Pedro Cruz

Instructor: Malcolm Campbell

English 1103

Date: October 1, 2013

Better Check Yourself Before You Wreck Yourself
(Problems with additional technology in cars)

The innovation of the car has taken big steps forward in the last few decades as compared to the last few centuries and the speed at which innovations are being made ~~are~~ is at a record high. From a ~~history~~ historical standpoint, the idea of the self-propelled vehicle was not thought of until around the 1760s and the first patent was not established ~~till~~ until the year 1789. ~~and~~ The first automobile with an~~d~~ internal combustion engine was not made ~~till~~ until the 1860s and not commercialized until around the 1870s (timeline). ~~Until around~~ During the 1960s, the design of the car ~~has~~ changed a significant amount to take on a shape which more closely resembles ~~more~~ the body of a current automobile. As the human race entered the 21st century, there has been more availability of advanced technology allowing many people to think outside of the box with what they want to do with the automobile and how they want to change it. With ~~those~~ these new ideas, there has been a change of ideology between how to gather more speed and acceleration to how to ~~create~~ make the car more fuel efficient or even how to re-invent the car for the modern world. It is as if we have hit an ideological limiting factor which allows the priority of upgrading the automobile to ~~be switched from~~ vary between people ~~wanted~~ wanting a fast car for their own needs to people being aware of the environment and research being done to change the car for

the person of the present, or even the future. With the amount of technology available to us today though, what has taken many years to achieve is only taking a few years to completely re-invent. With the addition of things as simple as mounting cameras, to and adding radar with pedestrian detection software, to where the concept of having a completely autonomous car in the next couple of years is not such a far-fetched idea (bankrate). However, all these innovations require the addition of electronic controls which in return opens the car up to malicious manipulations (Neiger). With the opportunity there, safety is a major issue which should be addressed when considering the development of the car.

Some of the developments are meant for pure positive advancement, like Many advancements that are being made are for the improvement of human life and our effect on Earth, for example the hydrogen fuel cell battery. They hydrogen fuel cell is an electrochemical cell in which the energy of a reaction between a fuel, such as liquid hydrogen, and an oxidant, such as liquid oxygen, is converted directly and continuously into electrical energy (The American Heritage). What this means is that the battery can be charged a multiple amount of times, allowing higher efficiency in a battery, therefore, causing less waste. This also means that the automobile would now run on electricity rather than the combustion engine that it is currently using. The hydrogen battery would lead the change of the power source of today's car from an oil-consumption vehicle to one that runs on batteries arranged in a multitude of ways, as shown by C.E. Thomas in his article "Fuel Cell and Battery Electric Vehicles". In his article, Thomas compares different types of cars and the greenhouse by providing data that he had collected and displaying graphs in which he predicts the shift from the oil-consuming cars we have today, or ICVs, to a more environmentally friendly alternative by the year 2095. However, right now the expense of this alternative fuel source is costing costs a lot more than normal gasoline-

Comment [M3]: This is a good sentence. I very much like this sentence.

consuming cars, but as gas prices continue to rise—since it is a limited resource—a hydrogen battery might start to seem like a better alternative (Thomas). No matter the amount of benefits that the hydrogen fuel cell might bring, there are always negative sides, since perfection is a mere idea. Some of the negative aspects are seen through tests with the other technology, some of which has already been seen in cars.

While the hydrogen battery has to wait before it can see commercial release, the Heads-Up Display, HUD for short, has shown what it can do in the release of the 2004 BMW as well as the version 2.0 release in 2011 (Boeriu). In the article "Head-up displays and their automotive application", Nicholas J. Ward reviews the current research and gives test data that he has gathered from his research to come to the conclusion that it is too early to decide the effectiveness of the machine, but so far it seems that the pros do not outweigh the cons. This innovation is adding a display in the front mirror of the car that would allow the driver to detect pedestrians or other cars around the vehicle; the display would also warn the driver of road work and the speed limit that they should be driving meaning that information would become more easily accessible to the driver allowing him to make more informed decisions. Ward wrote the article as a way to convey information of on what they have gotten so far, seeing as they still have many questions left unanswered. for example: Further questions for researchers to explore are what particular information should be displayed, how big the display will be, placement, and whether the display would be helpful or just serve as another distraction?. Tests with NASA were performed where pilots were asked to land an aircraft using either the HUD or other conventional instruments and determined that the time it took for people to notice an obstacle was longer for people using the HUD. This means they could have been distracted by the display which in turn took their attention off their surroundings (711). Would the possibility of an

Comment [M4]: I think the way you had this before might have been fine. I just kind of re-worded it and now it is kind of boring-sounding..?

overflow of information cause people to hesitate when making decisions? If we cannot even see the positive effects of using the HUD to help detect environmental stimuli, what would be the benefit of adding these computers?

This increasing addition of computers to the automobile has made people start to wonder wondering about the safety implications this could have on the community of customers who have grown dependent on the vehicle as a means of transportation. BBC News published an article by Neiger describing how people had successfully "hacked" into a car and were able to take over all the functions of the car, taking control from the driver. Chris Neiger defines hacking, in his article "Car-Hacking Gets Real", as the ability to control the car, without a person being physically present. The hacking was successful with the wiring of a computer to figure out the code to control the electronic control units, or ECUs, which allowed the two hackers to create havoc by taking over the car (Henn). When the topic was brought to the car companies, they argued that they were not worried since it required addition of hardware and wiring to the car that a driver would notice (1). To the car companies, this meant a harder smaller possibility of this happening and since the materials where were not easily accessible to the regular person, so as any big company would have reacted, they are were not worried. Don Bailey, a security researcher who has hacked into multiple cars remotely via the cell phone network states that he is disappointed in the response of the companies; that it may be tough and may take time but it is possible (1). Right now the cars are not connected to the internet, which is why the wiring has to be done to learn the language of the car, but as technology advances, the internet may be integrated in a few years, and which would create a bigger vulnerability to the "fragile" system (Nieger).

If cars are available with systems weak outside interference then everyone is in danger. Do you drive? Or do you know someone that drives? It is likely that everyone who is able to read this paper can answer yes to at least one of the questions if not both, which means that you could be a victim. The addition of better software would require more money being invested, which could be one of the reasons that car companies feel that hacking is not an immediate threat. If safety is present, then the advancements of technology could provide a new way of life.

The National Highway Traffic Safety Administration, NHTSA, has taken into account the speed at which technology is advancing and unlike the car companies, they are performing their own test in order to create laws that stay ahead of the threat (Aldana). The NHTSA is taking the issue into their own hand by taking safety into concern. This addition of electronic contents to the automobile have has caused worry in most and with the idea of autonomy in the car and what that would mean as far as adding more computers, concerns are that and how as more computers are added, the easier it becomes for people to take over the car. With technology changing, so do laws, and that is why the U.S. Department of Transportation released policies on the different levels of automation possible and how cars would be classified: from level 0 (no autonomy) to level 4 (full autonomy). To give an idea of where we stand right now, the Google car is at a level 3 and is currently being perfected (1). There are two "Google cars" which are self-driving Prius and Lexus cars that, according to the leader of Google's Autonomous- car project, are safer than humans driving cars (Sanghani). The cars have been taken out on public roads and they have proven proved that the cars' software was proven better at keeping safe distances from other vehicles, than human drivers could (1). In fact, in one of the tests, a Google car was hit by another driver. The car was able to create an annotated map of the surroundings and what happened, meaning that insurance claims could be decreased if everyone got were

> **Comment [M5]:** Good job identifying the audience here.

driven around by a Google car. The car has been on public roads since 2010 with a human driver

to take over whenever necessary. It is close to being completed and the company is thinking of

different ways to commercialize the car (1).

With cars innovation currently changing almost monthly and with safety a constant

concern, policy has to change and the U.S. Department of Transportation has to keep up with car

innovations. They also have to do research to stay on top and make sure that as the automobile

changes, so does policy to provide safety for the driver. Restrictions have to be made to on how

much can be added to the car, as well as having plenty of data done to collected on each addition,

as well as car companies opening their cars and considering the possibility of hacking so they

have their defenses up. The NHTSA is doing their best to do their research to stay ahead of the

game with the advancements being done to cars in order to put policies into place, but change

will not become possible if the car companies are not willing to cooperate and strengthen their

software now, before they connect cars to the internet and it is too late.

With the changing of the car there will be more changes done to daily life and I already

see a generation that is not able to do anything without having to depend on technology. While

some believe this allows today's generation to focus more on solutions than the steps required,

one should also have a deep understanding of the steps they are taking in solving a problem.

What does this technology take away? With the autonomous car, one won't be able to just drive

with no destination in mind, to clear one's head. It will no longer be a privilege to drive places

since one would not be doing the driving anymore. That is why an integration of the autonomous

cars should be done to where one can turn it off and still use the car manually. Where While on

the road, there would be lanes with autonomous cars and lanes where one can drive manually as

a way to have a faster speed limit in the autonomous lanes since all the cars would be able to

communicate with one another, which is why car companies should develop stronger software. A license would still be required to where a person would be able to take over if the car malfunctioned or a system where the cars would give off warning when it was close to a malfunction to allow time to pull over. There are more ideas and problems that would need to be addressed but a hybrid would work best in both a transition to the new cars and allowing the consumer a choice.

There are two sides to every story but with the addition of more and more technology, the safety of everyone should be the priority before any commercialization is put into place. This issue cannot be brushed off anymore since the advancement of cars has already come so far and the rate of advancement will only continue to increase. Car companies cannot push this off any longer and if they decide to, the consumer shall remind them that their time is running out.

Formatted: Indent: First line: 0.5"

Comment [M6]: This paper is quite engaging. I don't really know *that* much about cars and yet the things you mentioned completely had my attention.

Comment [M7]: Also I ended up not making any real drastic changes. I felt like it flowed rather well. You only have a little teeny bit left to write! Whoo!

Works Cited

Aldana, Karen. "U.S. Department of Transportation Releases Policy on Automated Vehicle

    Development ." U.S. Department of Transportation Releases Policy on Automated

    Vehicle Development. National Highway Traffic Safety Administration, 30 May 2013.

    Web. 01 Oct. 2013.

The American Heritage® Dictionary of the English Language, Fourth Edition copyright ©2000

    by Houghton Mifflin Company. Updated in 2009. Published by Houghton Mifflin

    Company. All rights reserved.

Boeriu, Horatiu. "Head-Up Display 2.0 – Augmented Reality." *BMW BLOG RSS*. N.p., n.d.

    Web. 23 Oct. 2013.web.

C.E. Thomas, Fuel cell and battery electric vehicles compared, International Journal of Hydrogen

    Energy, Volume 34, Issue 15, August 2009, Pages 6005-6020, ISSN 0360-3199, web.

Heaps, Russ. "8 great new advances in auto technology." *8 great new advances in auto technology*. N.p., n.d. Web. 23 Oct. 2013

Janner, Jay . "Google brings its driverless car to Austin." Austin News, Sports, Weather, Longhorns, Business. N.p., n.d. Web. 23 Oct. 2013. Web.

Nicholas J. Ward, Andrew Parkes, Head-up displays and their automotive application: An overview of human factors issues affecting safety, Accident Analysis & Prevention, Volume 26, Issue 6, December 1994, Pages 703-717, ISSN 0001-4575, web.

Sanghani, Radhika. "Google's driverless cars are 'safer' than human drivers." *The Telegraph*. N.p., 29 Oct. 2013. Web. 30 Oct. 2013. Web.