

Building an E-Commerce Website

Autonomous Vehicles and Their Effect on Society

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On my honor as a University Student, I have neither given nor received
unauthorized aid on this assignment as defined by the Honor Guidelines for
Thesis-Related Assignments

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Introduction

In recent years, artificial intelligence has become extremely powerful and can be efficiently implemented in autonomous vehicles (AV). As artificial intelligence continues to develop and autonomous vehicles become more advanced, there will be many societal changes and ethical challenges.

Driving is a large part of most people's lives, so if there was no longer a need for humans to operate their own vehicles, there would be a major shift in many people's day to day lives. Many professions that require human operation of vehicles will become obsolete if a safer option emerges (Anderson, Nidhi, Stanley, Oluwatola, Samaras, & Sorensen, 2018). Driving on average will become safer and 94% of accidents can be avoided because human errors will be eliminated, but how will this be measured and will society accept this conclusion (Hicks, 2018)? Michael Nees (2019) discusses how people will react to this technology and states, "Clearly, safety will be an important factor that will affect acceptance of self-driving cars, but the criterion for acceptable safety in vehicle automation for the general public is currently unknown" (Nees, 2019). Just because a technology is available that will make people's lives more convenient and more safe, does not mean they will accept that this is a viable replacement.

There are also ethical questions about who will be responsible for an error in driving algorithm and how the system will handle crash algorithms. How does an AV prioritize the life of passengers, other drivers, and pedestrians? Some people argue, "all self-driving cars must act in the *interest of their passengers* over anything else," while others argue that minimizing damage is the most important factor, even if it means the driver will be harmed (Coca & Vila,

2018). These are things that society will have to address as autonomous vehicles progress and become ingrained in our society. Laws governing autonomous vehicles will play a major role in the development of the technology and may slow down the technology “because the liability burden on the manufacturer may be prohibitive of further development” (Anderson, Nidhi, Stanley, Oluwatola, Samaras, & Sorensen, 2018). Additionally laws that are focused directly on AVs and their limitations on the road will need to be addressed. This will include liabilities in the event of a crash and how artificial intelligence will prioritize life.

The research portion of my thesis does not relate to the STS topic. My research topic is an independent research assignment where I will be creating an application for independent nursing care. There is not an application that allows users to search for bedside health care and this could be an important technology because many people with terminal illnesses need to be cared for in their home.

Technical Topic

My technical topic is an independent research topic with my advisor, Alfred Weaver, where I will be working on an E-commerce application with colleagues Emily Roberts and Jill Dewoody. We will build an E-commerce website and further our experience in this field. Our project is an application that allows users to search for nurses and hire them independently of hospitals.

Many Americans, especially the elderly and those with terminal illnesses, need experienced nurses to care for them and administer medications in their homes. It can be very tiring for family members to spend all of their time helping and caring for relatives, so hiring these nurses can relieve a lot of stress. Additionally, bedside nurses help meet medical needs that

the patient's family cannot, while also keeping their sick loved one out of the hospital. Today, over 65% of Americans who need long term care choose to hire in-home assistance instead of other care alternatives (Administration on Aging, 2019). However, even with this large demand, there is unfortunately no existing system that makes hiring these nurses affordable and efficient. To find these medical professionals, patients and caregivers rely on either word of mouth or existing agencies. While word of mouth is unreliable and limited, the agencies charge an additional fee of 15%-30% on top of the nurse's rate (NNBA, 2019). The current agency system also requires a middleman to match patients and nurses, which further increases both fees and time. Additionally, these agencies do not allow patients to browse available nurses and directly contact them to instantly inquire about rates and availability, which could be problematic if a patient needs assistance unexpectedly due to a sudden illness or injury. Essentially, if a patient only needs one-time nurse care for some number of hours, it may not be worth the effort of going through an agency. Thus, overall, the high cost and long turnaround time associated with current nurse agencies provides a gap in the market that we hope to fill.

We will create a web application to connect registered nurses with a variety of qualifications to those needing an at-home nurse service. Our site will have similar functionalities to care.com, which connects babysitters, nannies, etc. to families, but our website will specifically connect registered nurses and patients. Our site will have sign up and log in pages for both patients and nurses, but the profile pages for nurses and patients will be different. The individual requesting nursing care will be able to view and search for nurses based on a specific time, the amount that they are willing to pay, and the specialty that they need. They can also pay for services, update their patient profile, message a nurse directly, and rate nurses on

performance. On the other hand, nurses can fill in available work times, update their nurse profile with desired pay rate and specialties, and apply for positions. The payment system will work as follows: the patient will pay up-front when they book a service, and the cost is calculated using the nurses' desired hourly rate, hours of needed services, and our 5% fee. Once the patient pays us, we will update the nurse's balance. The nurse can then transfer his/her balance to his/her own Paypal whenever he/she chooses. By incorporating this functionality in a user-friendly website, we will solve our desired problem by connecting patients to nurses with ease. Our solution is useful because it improves the efficiency of hiring medical professionals, reduces the overall cost, and provides patients with a greater selection of medical professionals from which to hire.

STS Topic

Technological determinism is a theory that states that technological development drives societal change and that "technology exert[s] a greater influence on societies and their processes than any other factor" (Smith, 1994). People create new technology and society reacts to it and adapts to thrive with this new technology. There are many valid aspects of this theory and examples where this theory applies to technology and society. However, there are some critiques of this theory and a competing theory called Social Construction of Technology was created (Klein, Kleinman, 2002). Social construction argues that humans drive changes in technology and Pinch and Bijker, two founders of the theory, argue that technological determinism is faulty, and that social pressures are the main factor in technology (Pinch and Bijker).

Technological determinism can be applied to the topic of autonomous vehicles and their effect on society. 50.6 minutes is the average amount of time people spend in their cars per day,

which could be spent doing other things (Tefft, 2018). People's habits and daily commutes will be directly affected by AV technology, which could allow for more productivity or sleep. Additionally, many people that previously did not have the ability to operate motor vehicles may be given this opportunity. Elderly people, blind people, mentally handicapped people, drunk people, and young people may be able to drive, which would be a convenience to people who previously had to drive them.

Society will also have to adapt to new infrastructure due to AVs. If society comes to a point where all vehicles or the majority of vehicles on the road are self driving, then infrastructure will change as a result. If cars can communicate and determine optimal traffic patterns, it may be possible to eliminate some existing infrastructure like traffic lights, stop signs, and other things that are in place because of human inability to coordinate (Liu, Song, 2019). Although there may be removal of some of our current infrastructure, there are a couple things that will need to be improved or added. AVs rely on detecting lines in the road in order to stay navigate roads. In order for an AV to perform at its best, road painting will need to be improved or another way to make sure AVs stay in the correct lane will need to be developed.

Laws governing who is responsible in the event of a crash will need to be addressed. If there are errors in the software that cause injury or death, many people will blame the creators of the software. The judicial system will have to make difficult decisions about who will be held accountable (Coca & Vila, 2018). In the current legal system, a driver that is at fault has to compensate the other driver for any damages that have occurred. In the case of an AV, there is no driver to place blame on, so the blame will fall onto the car's company, which will cause liability for these companies (Koopman & Wagner, 2017). This is because "it is difficult to argue

that any persons being carried in the vehicle could be described as driving” (Collingwood, 2017), and if there is no human driver, then the liability is placed on the creator of the software. This liability and the fear of having to pay for damages could be a possible roadblock for companies looking to expand their AV technologies (Brodsky, 2016) . Social construction of Technology supports this example of AVs and their relationship with society; the laws and liabilities may affect this development in technology (Anderson,Nidhi,Stanley,Oluwatola,Samaras,& Sorensen, 2014).

The trolley dilemma is an ethical question of whether it is more ethical to divert a trolley about to hit and kill multiple people if this would result in one person being killed. This brings up major ethical questions about what decisions should be made when dealing with human life and deciding which is more ethical, “utilitarian and deontological thinking, acting and omitting, harming and letting harm to occur, [and] positive and negative duties” (Wolkenstein, 2018). Should a car prioritize the life of the driver, the life of a pedestrian, or the life of other drivers? Society will have to agree upon a standard for how AVs will make moral decisions in the future (Rowthorn, 2019). Most automotive makers will be encouraged to create selfish crash algorithms that prioritize the driver’s life over everything else, because “Who would be willing to pay for a car that would sacrifice his life to save three children?” (Coca & Vila, 2018) The utilitarian standpoint on this issue is to minimize the amount of harm done in general and would argue that the driver’s life is equally as important as one pedestrian and less important than two pedestrians.

Either belief system will create its own variety of problems and changes and the government will most likely need to create legislature to determine how decisions like this will

be made. A system where the car takes the utilitarian situation might hinder economic growth in the AV realm because of the discouragement to buy AVs, while a system where the car makes the selfish choice may receive pushback from people that argue the technology should be minimizing harm.

Research Question and Method

My STS research question is, how will society change with autonomous vehicle technology and what problems will we face with this new technology? Many of the changes were discussed in the previous section. Changes like infrastructure, laws, and ethics are all things society will need to adapt to in order to fully utilize this new technology.

The research method I will use to answer this question is the Wicked Problem Framework. This will be useful because the question of how will society change because of a technology is a complex, dynamic problem, and we are not completely sure how it will resolve (Head, 2019). The methods I will use to answer this research question are determining changes already occurring in today's society despite AV usage not being widespread or very advanced. There have already been changes in society, and it could be useful to know how society has already been affected. There are also many people discussing possible ethical issues and solutions to AVs which will be useful to reference. Addressing the problems that this technology may encounter is mandatory before I can discuss how society will react and change because of it. The legal and ethical problems will be large portion of my discussion because this may be the most unpredictable area in which society is affected.

Conclusion

The creation of the independent nursing application will create a convenient and more effective way to hire nurses for independent use. This will make it cheaper and more convenient for people seeking bedside nursing to get the care they need. This application would cut out the middleman from the process and streamline the process as a whole. Both my technical project and STS portion of the prospectus will increase convenience for people. These may be in different realms of society, but people looking for nursing care and people travelling will be positively affected by these technologies.

My STS deliverable will address the increases in autonomous vehicle technology and how this will affect society. It will discuss ethical challenges, legal changes, and other social changes. Addressing how society will react and how AV technology will progress is a complex problem to understand and I hope to address some of the changes that will occur. I think I will learn about the laws that will likely need to be enacted to keep AVs regulated. I also hope to answer some of the ethical challenges that accompany AVs.

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