Crash Avoidance System

By Kristen Anderson
and Kat Kononov
Motivation

http://wallpaperstock.net/car-crash_wallpapers_5294_1280x1024_1.html

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Objective

- Crash avoidance system
  - Static and dynamic avoidance
- Implemented on RC car
Overview

- Components
  - Labkit
  - RC Car and remote
  - Distance sensors
  - XBee radios
  - IR remote and receiver
Overview

High-level Block Diagram

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Main Modules

FPGA Block Diagram

IR Receiver

Driver Input Processing Module

Controller FSM

Sensor Input Processing Module

Car Command Output Module

Car Remote Control

Receiver XBee

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6
Driver Input Module

RCV Chip → Sampler → Command Receiver FSM → Decoder → Driver Command

Divider

27MHz

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Sensor Input Module

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Command Output Module

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Extension

- Mapping surroundings
- Based on sensor data
Controller FSM

FPGA

IR Receiver

Driver Input Processing Module

Controller FSM

Sensor Input Processing Module

Car Command Output Module

Car Remote Control

Receiver XBee

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Side Object Avoidance

No Right Turn

No Left Turn

No Turn

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Frontal Object Avoidance

- Minimum front distance
- Minimum side distance
- Passive State
- Avoidance Turn
- Avoidance Straight
- Return Turn
- Passive State

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Dynamic Avoidance

Side Avoidance

http://www.designedtoat.com/sports3.shtml

Front and Rear Avoidance

http://www.clker.com/clipart-26981.html

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Parallel Parking

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## Schedule

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<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
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Conclusion

- Scalable crash avoidance system
  - Distance sensors in all directions
  - Processes all commands sent to the car
- Semi-autonomous features
  - Parallel parking
- Mapping possibilities
Questions?