Considerations in Software Toward Driving Acceptance & Trust of Autonomous Vehicles

Connor Goddard

Department of Computer Science, Aberystwyth University
Aberystwyth, Ceredigion, SY23 3DB
Email: clg11@aber.ac.uk

Abstract—As recent technical accomplishments continue to accelerate the notion of driverless vehicles from vague possibility toward tangible reality, increasing attention within this domain is focussed on addressing the social, legal and philosophical issues that are expected to represent significant barriers in the path toward mainstream adoption of fully-autonomous vehicles within our existing societal frameworks.

From surveying current literature obtained from a range of academic, industry and government sources, this study focusses on the emergence of four major factors found to significantly influence the considerations held by consumers toward the adoption of driverless technologies: driver liability, occupant safety, occupant control and understanding of their autonomous vehicles and ethical concerns arising from increased autonomy.

I. Introduction

In the year of 1886, Karl Benz designed, built and patented the world's first petrol-powered automobile [?]. Now widely considered as the birth of the modern motor vehicle, this event would set alight a revolution in human transportation, becoming the driving force behind some of the most important technological innovations of the past two centuries.

The introduction of moving assembly-line production and "just-in-time" (JIT) delivery of parts transformed the way in which complex products such as vehicles and electronic goods could be mass-produced, leading to a dramatic increase in production efficiency and a consequential decrease in associated cost, with savings passed on to consumers in the form of cheaper purchase prices.

The development of anti-lock braking systems (ABS), airbags, seat belts and crash test dummies have all played critical role in maximising passenger safety across all forms of civilian transportation (including road, rail, marine and aviation). Many of these systems have found uses in other diverse areas of industry, including the entertainment and aerospace sectors (e.g. lap belts on roller-coasters [?] and airbag landing systems for space probes [?]).

Vehicle insurance brought along financial protection for both drivers and accident victims against potential liability in the case of traffic collisions, helping to make driving both more affordable, and financially accountable.

As technology has moved into the digital age, the automotive industry has remained a major ambassador for new development. Satellite navigation, climate control and cruise control refer to just a small proportion of in-car technologies that have since become mainstream as part of modern society.

With progress in automation and artificial intelligence technologies moving on in leaps and bounds, the notion of fully-autonomous vehicles - in which the human driver no longer has to maintain focus on the road ahead - has been steadily gathering pace, with experts predicting such technology will become a part of everyday life by 2040 [?]. Over the past couple of years, the discussion of driverless vehicles has poured out from the confines of industry and into the public sphere, popularised by the launch of high profile projects such as the Google self-driving car [?], and the introduction of semi-autonomous driving technologies such as the Tesla Autopilot system [?].

As vehicles have begun to exhibit increasing levels of automation, over time drivers have become normalised to the idea of delegating specific aspects of driving over to a computer, and in doing so implanting their trust in those systems and their creators to perform as expected.

II. Conclusion