Lane Departure Warning System

Implementation and Evaluation Plan

Saving lives, one alert at a time

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Overview

1. Introduction
2. Implementation plan
3. Evaluation plan
4. Future work
5. Questions

Introduction

- Main design components:
  - Input: Monitoring environment
  - Control unit: Interpret the data from monitoring
  - Output: Alert system for the driver in the event of a lane drift

Implementation Plan

Task layout

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9
8-Feb	15-Feb	22-Feb	1-Mar	8-Mar	15-Mar	22-Mar	29-Mar	5-Apr
1) Order Parts	1) Develop LDWS system algorithm	1) Use VHDL to develop the input module	1) Construct demonstration set	1) Test model on demonstration set	1) Develop user tests: Power User Test and Normal User Test	1) Create user documentation based on previous plan	1) Beta testing with select power users	1) Beta testing with normal users to ensure that user documentation is comprehensive and easy to follow
2) Use relevant block set to create simulation with Simulink®	2) Consult with faculty advisor (Dr. Gloster) to critique the algorithm	2) Use VDHL to develop the control unit module	2) Critique and test VHDL software	2) Update VHDL code in input module if needed	2) Develop and critique plan for user documentation		2) Update user documentation accordingly	

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Implementation Plan

Personnel Management

Team Member	Task List Excerpts
Chukwuemeka Ekeocha (Team Scribe)	• Create project summary document for Dr. Kim's proposed SD booklet • Lead construction of miniature road track • Build template for user documentation
Uchechukwuka Monu (Researcher)	• Present pros and cons of all options in an evaluable form summary of expert opinion and best practices for the sensor technology, FPGAs, and alternative mechanisms being considered. • Research into available simulation blocks and lead team on simulation of project
Uzoma Nwagba (Technical Liaison)	• Debrief Dr. Gloster on overall project, status and milestones • Source technology options (Simulink, PSpice, MATLAB, Xilinx, and ModelSIM to be used for simulation • Place calls to vendor companies to clarify compatibility concerns between components
Peter Ramsumair (Team Facilitator)	• Drive the implementation phase of the project, setting deliverables for each member • Map out preliminary calendar of meetings and manage timeline for project completion • Submit part list for placement of order, and receive parts from the department • Source props (chairs, disguises, etc) for finishing touches on the car

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Implementation Plan

Risk Management

	Risk Identification	Risk Management
Input	The appropriate sensors specific to our design, in terms of size and functionality, are unavailable in the market	An alternative sensor system has already been found
Control Unit	Logic errors and coding issues are encountered with the FPGA board	The team will extensively debug the program until the errors are pinpointed and rectified
Output	The intensity of the vibrations from one vibrator is not significant enough to vibrate the chair	Multiple vibrators will be used to cause an effective warning alert to the driver

Evaluation Plan

Expert Opinion Evaluation

- The LDWS should issue a warning 95% of the time per left or right side drifts
- Warning should be visual and tactile
- The system should be small enough not to hinder the user
- The connectors should be rated for automotive duty
- The LED should be clearly discernable from the outside light or darkness and the vibrational threshold should be high enough to warrant a response

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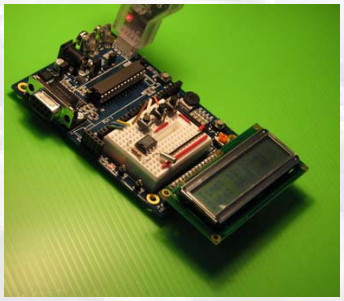
Evaluation Plan

Simulation Evaluation

- Testing the input for different colors of the lane markings
- Testing the input for different types of lane markings
- Testing the input for different combinations of the sensors
- Testing the functionality of the system with or without the turn signal
- Testing the response time of the user to the vibrational seat and the LED

MATLAB SIMULINK

VHDL



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Evaluation Plan

Prototype Testing

- Overall functionality of system under normal driving conditions
- Tests in poor visibility driving conditions
- Testing the battery life of the system
- Testing the functionality of the turn signal and the vibrational seat
- Testing the intensity of the lane drift comparable with the warning methods
- Design user based tests

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