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Speaker: Dr. Asaf Degani

Title: Ethical Considerations for Autonomous Vehicles: A Formal Approach

Abstract:

Growing numbers of cities and companies are beginning to deploy state-of-the-art technologies and services such as autonomous cars, robot taxis, delivery- and maintenance-robots, moving information kiosks, and others. As a consequence, it is expected that the public space where people, cars, and robotic systems intermingle will need to undergo transformations to accommodate these new robotic entrants. This accommodation is not only related to the infrastructure and the technology involved, but also concerns people's grasp of how these "robotic beings" are expected to act, interact, and related to other entities in the public space. One important aspect of this accommodation concerns the development of new "rules of the road" and priority scheme such that the space can be effectively shared. In addition, these rules need to be "ethically valid" to allow for public acceptance of this technology [1].

We suggest a framework and methodology for developing ethical decision making in the context of autonomous vehicle behavior (part of a soon to be published ISO standard [2]). One of the advantages of this approach is that it can take any set of ethical values (e.g., the United Nations' universal values, the Bioethics code of conduct, etc. [3]). The selected values, principles, and later on the "design maxims" provide general guidelines for "driving rule" development and criteria for their formal evaluations (see Figure 1). I will discuss the development of ethical driving rules for a variety of use cases such as lane changes in dense traffic, negotiations in ambiguous situations, giving way to emergency vehicles, and unavoidable crashes ("the trolley problem"[4]). Finally, ethical considerations for robot exterior design as well as interaction design will also be discussed in the context of delivery bots.

References

- [1] Norton, P. (2021). *Autonorama: The Illusory Promise of High-Tech Driving*. Washington, DC: Island Press.
- [2] ISO. (2022). *Guidance on ethical considerations relating to safety for autonomous vehicles*. ISO/DIS 39003. Geneva, Switzerland: International Organization for Standardization.
- [3] Jenkins, R., Cerny, D. & Hribek, T. (2022). *Autonomous Vehicle Ethics: The Trolley Problem and Beyond*. Oxford U. Press.
- [4] Foot, P. (1967). The Problem of Abortion and the Doctrine of the Double Effect. *Oxford Review*, no. 5. pp.1-7.

Bio:

Asaf Degani is a Technical Fellow at General Motors R&D. His research focus is on the analysis and design of human-machine interaction with special emphasis on autonomy. He supports several major projects at GM concerning transfer of control in automated vehicles and leads research work on the implications of this technology on human psychology and ethics.