Universal Car Kit

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***Abstract*— In 2019, a study done by the National Highway Traffic Safety Administration concluded that 94% of the serious vehicle accidents that occurred in 2018 were due to human error. They believe that with the incorporation of autonomous vehicles in American society we can save the lives of the nearly 36,560 people that died in 2018 from vehicle accidents [1]. They support this claim with the evidence that lane-assist, blind-spot monitoring, and brake assist have helped decrease the deaths per 100,000 people from approximately 23 people in 1980 to 11 deaths per 100,000 people in 2018 [2]. With these new components in technology, vehicles can avoid accidents caused by drowsy or distracted drivers. They also believe that with fully autonomous vehicles we can cut down on roughly $190 billion every year just in health care costs [3]. They believe that with enough advancement in autonomous vehicles they can become completely driverless avoiding accidents indefinitely allowing for faster travel time and increased efficiency in traffic flow. While there are challenges and decisions to be made concerning the adoption of AVs the advancement alone in smart cars has proven monumental in the safety for drivers. For example, Jessica Cicchino IIHS vice president of research, found that if all vehicles had been equipped with lane departure warning, nearly 85,000 police-reported crashes and 55,000 injuries would have been avoided in 2015. With these numbers in mind, it is imperative that we assist in the installment of these systems in your typical car. However, it is found that the installment of these components has been reserved for newer generation models. Vehicles that were built before the invention of these advanced technologies have been forsaken. That is why the aim of this project was to advance, develop, and deploy autonomous vehicle components and instruments in an older vehicle to assist in the modernization and progress of the autonomous/smart vehicle. Blind spot monitoring, lane assist, back up camera, and GPS navigation are just a few of the simple components that an autonomous vehicle uses to allow for a driverless vehicle. However, very few researchers have thought about building an autonomous car from an older model vehicle, which is exactly what this project addresses. This project does so to better enable researchers and academics to understand the nuances and implementation of the levels of automation. Using case studies from corporations like, NHSTA, IIHS and INTERTRAFFIC, we analyze the effects that autonomous vehicles have on safety, economy, society, efficiency, convenience, and mobility. We show that it is possible to implement these similar autonomous vehicle components into a 2002 Lexus Is300, which has very limited technology and resources. Using a Raspberry PI circuit board, we were able to connect the different components into the board to allow the car to communicate to the driver. In this process we found compatible hardware components that enabled the car to develop smart car features. The significance of this study was to show that as we wait for a society filled with autonomous cars we can build and install technology and software into our very own personal cars to assist in a safer transportation experience.**

REFERENCES

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