[Introduction] I argue, from a purely ethical perspective, that investment in Tesla is …

Ethical issue 1: Should Autopilot and FSD software be available to members of the general public? Has Tesla acted ethically in its distribution of this software?

Before covering the ethical issues surrounding Autopilot (AP) and Full Self-Driving (FSD), it is necessary to first outline what they are, and the differences between them. According to the Tesla website, Autopilot is a generic term for their “advanced **driver assistance** system”, which is powered by 8 external cameras, a forwards-facing radar, and 12 ultrasonic sensors that all serve as inputs to an onboard computer running a deep neural network [1]. AP and FSD are two specific types of Autopilot, each with different features, the most relevant of which are outlined below.

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| --- | --- | --- | --- |
| Feature | Description | AP | FSD |
| Automatic emergency braking |  |  |  |
| Traffic-aware cruise control |  |  |  |
| Autosteer |  |  |  |
| Highway navigation |  |  |  |
| City street navigation |  |  |  |
| Traffic light/stop sign stoppage |  |  |  |
|  |  |  |  |

TODO: decide which features need to be mentioned, how in depth of a description they need, and what format to put it in (table like above, or words like below).

The most relevant features to this discussion include automatic emergency braking (both), traffic aware cruise control (AP), autosteer (AP), highway navigation (FSD beta), city street navigation (FSD beta), and traffic light/stop sign stoppage (FSD). Both packages fall under the industry standard [2] Society of Automotive Engineers (SAE) level 2 classification of self-driving vehicles, which means **the driver is still required to be fully attentive, with hands on the wheel, ready to take control at all times** [3].



Figure 1: SAE's Levels of Vehicle Autonomy - Tesla Autopilot commonly classified as level 2 [2]

You may have already been confused to learn that the name Autopilot can be used as a general term for both Autopilot and FSD, or to refer to the specific software package Autopilot [TODO: potentially cut the previous line]. It is also misleading to call these packages Autopilot and Full Self-Driving, as the former implies it is an autonomous piloting software, and the latter a feature complete self-driving software.

In fact, a German court recently banned Tesla from using such terms [4].

A survey conducted by the Insurance Institute for Highway Safety, of which the results are depicted in figure 2, clearly reveals Tesla’s Autopilot naming is the worst offender amongst level 2 driving software when it comes to misleading the general public [5].

Figure 2: Results of the IIHS survey depicting the percentage of people who believe certain behaviours are safe whilst a level 2 system is being used - Tesla's Autopilot depicted in blue [5].

Tesla CEO Elon Musk has also repeatedly neglected his own safety advice by taking his hands off the wheel whilst Autopilot was engaged in multiple televised interviews, including on 60 Minutes [6], CBS This Morning [7], and Bloomberg [8]. Actions speak louder than words, and with the huge audiences that these mainstream outlets have, it’s morally reckless to normalise this kind of behaviour.

Argument flow: Misnaming, misrepresentation (Elon taking hands off wheel), and bad testing style -> Conclude that Tesla is being somewhat unethical deontologically (going against industry norms) but we must ask: what are the consequences? Deaths -> but in most cases it is because the drivers are breaking promises (not tesla’s fault entirely) -> saves lives (statistics on deaths caused by car accidents, third party safety rating of Tesla’s)

However, from a deontological perspective, the drivers are the party that are acting unethically. They have broken their promise to remain attentive at all times, and the trivial nature of the crashes heavily suggests they weren’t paying attention.

Redress: The names could be changed to Driver Assistance and Partial Self-Driving

**Argument 2: Autopilot potentially saves more lives compared to the number of deaths it causes**

Evidence: crash statistics and safety ratings given by third parties, compilations online of crash avoidances,

Counterpoint: Autopilot has also been involved in a number of crashes and deaths

Evidence: the two sardine can deaths. Did Tesla have the autopilot nag system in place at this stage? If not, then they were morally negligent but at least they’re being morally reactive (use proper terms)

Further point: It often fails in situations that are very easy for humans to solve

Evidence: cite crashing into overturned truck and the turning into oncoming traffic from Dirty Tesla example

Further point: crashes involving self-driving cars are often unlike those of human driven cars. There are numerous examples of Autopilot crashes which would have been trivial to avoid in normal cars.

Counter-Counter: Tesla was not the bad actor in these situations. Drivers are supposed to stay focused on the road at all times when using Autopilot. They are breaking their promise.

Evidence: Agreement messages when enabling Autopilot, and Tesla has even implemented a nag system, where the user must be holding onto the wheel whilst Autopilot is engaged, otherwise the car will stop and put the hazards on.

Counter: The Autopilot is only blocked for the rest of the current drive. This means you only have to park the car, then drive off again and Autopilot registers this as a new drive, hence unblocking it. There must be a harsher penalty for breaking the rules.

Argument 3 (or extension of 2?): Autopilot isn’t affected by some of the most common causes of traffic accidents (drlunk driving, sleep impairment, speeding etc.)

Argument 4 – algorithmic decision making: The deep neural network, because of its nature, can make really silly mistakes (thinking a truck is an overpass or overhead sign).

It is also worth noting that there are huge ethical issues in the future of self-driving cars, namely the trolley problem and automation. Both of these issues are likely to arise once the software attains the higher levels of autonomy (4-5). The current Autopilot software is nowhere near sophisticated enough to reason through the trolley problem. Robotaxi’s (and autonomous delivery etc.) cannot be implemented until this level of autonomy is achieved, and thus isn’t a current issue.

# References

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| [1] | Tesla, “Tesla Autopilot Support Page,” Tesla, 2020. [Online]. Available: https://www.tesla.com/support/autopilot. [Accessed 16 11 2020]. |
| [2] | SAE International, "SAE International Releases Updated Visual Chart for Its “Levels of Driving Automation” Standard for Self-Driving Vehicles," SAE International, 11 12 2018. [Online]. Available: https://www.sae.org/news/press-room/2018/12/sae-international-releases-updated-visual-chart-for-its-%E2%80%9Clevels-of-driving-automation%E2%80%9D-standard-for-self-driving-vehicles. [Accessed 16 11 2020]. |
| [3] | SAE International, "Taxonomy and Definitions for Terms Related to Driving Automation Systems for On-Road Motor Vehicles," SAE International, 15 June 2018. [Online]. Available: https://saemobilus.sae.org/content/J3016\_201806/#toc. [Accessed 16 11 2020]. |
| [4] | BBC News, "Tesla's 'Autopilot' misleading, Germany rules," BBC News, 15 July 2020. [Online]. Available: https://www.bbc.com/news/technology-53418069. [Accessed 16 11 2020]. |
| [5] | Insurance Institute for Highway Safety, "New studies highlight driver confusion about automated systems," Insurance Institute for Highway Safety, 20 6 2019. [Online]. Available: https://www.iihs.org/news/detail/new-studies-highlight-driver-confusion-about-automated-systems. [Accessed 16 11 2020]. |
| [6] | T. Greene, "Elon stokes stupidity by driving Tesla Model 3 unsafely on 60 Minutes," The Next Web, 12 12 2018. [Online]. Available: https://thenextweb.com/artificial-intelligence/2018/12/11/elon-stokes-stupidity-by-driving-tesla-model-3-unsafely-on-60-minutes/. [Accessed 16 11 2020]. |
| [7] | CBS News, "Elon Musk says Tesla's autopilot system will "never be perfect"," CBS News, 13 4 2018. [Online]. Available: https://www.cbsnews.com/video/elon-musk-says-teslas-autopilot-system-will-never-be-perfect/#x. [Accessed 16 11 2020]. |
| [8] | Bloomberg Quicktake, "Tesla Test Drive: Model P85D, Autopilot, Zero to 60," Bloomberg, 10 10 2014. [Online]. Available: https://youtu.be/MO0vdNNzwxk?t=120. [Accessed 16 11 2020]. |