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16. Abstract

   Self-driving vehicles are expected to improve road safety, improve the mobility of those who currently cannot use conventional vehicles, and reduce emissions. In this white paper we discuss issues related to road safety with self-driving vehicles. Safety is addressed from the following four perspectives: (1) Can self-driving vehicles compensate for contributions to crash causation by other traffic participants, as well as vehicular, roadway, and environmental factors? (2) Can all relevant inputs for computational decisions be supplied to a self-driving vehicle? (3) Can computational speed, constant vigilance, and lack of distractibility of self-driving vehicles make predictive knowledge of an experienced driver irrelevant? (4) How would road safety be influenced during the expected long transition period during which conventional and self-driving vehicles would need to interact on the road?

   The presented arguments support the following conclusions: (1) The expectation of zero fatalities with self-driving vehicles is not realistic. (2) It is not a foregone conclusion that a self-driving vehicle would ever perform more safely than an experienced, middle-aged driver. (3) During the transition period when conventional and self-driving vehicles would share the road, safety might actually worsen, at least for the conventional vehicles.

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