Mind the Gap: From Magenta Line to Mandi House

HUL281 Technology and Governance

Major Blog on Driverless Cars

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*"IIT, Station. Doors will open on the right; please **mind the gap!**" One usually hears this when they deboard the metro on the **Magenta Line's** IIT station. The Line recently became India's first completely driverless metro service. Whereas **Mandi House** lies on the human driven violet and blue lines. It is also the place for the Mandi House Gol Chakkar (round-about) where seven roads meet. With a driverless metro service starting in the country, one could also hope for driverless cars to follow suit. But as one could imagine, the conditions in which the magenta line works are very controlled compared to any "gol chakkar". Thus this gap needs to be kept in mind while thinking about the feasibility of rolling out driverless cars. But at the same time, the technology has many benefits.*

Driverless cars do not need any human intervention for functioning. They have cameras and sensors to 'perceive' the world and navigate accordingly via computers. Since computers do not get tired or distracted, many road accidents can be prevented, leading to more safety. Since cars can be connected to each other via the internet, there can be better coordination among themselves to efficiently utilize the road infrastructure. Lesser reaction times due to the coordination will make automated cars to travel more close to each other, increasing the number of vehicles on roads. Vehicles can also coordinate for less waiting time at intersections by arriving at it systematically by regulating speed[1].This can lead to less pollution and better fuel efficiency, which can also be guaranteed when the car predicts the traffic condition and accelerates/decelerates intelligently. If the computer is at the steering wheel, people can sit back and do other work while commuting. Driverless cars can also be a boon for accessible transportation with differently-abled, old age people and children driving efficiently. The sharing economy will also benefit from Autonomous Vehicles (AVs). The cost of hailing a taxi would come down. More people might prefer private vehicles over taxis, and thus we could free up parking space. Ride-hailing apps like Uber and Lyft are seeing this potential and are already promoting the technology. AVs can gather vast amounts of data. Thus many other data-driven companies like Google are also working for the deployment of the technology.

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[1] Alan G Brake | 21 March 2016 32 comments. "MIT Researchers Plan 'Death of the Traffic Light.'" *Dezeen*, 23 Mar. 2016, www.dezeen.com/2016/03/21/light-traffic-junctions-mit-research-smart-intersections-design-driverless-vehicles/

Privacy-aware people resist cooperation in AVs since data would easily flow. This flow contains the activities going around a car which can easily be monetized. The next set of actors that resist driverless cars are pedestrians. Since AVs do not run into a person, pedestrians can take control of the roads[2]. To prevent this, some suggest separated infrastructure for AVs and pedestrians, raising questions about which entity to give more priority and the associated costs. Making roads AV ready can be easy, create barricades preventing people from crossing, but the infrastructure for pedestrians like overbridges is costly. An unethical suggestion is to make cars purposely run into people for making them scared and prevent jaywalking. The sensor technology also needs to be more accurate in detecting obstacles and people since there have been crashes involving pedestrians[3] and drivers[4]. There also has been concern about the testing the cars in the real world with pedestrians around them getting used as "test dummies" without consent[5] [6]. People considering cyberattacks resist cars connecting to the internet. Hacking a vehicle has more consequences than regular data leaks because people's lives would be at stake [7]. Another set of actors cautious of AVs are people from developing nations like India. Self driving cars need better road infrastructure and find it difficult to navigate potholes[8], a challenge in India with various road conditions and qualities. There is an anticipation of a loss of jobs and the high costs of the technology, making it accessible only to rich people. With only a few cars on the streets, the whole concept of cooperation would get flawed since many vehicles are not on the roads to do it. Some researchers who have done their studies with more real-world scenarios think that AVs might increase congestion due to "being more cautious initially"[9], people's resistance to ride share[10], and increased dependence on AVs because of less fatigue while travelling[11]. This is stark opposite to the claims of less congestion and pollution made previously.

[2] Jason Thompson Senior Research Fellow, and Gemma Read Senior Research Fellow in Human Factors & Sociotechnical Systems. "Nothing to Fear? How Humans (and Other Intelligent Animals) Might Ruin the Autonomous Vehicle Utopia." *The Conversation*, 20 Aug. 2020, theconversation.com/nothing-to-fear-how-humans-and-other-intelligent-animals-might-ruin-the-autonomous-vehicle-utopia-114504

[3] "Uber Pulls Self-Driving Cars after First Fatal Crash of Autonomous Vehicle." *CNNMoney*, Cable News Network, money.cnn.com/2018/03/19/technology/uber-autonomous-car-fatal-crash/index.html?iid=EL

[4] Stewart, Jack. "Tesla's Self-Driving Autopilot Involved in Another Deadly Crash." *Wired*, Conde Nast, 30 Mar. 2018, www.wired.com/story/tesla-autopilot-self-driving-crash-california/

[5] Marshall, Aarian. "Who's Regulating Self-Driving Cars? Often, No One." *Wired*, Conde Nast, www.wired.com/story/regulating-self-driving-cars-no-one/

[6] KellieAutumnEll. "Driverless Cars Aren't Safe or Ready for the Road: Robotics Expert." *CNBC*, CNBC, 2 May 2018, www.cnbc.com/2018/03/20/driverless-cars-arent-safe-or-ready-for-the-road-robotics-expert.html

[7] Loughran, Jack. "Hackers Could Stall Just 20 percent of Driverless Cars to Cause Traffic Deadlock." *RSS*, 30 July 2019, eandt.theiet.org/content/articles/2019/07/hackers-could-stall-just-20-per-cent-of-driverless-cars-to-cause-traffic-deadlock/

[8] "Driverless Cars vs. Potholes." |, 14 Mar. 2018, www.pothole.info/2018/03/driverless-cars-vs-potholes/

[9] Pultarova, Tereza. "Driverless Cars May Increase Congestion, at Least Temporarily." *RSS*, 6 Jan. 2017, eandt.theiet.org/content/articles/2017/01/driverless-cars-may-increase-congestion-at-least-temporarily/

[10] staff, Science X. "Driverless Cars Could Lead to More Traffic Congestion." *Tech Xplore - Technology and Engineering News*, Tech Xplore, 23 Oct. 2019, techxplore.com/news/2019-10-driverless-cars-traffic-congestion.html

[11] "How Driverless Cars Will Interact with a Human World." *Safe Routes Partnership*, www.saferoutespartnership.org/blog/how-driverless-cars-will-interact-human-world

Thus, pedestrians are getting impacted negatively by AVs, whereas people who commute long distances daily might want to use them. Children, differently-abled and old age people want to become more independent using driverless cars whereas drivers are concerned that their job might get lost. The incentive for them to resist self-driven cars is that of retaining their jobs.

One could see a utilitarian view emerging when many people involved in developing the technology think that self-driven cars are still safer than their human counterparts since no human error is involved and in the long run, it would end up saving a lot more lives than killing. Considering mobility as a right, the human rights perspective second the technology considering its increased accessibility. But also oppose the technology seeing the rights of the pedestrians. The dignitarian view considers the job security of people like drivers as necessary. It raises concern about AVs' testing in real environments with people around and thinks that seeking consent would not make these tests less prone to run into people. Finally, it opposes surveillance capitalism that could come with sharing of data since it believes "that life should not be commodified"[12].

Since mobility in everyday life affects almost all people, we see a vast majority of people having different concerns with self-driving cars. Thus looking into the ethics around the technology becomes essential. Programming cars to not stop at pedestrians to scare them from jaywalking puts questions on the design of the technology itself. It was created to make travelling safe by eliminating human error, thus what benefits are we getting from implementing the technology in this way? Driverless cars are not ideal for reducing pollution and congestion on roads since public transportation can do it more effectively. Since many anticipate that driverless vehicles would travel more closely to each other, the technology's failure here can be disastrous. Hacking into these vehicles can easily lead to accidents, traffic jams or anything that the adversary wants.

Driverless cars also raise questions about "entrepreneurial innovation". Is the trial and error approach viable, and can people's deaths be justified in the name of advancing technology? The working-class population, which might get more free time from driverless cars, has more power in the system than a standard pedestrian using the footpath. This is an example of a matrix of governance and governmentality. A disciplined and predictable environment is ideal for automated cars, and thus they will also shape the "conduct of conduct" of people on roads.

The reason for choosing Mandi House in the title was its proximity to the Supreme Court, reminding us that regulations around driverless cars need to consider all people's concerns. Driverless cars can learn from each other. Thus, I understand the need for sharing of data and cooperation. But we should also ensure privacy simultaneously, and strict rules against monetization of this data should exist. AVs need a high-class infrastructure with minimum pedestrian blocking for its operation. For India, this would be a challenge because of various other schemes that require more priority. Plus the cost of these cars is anticipated to be very high, so investing a lot of money in an infrastructure that is accessible only to a few is not ideal.

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[12] Brownsword, 2008: Class Reading October 19, The Challenge of Regulatory Legitimacy

Allowing driverless cars to run on the current infrastructure is dangerous since Indian roads have various unique conditions. And most of the present technology is being developed keeping in mind the situations in the developed countries. Thus I would not allow the deployment of fully autonomous cars in the present scenario in India. But I recognize the improvements to safety with the assistance of automation. Thus I would allow more sophisticated human-computer interaction in cars, which can help humans foresee mishaps early and reduce accidents. More research in this area concerning India may one day lead to safer driverless vehicles. Many anticipate that autonomous vehicles would also create a lot of jobs as well[13]. The additional time for AVs' deployment would make it smoother for Indian people like drivers to learn new skills that the driverless cars industry demand. Moreover, development of AV's algorithms should be democratized, so that more people understand what all the technology can and cannot do and for more people to find possible bugs in driverless cars, making it safer. Public transportation is a better option for reducing congestion and pollution, and the government should invest more. We could also make them more accessible and safe to give independence to various people like differently-abled.

I would also like to cite EasyBib Bibliography Creator which I used to create proper citation formats of various news articles.

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[13] Class Reading November 23 "MIT Work of the Future Building Better Jobs in an Age of Intelligent Machines" Section 3.4 discusses possible job opportunities in a driverless future. The sub heading "Transportation Jobs in a Driverless World" talks about two such new jobs that do not need a lot of technical expertise.