Chapter 15
Ethics and Risks Associated With Self-Driving Automobiles

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ABSTRACT

Autonomous vehicles are already on public roadways and may present hazards well beyond simply allowing a car or truck to drive itself. As the automobile industry prepares to add even more "smart" technologies, it is prudent to investigate the ethics behind what can be lethal machinery. Radar, LiDAR, sensors, cameras, and other technologies are briefly explored along with levels of automation and current standards that are supposed to apply to components. Central to the purpose of this investigation is the telling of individual stories in which drivers, passengers, and pedestrians have died or otherwise experienced life-changing events. Some positive effects are apparent, but whether machine learning can appropriately make life-and-death decisions is yet to be accepted by society. Other facets include economic and environmental complications, human behaviors, company responsibilities, and the need for legal guidance in a field that currently mostly operates on recommendations.

INTRODUCTION

Autonomous automobiles may be considered a technical wonder, but present an ethical dilemma: how can humans trust that operators, drivers in other vehicles, and pedestrians are truly safe from life-threatening accidents? This technology's basic concepts and description of specific incidents help in understanding the real-life implications, and lead to the exploration of risks that society must either accept, regulate, or maybe even renounce.

First, the idea of automating automobiles is not new. Research began as early as the 1920s with first trials conducted by the 1950s (Ondruš et al., 2020). In 1977, Tsukuba Mechanical of Japan developed a car that used "white street markers via two vehicle-mounted cameras" to set an unmanned vehicle in motion at about 20 miles an hour (Kopestinsky, 2022, Driverless Car Statistics section). By the 1980s the concept became a reality thanks to coordinating efforts of several universities and car manufactur-

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ers (Ondruš et al., 2020). Cruise control, a component of self-driving cars, has been in use for decades; many cars today also have parallel parking assistance (Faulhaber et al., 2019). It is clear this is not a passing fancy; current statistics declare more than 80 companies are working on this technology with $54 billion invested in the global market as of 2022 (Kopestinsky, 2022).

Developers and proponents of autonomous vehicles claim they are safer than traditional cars, help to plan driving routes, reduce stops and waiting time for taxi services, share sensor data that is gathered with others on the road, and largely bypass human errors as the sensors do their job (Clayton & Kral, 2021). Traffic would be better regulated, and due to sensors, automobile theft might be reduced (Ondruš et al., 2020). A survey reported by Schneble and Shaw (2021) claims that emergency decisions may be faster since it does not involve the emotional reaction of a human driver – a term they call "autonowashing" (p. 2). Margan (2018) claims once this is widespread, "our roads will be safer as the driverless cars will always be attentive to the environment, obey the traffic rules, and never get tired, distracted, drunk or have fits of road rage" (p. 15). Another benefit may be lowered emissions due to smoother vehicle operation (Gurumurthy et al., 2021), although electric vehicles would produce an even more profound environmental impact. Also, those who are physically or cognitively unable to operate a motor vehicle on their own may benefit, and traffic may run more smoothly with electronic communication between vehicles (Faulhaber et al., 2019).

Mayer et al. (2021) states while human drivers are the predominant cause of accidents and the high number of road fatalities worldwide provides motivation for use of self-driving vehicles, it still must be considered that unpredictable pedestrians, animals, other drivers, and other factors make it impossible to expect zero misadventures. Part of the development of these vehicles, then, is to program them for dealing with events – and the question must be raised whether or not technology should be allowed to make moral decisions in life-or-death situations (Mayer et al., 2021). Ondruš et al., (2020) points out changes in weather conditions as a complication, and the reliance on technology may also result in generations of less experienced drivers, which can surely be problematic when the human must take back control of the vehicle.

Before a deeper exploration into this topic, it is helpful to consider what other technologies are already used on the road. Cameras capture speeding using radar detection, accidents can be detected and mapped on the internet so other drivers can check the web to avoid potential delays, and emergency services can receive priority through rerouting traffic (Stan et al., 2014). All-Electronic Tolling (AET) is employed on some toll roads, allowing funds to be collected by reading license plates or using a transponder instead of stopping to use cash (International Bridge, Tunnel and Turnpike Association, 2018). These and other measures are in place for safety and convenience as well as conserving fuel and potentially reducing air pollution (Stan et al., 2014). In a more automated future, there may be less need for roadway signage (Ondruš et al., 2020). Additionally, automation can be and is used in places other than public roads: in the agricultural community, an autonomous tractor is scheduled for launch in 2022; John Deere claims it will enhance efficiency due to the ability to deal with elevated landscapes, different soil types, moisture levels, and other issues ("John Deere," 2022).

TECHNOLOGY BASICS

Self-driving car technology is tremendously complex but a general understanding is helpful in contemplating the ethics of its use. Autonomous setup begin with an operating system so that algorithms