

Computer Senior Seminar Research Paper Outline

By Matthew Clark

Chapter 1: Introduction

First Describe the problem and its background

- I) Why I chose this topic:
 - i) Autonomous vehicles' socioeconomic impact:
 - Safer traffic system
 - Cheaper automotive economy
 - Mobility for the disabled or elderly
 - ii) Personal interest:
 - Strong long-term career opportunities
 - Satisfying and impactful work
- II) Identify three key developments in recent years
 - i) Darpa's ALV, Lidar/Camera based autonomous vehicle and investments
 - ii) Self-Parking Systems
 - iii) Google's Demo car
- III) Current state of Autonomous Vehicles
 - i) The Autonomous Level System
 - ii) Example of Current AV
 - iii) Examples Failures/Issues of the current AV systems

Second Present the problem that is studied in the paper

- I) What object detection techniques and systems show the most promise?
 - i) People
 - Identify the problems
 - define the reliability and robustness
 - measure the performance
 - evaluate the cost
 - ii) Vehicles
 - " ... "
 - iii) Road signs, lanes, signals, etc.
 - " ... "
 - iv) Environment
 - " ... "

Third Define some Terms

- I) Assumptions:
 - i) What Companies and Consumers desire

Fourth Outline limitations

- I) Inability to test systems and techniques
 - i) No access to self-driving cars
 - ii) Little replication or implementation of techniques into working code
- II) No visibility into private companies' R&D

Chapter 2: Review of Literature

First Restate the categories of object detection

- I) People
- II) Vehicles
- III) Road signs, lanes, signals, etc.
- IV) Environment

Second Background of what makes this technology possible

- I) Hardware
 - i) Advancements of Processors
 - ii) Development of the Digital Camera Sensor
 - iii) Other sensors
- II) Significant Algorithms

Third For each category, describe different solutions

- I) This is not the analysis, but simply a description of what the solutions are

Chapter 3: Analysis

First Restate the purpose

Second Description of metrics and procedure

- I) How to...
 - i) Identify the problems
 - ii) define the reliability and robustness
 - iii) measure the performance
 - iv) evaluate the cost
- II) describe the general procedure

Third Discuss the strength and weaknesses of my methodology

- I) Pros
- II) Cons

Fourth Research Methodology

- I) Metric for sources
 - i) This how and why I chose x & y sources
- II) Alternate sources and experiences that influenced the paper

i) Why they were included

Fifth Go through each type and technique/implement the procedure described above

I) People

II) Vehicles

III) Road signs, lanes, signals, etc.

IV) Environment

Chapter 4: Discussion of Results

First Restate the research questions

Second Outline and organize the results

I) Employ statistics, figures, and graphs

Third Discussion

I) Describe the implications

II) Evaluate whether the results answered the research question

Chapter 5: Summary

First Briefly sum the study

Second Conclude the results

Third Recommend future research

Fourth References/Bibliography