

# Consideration for Autonomous Driving Technology to Bring Well-Being to Society

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In the era of autonomous driving (AD), there are prospects that people will be able to cross anywhere. Although AD is useful for preventing traffic accidents, there is concern that the spread of such automation technology may reduce the consideration for the safety of the people who use it and the mutual interest among the parties concerned. In order for AD to be accepted by the local community, it is necessary to adopt an ethical perspective that promotes mutual understanding between people through the behavior of autonomous vehicles, on the premise of ensuring safety and convenience. Especially in the traffic environment where existing manual vehicles are mixed and used by various pedestrians, self-driving cars that behave in accordance with the social ethics of the area are required. This manuscript introduces the Socially Harmonized Autonomous Driving System (SHADS), which considers that autonomous driving technology, including autonomous and intelligent systems, supporting people's lives and various activities in the region and brings well-being to society. Then, from the viewpoint of harmonizing the convenience of the SHADS users with the well-being of the local community, this paper reconsiders the interpersonal network in the transportation community with the SHADS users as transportation participants, and also reconsiders the evaluation method of ethical points from the viewpoint of multiple ethical values, considering what should be taking into account when designing autonomous driving technology used in the local community

The authors defined the concept and architecture of the Socially Harmonized Autonomous Driving System (SHADS) along with the three pillars of the "Ethically Aligned Design, First Edition" (EAD) <sup>(5)</sup> released by the IEEE standards association. SHADS defined "a network of interpersonal relationships in transportation", where the SHADS users not directly involved in the operation of SHADS, which is a fully autonomous vehicle, participate in the decision to give way to pedestrians. Furthermore, we defined the ethical points evaluating the SHADS users when they give way. In this manuscript, the significance of "network of interpersonal relationships in transportation" is reconsidered as what should be considered when designing autonomous driving technology used in the local community.

In order to respect the convenience and values of the SHADS users, as well as the safety and security of people living in the local community, and to harmonize them, it is necessary to consider not only the convenience of the SHADS users but also the ethical responsibilities of the SHADS users. Who should be blamed and admired when passers-by and vehicles around SHADS consider this vehicle to be rude or polite depends on whom the ethical behavior of the self-driving car belongs to in the first place. Here, P.F. Strawson's Reactive attitude <sup>(10)</sup> is used to define a "network of interpersonal relationships in transportation". Strawson thought that in an inter-personal human relationship, people expect and demand respect for each other, and the reaction to acts of good deeds, moral harm, indifference, etc. from others was called Reactive Attitude. Good-faith or non-good-faith behavior towards a person leads to the reactive attitudes of those around them based on empathy and spreads like a network. Expecting a person to act morally and taking a reactive attitude such as gratitude or disappointment considers that person to be responsible for the moral act.

On the other hand, it is conceivably desirable that SHADS users who are not involved in driving also participate in the interpersonal network on this transportation community. Figure 1 shows a conceptual diagram of interpersonal network in the transportation community including SHADS users. Pedestrians and occupants of other vehicles will consider SHADS to be on an interpersonal network on the same transportation community. That is, they expect SHADS users to do good things with self-driving cars and consider SHADS users to be ethical praise and criticism. If SHADS users do not exist on this network, machines will be the only people who expect and demand mutual respect from humans in a world where fully autonomous vehicles have become widespread. It can lead to diluting relationships. Therefore, it is desirable to construct an interpersonal network that communicates morally with others, even if it is mediated by a robot.

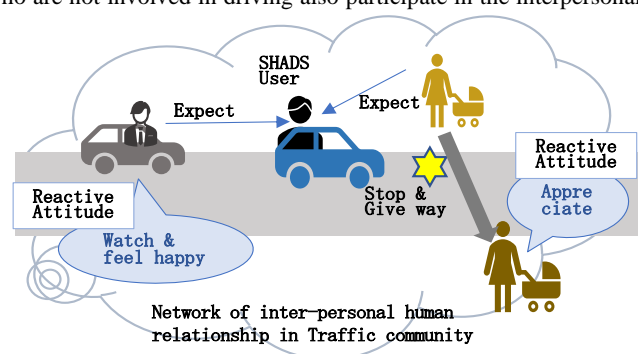


Fig. 1 Network of inter-personal human relationship in Traffic community