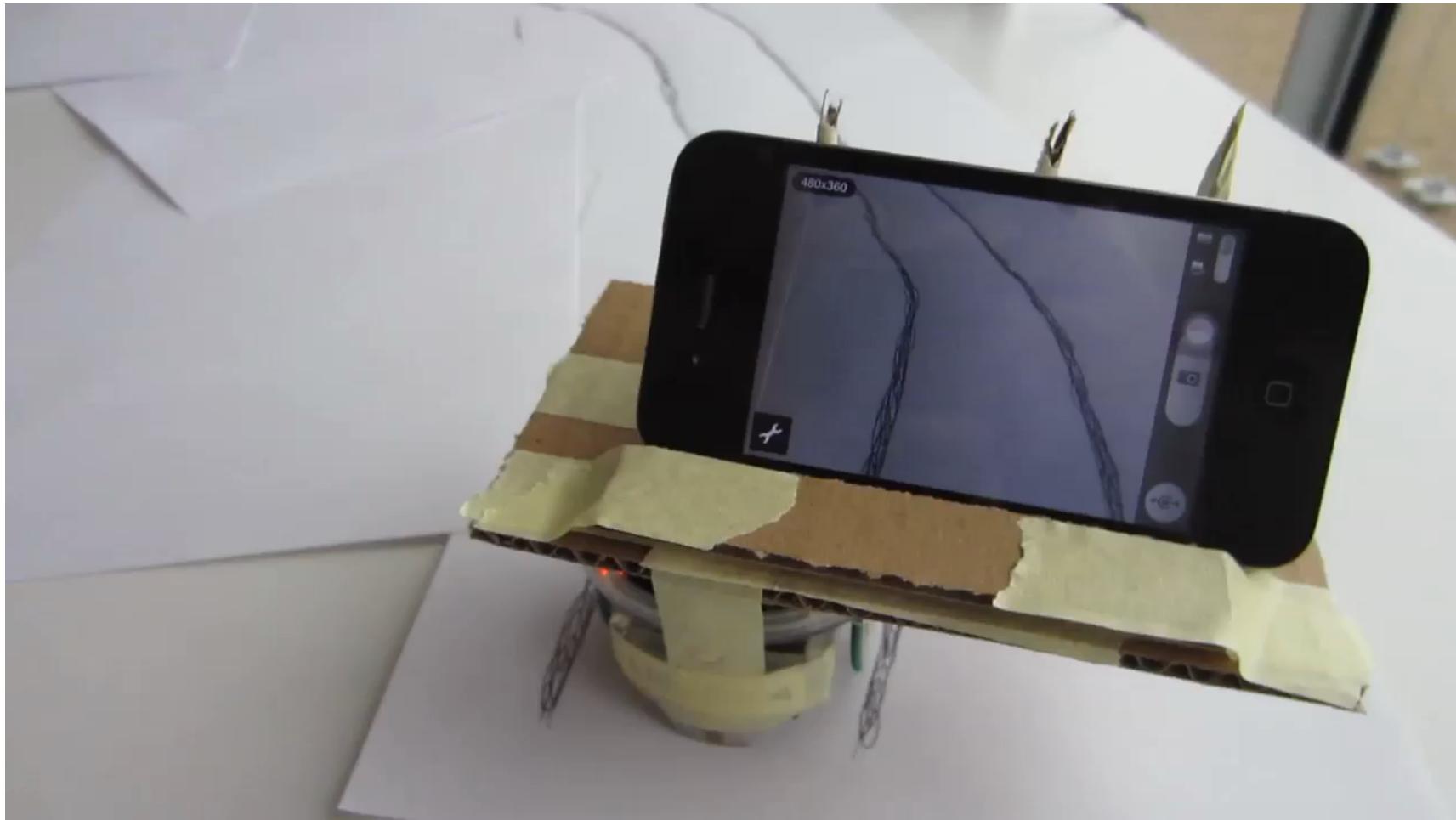
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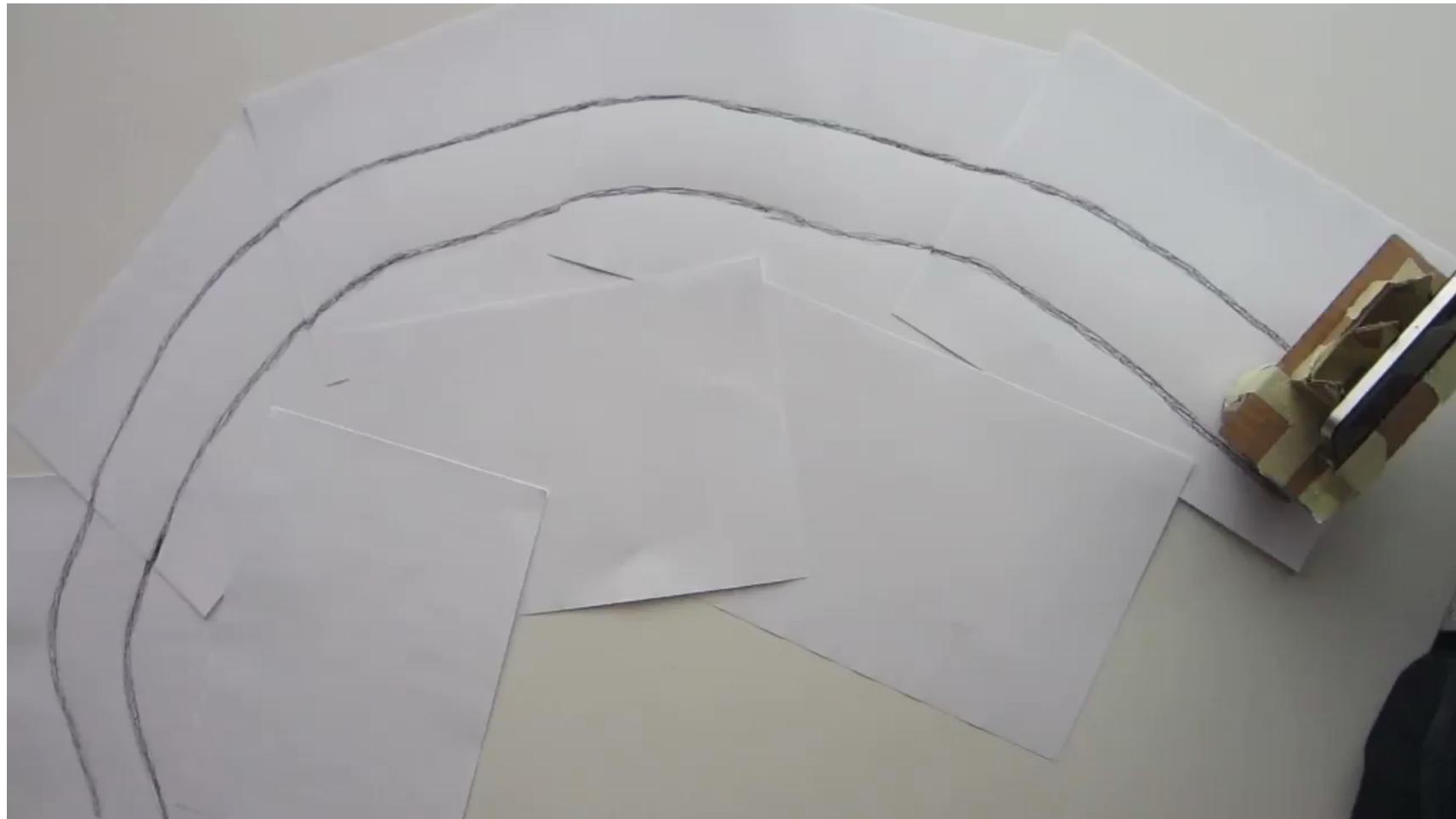
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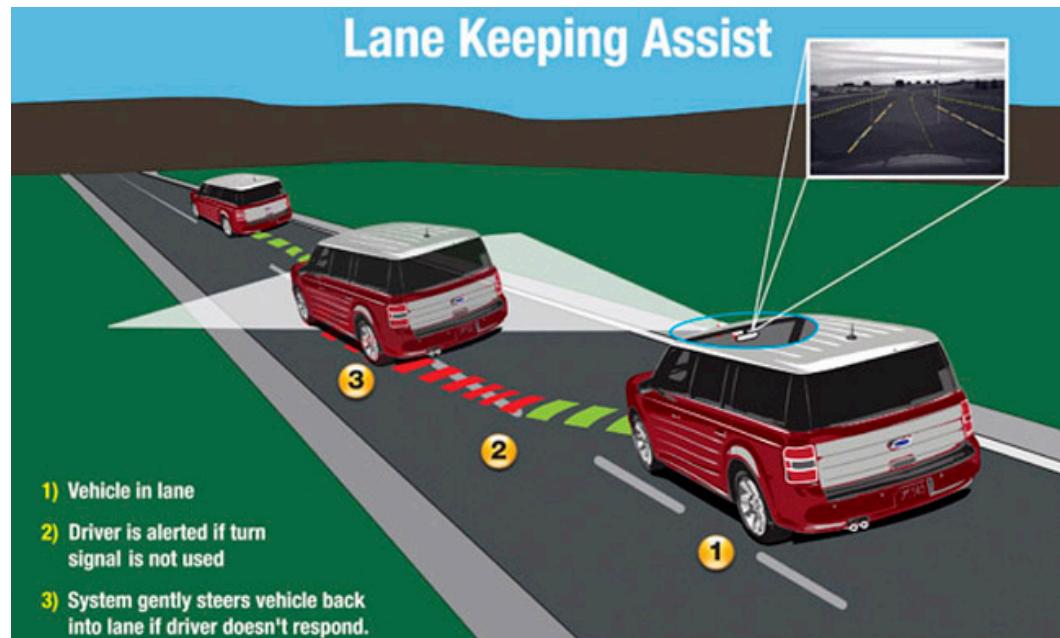
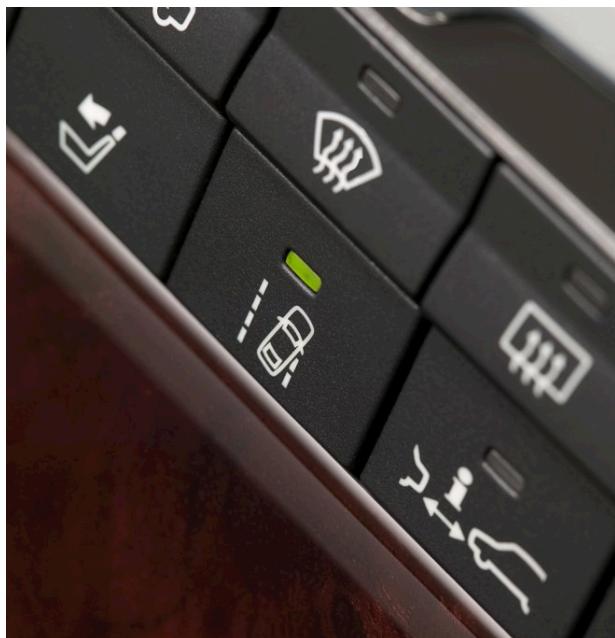


# RESULTS



# CONCLUSION

- Hough transform works!
- Can increase robustness with other cues (ex. road color)
- Commercial Lane Departure Warning (LDW) systems



[https://www.media.volvocars.com/media/images/high/12134\\_52\\_11.aspx](https://www.media.volvocars.com/media/images/high/12134_52_11.aspx)

<http://www.automobilesreview.com/auto-news/fords-new-smart-intersection-talks-to-cars-to-help-reduce-collisions/2916/>

# QUESTIONS

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