Undergraduate Thesis Prospectus

Deployment of Web Applications in the AWS Environment
(technical research project in Computer Science)

Understanding Robotic Cars: How Views Towards Them Have Changed
(sociotechnical research project)

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General Research Problem

What do robotic cars have to offer to the future of road transportation?

This prospectus aims to analyze how robotic cars could impact the future by understanding their past. If robotic cars prove to be viable in the future, some studies suggest they "have the potential to reduce crashes by 90%, potentially saving approximately $190 billion per year" (CSS, 2023). Should these drastic claims happen, they would result in vast economic improvements and increased public good. The same paper also recognizes potential negative impacts including more congestion, increased cost of cars, and related social equity issues such as "security, safety, and public health." This dichotomy of potential benefits and drawbacks makes understanding the past and contemporary situation of robotic cars valuable as a potential way of understanding how robotic cars will impact the future of road transportation.

Deployment of Web Applications in the AWS environment

What did I learn of professional value from my internship experience?

I am writing this paper for the CS 4991 class for the fall 2023 semester with professors Rosanne Vrugtman and Brianna Morrison. In it I will describe the skills I learned throughout my internship and enable people who read it to understand how to process works for deploying web applications using the Amazon Web Services (AWS) environment. This includes AWS's hosting service Amplify, authentication service Cognito, middleware services Lambda and API Gateway, and database service DynamoDB. It will describe how these services can be combined together in order to fully host most web applications.

Understanding Robotic Cars: How Views Towards Them Have Changed

Since 2008, how have social groups in California competed to determine the place of robotic vehicles in the future of road transportation in the state?

Prior to 2008, robotic cars were limited to government, industry, and collegiate experiments and competitions like DARPA's Urban Challenge, where college teams designed robotic cars to fit DARPA's requirements (Badue et al., 2020). These competitions laid the foundation for today's robotic car systems, but social groups did not truely influence robotic cars' place in road transportation until later. Around 2008, commercial robotic cars were released, changing the public policy landscape. Since then, Studies have shown that some robotic vehicles when compared to normal cars have only a little over one-third of the crashes per million miles, making them potentially a safer form of transportation (Xu et al., 2019).

Social groups could also change the views of the older American population, who have a significant impact on who gets elected and which policies get addressed. A recent study of people 65+ showed a "pre-existing distrust in vehicle movement on roads coupled with the innate distrust in new and unproven technology explains the nonpositive rating of trust by older pedestrians" (Rahman et al., 2019). These opinions could influence lawmakers when considering laws around robotic cars given the historically higher voting power associated with older generations. So it is important to not only understand how social groups are impacting the younger generations, who will have to live with whatever policies surrounding robotic cars get created, but also the older generations, who will influence the policies even if they won't have to live with the consequences.

The social impacts of robotic cars are key to understanding if this technology is worth developing, since the Center for Sustainability Systems (2023) suggests potentially upwards of 90% of crashes avoided and $190 billion saved related to that crash avoidance. However for this

to be possible,the technology would have to be supported socially before the technical side could ever be put to the test to see if the results of that study were true. One study into this matter showed "potential anxiety about using such advanced technology… has a large impact on purchasing intentions" (Topolsek et al., 2020).

The National Federation of the Blind is an advocacy for robotic vehicles. They aim to "educate and advocate on the need for federal autonomous vehicle legislation and regulatory exemptions so that achievements in transportation independence can exist … in ordinary life" (NFIB, n.d). They are one of the major private proponents of robotic cars, since they see it not only as a way of making things easier and safer for people who already drive, but to enable those who can't drive themselves to have more autonomy in their day to day lives.

The Safe Street Rebels is an advocacy against robotic cars. They argue that robotic vehicles should be taken off the streets, because "robotaxis are effectively above the law. Their fleets cannot be cited for traffic violations" (Babe, 2023). This is one of the major private opponents of robotic cars. As NPR reported the advocacy was "responsible for this so-called coning incident and dozens of others over the past few months," with aims of disrupting the system through the use of cones placed on hoods to disable robotic cars, as well as other protests and acts of disruption to bring attention to their cause (Kerr, 2023).

The current California governor appears to support robotic vehicles. On September 23, 2023, he vetoed a bill that would ban driverless robotic trucks on California roads (Marshall, 2023). This may indicate an unwillingness to limit robotic cars in California, meaning that without social groups against robotic cars getting enough voting power to elect an anti-robotic car governor, they may see limited progress on a state law level.

The California Public Commission also appears to support robotic vehicles. On August 10, 2023, "the commission ruled to allow the companies to operate across the city 24/7 and charge passengers for the ride" (Kupfer & Mojadad, 2023). This means that instead of only being able to charge for rides at night, they are now able to run throughout the day as well, opening their business up to be more profitable. In the same Kupfer & Mojadad article, they mention "city leaders, first responders and labor unions had all called on the California Public Utilities Commission to slow the robotaxis' rollout, citing safety issues," with concerns about robotic cars not always yielding to first responders.

Overall, the various influences of social groups in the current climate of robotic vehicles is rather complicated, and understanding how it got there from the initial releases in 2008 will be important to considering where it may go in the future. Regulating the use of new technologies in the US has always been a struggle for governmental agencies, and is often influenced by private social groups in various ways, and robotic cars appear to be no different.

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