

Leonardo Annese et al.

AUTONOMOUS VEHICLES
A LEAP INTO THE XXI CENTURY
Ethical, Social and Safety Issues



Photo Archivio Alinari



Autonomous Vehicles, a Leap into the XXI Century – Ethical, social and safety implications

Working Group Ethical, Social and Safety Aspects of Autonomous Driving

National Technical Committee Autonomous and Connected Driving

PIARC - World Road Association Italy

Authors:

Leonardo Annese (project Coordinator) Andrea Ballini, Fabrizio Benvenuti, Mirna Begnini, Daniele Bilanzuoli, Silvia Bruzzone, Massimo Carlini, Federico Cheli, Pierluigi Cordellieri, Stefano Crisci, Adriana Elena, Silvia Della Santa, Guglielmo Festa, Fabio Fossa, Gianluca Marchi, Marianna Martini, Luigi Martino, Massimiliano Nicotra, Paolo Perego, Manuel Picardi, Marco Pollastri, Nick Reed, Carlo Rossetti, Nicole Miriam Scala, Ivo Vernieri, Paolo Maria Vissani

Acknowledgements:

ISTAT Italian National Institute of Statistics

PIARC World Road Association

Cover Picture: Foto Archivio Alinari CAD-S-020007-0007

"Ritratto di gruppo a bordo di un'automobile 28/10/1908, Aurelio Monteverde"

Graphic designer: Mike Bramo

6. FROM PRINCIPLES TO PRACTICE

THE CHALLENGE OF APPLYING THE EUROPEAN RECOMMENDATIONS ON THE ETHICS OF AUTONOMOUS VEHICLES

Federico Cheli, Fabio Fossa



Source: <https://op.europa.eu/en/publication-detail/-/publication/b62d779f-f959-11ea-991b-01aa75ed71a1/language-en>

Autonomous vehicles are often presented as an important step forward towards a safer and more sustainable mobility. For instance, the automation of human driving is expected to substantially reduce the number of road injuries and casualties, which are caused for the most part by inadequate human behaviour (negligence, carelessness, drunk driving, overtiredness, and so on). The automation of human driving is also expected to allow for better traffic management, which might have positive impacts on the environment. In sum, it seems there are strong ethical reasons in support of the development of such technologies.

This does not mean, however, that autonomous vehicles come void of any ethical risk. It would be even less appropriate to belittle or hide these risks not to undermine the good image of autonomous driving. On the very contrary, if we really want to reap all its foreseen ethical benefits, it is crucial to carefully identify and clarify the risks connected to autonomous driving. Indeed, only in this way we will be able to anticipate and manage (to the extent possible) ethically problematic consequences. In addition, we will be able to elaborate most effective regulative frameworks and best practices to minimize the risks or, at least, to mitigate their effects.

Similar considerations might sound as overly cautious. They are not. Actually, they will probably play a central role in the future of autonomous driving. The reason for this has to do with a very relevant notion in innovation: user trust in technology – or, better, social trust in the set of human actors involved in the design, development, production, validation, regulation (and so on) of autonomous vehicles. Social trust is an essential ingredient in the process that leads to a widespread adoption of new technological products. Thus, in order to enjoy the ethical benefits we hinted at, it is of utmost importance to ensure social trust in autonomous driving: all possible measures

must be taken for that trust to be earned. A necessary step to get there – i.e., to make autonomous vehicles worthy of users' trust – is to incorporate relevant ethical values in scientific and technological research practices.

In order to align technological innovation to ethical values it is not enough to appeal to the moral conscience of the many social actors involved. On the contrary, it is necessary to make an institutional effort to clarify which ethical values are relevant (and why) and in which ways it would be possible to apply them to the practical context of autonomous driving. The European Union is decisively heading in this direction. In September 2020 the European Commission released a document authored by an *ad hoc* expert group entitled *Ethics of Connected and Automated Vehicles. Recommendations on Road Safety, Privacy, Fairness, Explainability and Responsibility*¹. The report precisely aims at presenting a coherent ethical framework to help all stakeholders identify and face the ethical challenges raised by autonomous vehicles.

The ethical framework proposed by the expert group on autonomous driving is based on eight overarching principles. These principles serve as cornerstones of the entire approach and point at ethical values that must be always protected and affirmed. The selected principles are as follows: 1) Non-maleficence (do no harm); 2) Beneficence (do good); 3) Dignity; 4) Personal autonomy; 5) Responsibility; 6) Justice; 7) Solidarity; and 8) Inclusive deliberation. Accordingly, the development and use of autonomous vehicles must be inspired by the effort of limiting harm as much as possible and of mitigating harmful effects on stakeholders. Moreover, solutions must be preferred that maximize ethically positive impacts. Furthermore, each new development must respect human dignity and the personal autonomy of all involved individuals. It is also important that responsibility is distributed fairly and clearly among stakeholders, so that each and every one of them can fully exercise its sense of responsibility. The distribution of risks and benefits must be fair as well, with an eye to those who occupy vulnerable positions in society. Finally, it is to be ensured that all relevant stakeholders get a seat to the table when important decisions are taken.

Even though it is essential to clarify which ethical values are relevant vis-à-vis autonomous driving, this is not enough to obtain the expected results. Indeed, principles are rather abstract notions, so that it is not always easy to grasp how to apply them in the everyday practical contexts of technological research, development and use. The risk, then, is for them to remain dead letters, words incapable of sorting any practical effect whatsoever. What is even worse, we might feel morally satisfied just drafting a list of ethical principles and asking stakeholders to comply with them. The risk we run here is to render the ethical effort totally ineffective, settling for just inconsistent and purely superficial actions. The objective, however, is to substantially modify the social practices linked to the development and use of autonomous vehicles. We must strive to get tangible results aligned with the direction pointed at by the eight principles.

This is the most controversial, but also decisive, point of the entire matter. What could we do to offer precise and applicable ethical guidelines to all involved actors? How could we offer effective guidance to stakeholders active in the domain of autonomous driving on how to apply the eight ethical principles? The problem is as complex as crucial. To solve it, however, is mandatory. If we will not be able to effectively apply principles to practice, the whole effort will be in vain.

The authors of the European report are well aware of this difficulty. As a first countermeasure, they propose twenty recommendations with the intent to help practitioners and professionals understand how the eight principles apply to the many concrete domains of design, production, use, and regulation of autonomous vehicles. The twenty recommendations are organised in three groups. The first group concerns safety – a traditional topic in the ethics of transportation that faces now new challenges also spurred by the awareness of the immense potential of autonomous driving as a means to make our streets safer. The second group of recommendations touches upon issues that are relatively new in the context of transportation – but not in robotics and Artificial Intelligence – such as privacy, fairness, and explainability. Finally, the last group focuses on the many challenges that autonomous vehicles pose to human responsibility, in an attempt to offer practical guidance to always foster its exercise.

¹ <https://op.europa.eu/en/publication-detail/-/publication/5014975b-fcb8-11ea-b44f-01aa75ed71a1/>

The recommendations proposed in the European report are without any doubt a useful tool to bring the concrete level of autonomous vehicles and the more abstract level of ethical principles closer to one another. However, not even recommendations are enough, by themselves, to bridge the gap between theory and practice. This is why it is of utmost importance to pursue the goals that lie at the basis of the report also in ways that might have a greater impact on the concrete reality of autonomous driving.

To conclude, it might be interesting to introduce at least two possible strategies to manage this application problem. The first strategy revolves around regulation and consists in promoting clear normative frameworks and best practices as outcomes of inclusive public consultation processes. The second strategy, that we are currently implementing at the Department of Mechanical Engineering of the Politecnico di Milano, consists in diversifying competences and skills by forming interdisciplinary research groups where engineers work side by side with social scientists and philosophers. This approach is meant to increase the opportunity to exchange ideas, anticipate potential risks, bring ethical issues into focus, study their potential social impacts and think of possible solutions already at the design stage. By introducing ethical reflection directly into the social venues where technological innovation happens, we might have one more promising chance to appropriately tackle ethical issues in autonomous driving, thus earning social trust and securing the ethical benefits that the adoption of autonomous vehicles is supposed to yield.