



Cardiff University
School of Computer Science and Informatics

The Road to Driverless Vehicles

Initial Plan

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CM3203: One Semester Individual Project, 40 credits

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1 Project Description

With the continuous evolution of technology, we as human beings are in a very exciting era as regards to technology changing the way we live on a day to day basis. Driverless vehicles could potentially change the way we travel for the better, tackling issues such as safety, emissions, traffic congestion and social inclusion. ^[1] The concept of driverless vehicles has been one of the most revolutionary technology advancements in recent years with global companies such as Tesla, Google, Ford and Nissan spending millions to bring it to fruition. Experts suggest driverless vehicles could be on the road by 2021, and that the driverless vehicle industry will be worth 28bn by 2035. ^[2]

Human error is the cause of most road accidents, with a staggering 1.25 million deaths worldwide due to collisions between vehicles in 2014. ^[3] Driverless vehicles use a vast range of technology and software to manoeuvre the vehicle without a human operator. The software is programmed to interpret road behaviour and real-life behaviour.

Whilst the concept sounds preposterous, it is seemingly becoming closer to reality and is only a matter of time before we see autonomous vehicles on our roads.

The aim of this project is to investigate the technical problems that must be overcome to enable the widespread adoption of driverless vehicles on our roads, together with any social or psychological issues that may be a barrier to their use. The technology used to manoeuvre the vehicles will be investigated to provide information about how this concept can become a reality. The researcher will consider the issue of the adoption of driverless vehicles from the perspectives of potential users, technology companies interested in developing driverless technologies, established car manufacturers (such as Ford), and global insurance companies. Furthermore, the researcher will analyse the opportunities and threats that might arise from the widespread adoption of driverless vehicles.

2 Project Aims and Objectives

This section will describe the aims and objectives the researcher wishes to achieve by the end of the project. The success of my project will be determined on whether or not these aims and objectives have been fulfilled.

1. Gain an understanding of what driverless vehicles are and how they work.
 - a. Research and explain what driverless vehicles are.
 - b. Research and explain the technologies (and algorithms if possible) driverless vehicles use to manoeuvre and react to environmental obstructions.
2. Highlight and discuss current issues that need to be addressed to enable the distribution of driverless vehicles.
 - a. Background research and discuss current driverless vehicles their progress and issues that need to be addressed.
3. Social and psychological issues that must be addressed before the widespread adoption.
 - a. Research and discuss the current psychological and social issues that currently exist.
 - b. Create a questionnaire to gather information on the opinion of driverless vehicles from the user's perspective.
 - c. Evaluate results from the questionnaire.
4. Analyse opportunities and threats that may arise from the widespread adoption of driverless vehicles.
 - a. Research and discuss the impact driverless vehicles will have on users, technology companies, car manufacturers and global insurance companies.
 - b. SWOT/PEST analysis for the impact driverless vehicles will have on users, technology companies, car manufacturers and global insurance companies.
 - c. General advantages and disadvantages of the adoption of driverless vehicles.
 - d. Additional impact driverless vehicles will have e.g. ownership of cars, jobs/companies such as taxi's, law enforcement, driving instructors, product distribution (lorries) etc.
5. Summarise whether the adoption of driverless vehicles is feasible.

3 Ethical Consideration

The researcher will be creating a questionnaire to gather information about the psychological and social aspect of driverless vehicles, distributing it to the public. The questionnaire will be anonymous and the information stored will be kept anonymous. The evaluation will be reached in the results of the questionnaire and will be available to read in the publication of the report.

4 Work Plan

As regards to the Gantt chart the deliverables and milestones include:

- Week 1
 - Deliverable - Initial plan report.
 - Milestone - Submission of initial plan report.
- Week 3
 - Milestone - Start final report.
- Week 5
 - Deliverable - ‘Gain an understanding of what driverless vehicles are and how they work’ section complete.
- Week 6
 - Deliverable - Create and distribute the questionnaire.
- Week 7
 - Deliverable – ‘Analyse opportunities and threats that may arise from the widespread adoption of driverless vehicles’ section complete.
- Week 10
 - Milestone - ‘Social and psychological issues that must be addressed before the widespread adoption’ section complete & Write up the results gathered in the questionnaire.
- Week 12
 - Deliverable - ‘Summary’ complete.
- Week 13
 - Milestone - First draft of final report complete.
- Week 14
 - Deliverable - Final report complete.
 - Milestone - Submit final report.
- Week 15
 - Milestone - Project completion.

**See pg.5 for Gantt chart*

Supervisor meetings

Meetings will be held with my supervisor every two weeks to ensure the project is progressing and heading in the correct direction. Meetings will also give me a chance to express any issues and find a solution.

Provisional supervisor meeting dates:

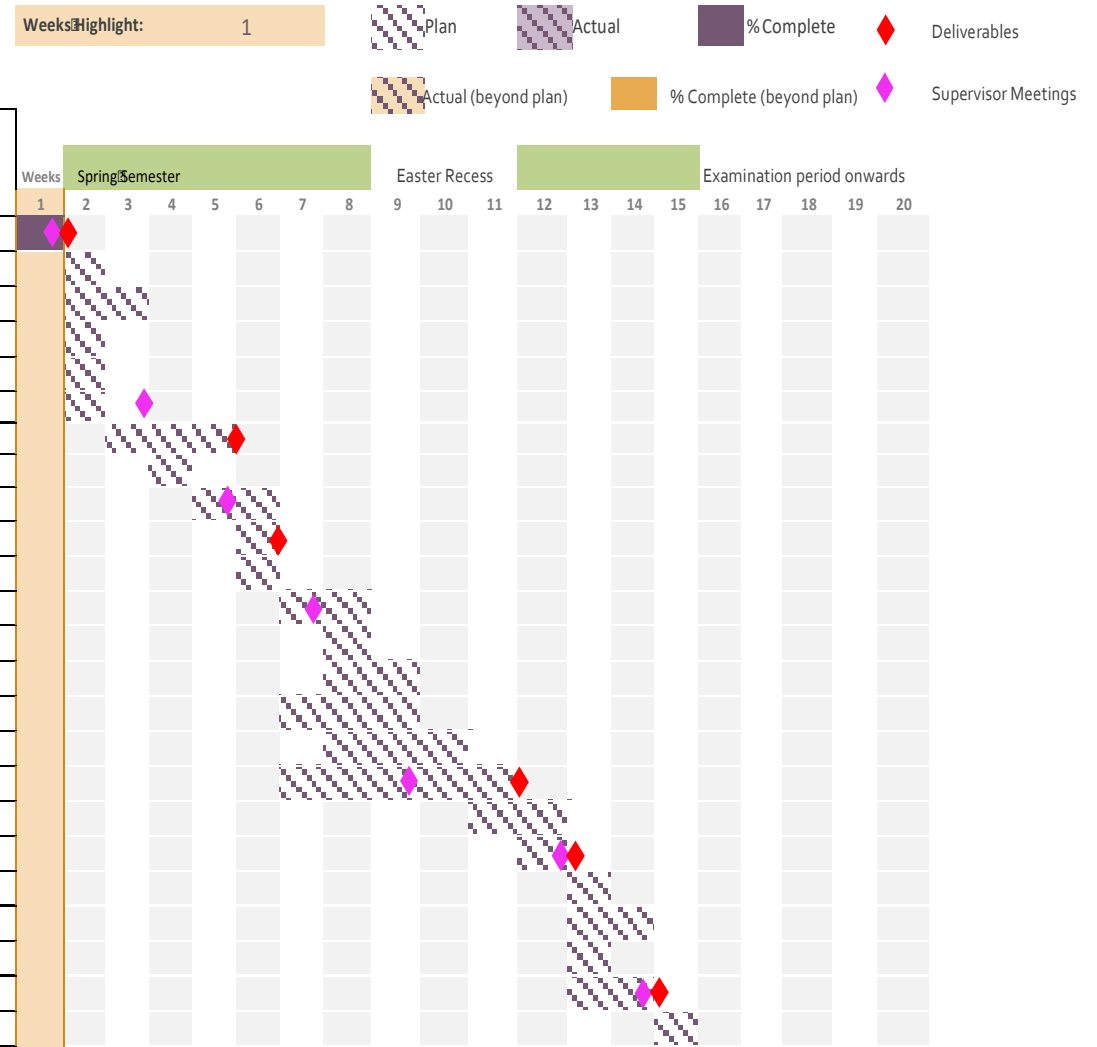
- 01/02/18
- 15/02/18
- 01/03/18
- 15/03/18
- 19/04/18
- 03/05/18

**Additional meetings may be added depending on project progress or issues. Also, meetings closer to submission deadlines or recess may be added if necessary.*

Gantt Chart

Project Planner

Tasks	PLAN	PLAN	ACTUAL	ACTUAL	PERCENT
	START	DURATION	START	DURATION	COMPLETE
Initial plan	1	1	1	1	100%
Background research & gather references	2	1			0%
Literature review	2	2			0%
Create brief structure & outline of report	2	1			0%
Background research on driverless vehicles	2	1			0%
Research the technologies involved	2	1			0%
Write up & finish first & second aim	3	3			0%
Research the psychological & social issues	4	1			0%
Create a questionnaire	5	2			0%
Review questionnaire & distribute	6	1			0%
Research the impact on users & technology companies	6	1			0%
SWOT/PEST analysis on users & technology companies	7	2			0%
Research impact on car manufacturers & insurance companies	8	1			0%
SWOT/PEST analysis on car manufacturers & insurance companies	8	2			0%
Write up psychological & social issues	7	3			0%
Write up the results gathered in the questionnaire (aim 3)	8	3			0%
Write up & finish fourth aim	7	5			0%
Research the advantages & disadvantages of the adoption driverless vehicles	11	2			0%
Summary (aim 5)	12	1			0%
Finish the first draft of the report	13	1			0%
Refine structure & add extra details	13	2			0%
Proof read final report	13	1			0%
Additional refinement & submit report	13	2			0%
Project completion & submit Report	15	1			0%



Risk Assessment

Risk	Likelihood	Impact	Strategy to minimize
1. Physical security – Devices being stolen or information being seen without authorisation.	Medium	Moderate	I shall log out or lock my computer after every usage. I shall not leave any USB sticks in computer rooms.
2. Not completing an aim/objective in time.	Medium	Moderate	I shall stick to the work plan and Gantt chart to ensure deliverables are met on time.
3. Loss of data/information.	Low	Large	I shall have backups. Backups on USB sticks as well as on google drive. Back up my work after every aim is completed.

Risk Map

		Likelihood of occurrence		
		High	Medium	Low
Potential scale of impact	Large			(3)
	Moderate		(1,2)	
	Small			

References

1. The Pathway to Driverless Cars. (2015). The Pathway to Driverless Cars. 1st ed. [ebook] Great Britain: DfT Publications, p.5. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/401562/pathway-driverless-cars-summary.pdf. Last accessed 30th jan 2018.
2. Rory Cellan-Jones. (2017). Driverless cars on UK roads by 2021 - really?. Available: <http://www.bbc.co.uk/news/technology-42046561>. Last accessed 1st feb 2018.
3. Waymo. (-). *Technology - Waymo*. Available: <https://waymo.com/tech/>. Last accessed 5th Feb 2018.