

# Computer Senior Seminar Research Paper Outline

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## Chapter 1: Introduction

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### 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

### 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

### Fourth Outline basic assumptions and 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**

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### 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

### Fourth Discuss the strength and weaknesses of my methodology

- I) Pros
- II) Cons

## **Chapter 3: Analysis**

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### 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 Research Methodology

- I) Metric for sources
- II) Alternate sources and experiences

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

## **Chapter 4: Discussion of Results**

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### 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**

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First Briefly sum the study

Second Conclude the results

Third Recommend future research

Fourth References/Bibliography