Explore – Impact of Computing Innovations
Written Response Submission Template

Please see Assessment Overview and Performance Task Directions for Student for the task directions and recommended word counts.

Computational Artifact

2a)

My computing innovation is the Tesla Autopilot, which is an "add-on-feature" of Tesla cars that allows the user to use autopilot[3]. Its purpose is to assist transporting a person to their desired location. The function is to take user input (text inputted to GPS), transform the text into signals, and receive signals from satellites to transport the user to the desired destination.

My computational artifact illustrates the innovation's purpose because it shows the user input (where the person types the destination) and the outcome (where the vehicle arrives at the chosen destination).

2b)

I used a program called Photoshop to make my artifact. I searched up images on **Google Images** and imported them onto a blank Photoshop canvas. After importing images, I rasterized them to edit the images seamlessly. Rasterization converts graphics into pixels, making it easier to add artistic effects. The techniques and tools I used include the crop tool (used to remove excess parts of an image), eraser tool (remove minor details of an image), and text tool (add words). Then, I arranged the images to make it aesthetically appealing and added text to explain the Tesla Autopilot's purpose and function.

Computing Innovation

2c)

One beneficial effect the Tesla Autopilot could have on the culture of motorcyclists is to keep motorcyclists safer on the highway. Motorcycles hide "easily in blind spots" and do not have the same safety features as a normal vehicle (like seatbelts and airbags), but "self-driving cars don't have blind spots. They have sensors and cameras pointing in all directions that allow them to detect cars and motorcyclists around them," allowing the vehicle to avoid vehicular accidents [1].

One harmful effect the Tesla Autopilot has on the economy is that thousands of employees in careers related to the automobile industry could be displaced. With the "twelve ultrasonic sensors that make up the sonar," the Tesla Autopilot "can see objects like a child or a dog, and are functional at any speed," leading to a decrease in accidents [3]. Therefore, "if autonomous vehicles are safer, automation could affect the workforce...through a decreased demand for labor in auto insurance, auto repair and body shops, health care, and legal services"[2]. If people drive the Tesla Autopilot, which is a safer vehicle, then there will be less of a need for services that extend to damaged vehicles or car-related accidents, making thousands of people unemployed.

2d)

The data the Tesla Autopilot uses includes text or string and signals. According to Reese, "drivers can enter an address into a navigation system," which is the user inputting text into the Global Positioning Service (GPS) in the car, that transforms the text into signals to send to satellites which will send signals back to the GPS to "detect the car's position on the road[3]." This will "allow the car to automatically change lanes and exit the freeway," and also use sensors and cameras to avoid collisions, in order to arrive at the inputted destination[3].

One security concern directly related to the Tesla Autopilot is that humans can find ways to hack the safety feature which can ultimately lead to car accidents. The Tesla Autopilot can "self-steer, adjust speed, detect nearby obstacles, apply brakes, and park"[3]. The safety feature "uses pressure sensors in the wheel to determine whether a driver is physically controlling the car"[4]. There was one man who hacked "the pressure sensors into thinking he was driving" by wedging an orange into the steering wheel[4]. In another case, "Chinese security researchers were able to hack a Tesla Model X, turning on the brakes remotely and getting the doors and trunk to open and close," which if the brakes are hacked by people with ill intent, could lead to safety concerns[5]. Therefore, tricking the safety feature of the Tesla Autopilot is a security concern.

References

2e)

[1]Harveston, Kate. “The Pros and Cons of Self-Driving Cars.” *The Fifth Column*. 14 Aug. 2017. Web. 26 Feb. 2018. https://thefifthcolumnnews.com/2017/08/the-pros-and-cons-of-self-driving-cars/

[2]Kalra, Nidhi. “What Autonomous Vehicles Could Mean for American Workers.” *Rand Corporation*. 29 Aug. 2017. Web. 26 Feb. 2018. https://www.rand.org/blog/2017/08/what-autonomous-vehicles-could-mean-for-american-workers.html

[3]Reese, Hope. “Tesla's Autopilot: The Smart Person's Guide.” *Tech Republic*. 4 Aug. 2017. Web. 27 Feb. 2018. https://www.techrepublic.com/article/teslas-autopilot-the-smart-persons-guide/

[4]Tracy, Philip. “This Guy Used An Orange To Hack His Tesla Into A Self-Driving car.” *The Daily Dot*. 16 Jan. 2018. Web. 28 Feb. 2018. https://www.dailydot.com/debug/tesla-orange-hack/

[5]Weise, Elizabeth. “Chinese Group Hacks A Tesla For The Second Year In A Row.” *USA Today.* 27 July 2017. Web. 6 March 2018. https://www.usatoday.com/story/tech/2017/07/28/chinese-group-hacks-tesla-second-year-row/518430001/

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