2020 CNNC: Round 3 Problem—ACVs

Confidential Information for CEAI's Representatives

CEAI is not opposed to the development of ACVs, but thinks that industry and government have inadequately considered the ethical issues involved. From CEAI's perspective, the delay in Flyt's production is a welcome opportunity to explore those issues more deeply and ensure that all relevant players take them into account.

An example of CEAI's concern is the emergency scenario that poses only two choices—one that would tend to protect the car's occupants and one that would tend to protect other users of the road. Which of these choices should be programmed into the system? Or should ACVs be programmed to generate the least overall harm and minimize driving casualties—a "utilitarian" approach? Studies have shown that people overwhelmingly prefer that ACVs be programmed with utilitarian ideas; that is, in a manner that generates the least harm and minimizes driving casualties. Yet these and other studies show that, while people want others to buy vehicles that incorporate utilitarian choices, they themselves prefer to ride in vehicles that prioritize the lives of people inside the vehicle at all costs. This presents a paradox in which people prefer that *others* drive utilitarian ACVs designed to maximize the lives preserved in a fatal situation but that *they* want to ride in cars that prioritize occupant safety. CEAI's position is that the resolution of this paradox is a policy choice that should not be left to the market to decide; whatever the answer, it should come from government based on a robust knowledge of the issues and ramifications of the programming choices.

Another concern is that AI is not yet ready to deal with some of the seemingly mundane, but actually quite complex, decisions that must be made when driving. Consider the case of a pedestrian standing at a curb. This everyday occurrence triggers a response in a human driver that is extraordinarily complex, involving a split-second decision about what to do based on such factors as whether driver and pedestrian make eye contact, the presence of other traffic on the road and its speed, the age of the pedestrian and his or her apparent attentiveness, and weather conditions—to name just a few factors. CEAI's view is that no AI system can yet deal with such scenarios. This is especially true when using a "top-down" approach to programming. In a top-down approach, developers strive for pre-programmed rules that imitate cognitive responses; the idea is to go from the top down and add detail into each layer of abstraction. In a bottom-up approach, developers start with simple methods and systems that grow and slowly become more complex, resembling a neural network that simulates human brain cells and learns as it goes. The idea is to see what aspects of cognition can be recreated in these artificial networks.

For years, the top-down approach dominated, but over time, the bottom-up approach is proving more able to deal with the kinds of complexities inherent in the example of the pedestrian standing at the curb. The main issue with the bottom-up approach is that it takes a long time for the AI system to learn appropriate responses to any given situation. CEAI would be keen to know which of these approaches—top-down or bottom-up—is planned for

Flyt. Other things being equal, CEAI would be prefer to lend its support to an ACV designed with a bottom-up approach to dealing with issues such as these.

CEAI's ideal outcome is for Flyt to be delayed by at least six months and possibly up to a year or more while these issues are canvassed and while Teleos can better explore the possibilities of bottom-up programming. Some of its members are experts in neural networks who might be able to help Teleos in this regard. CEAI thinks that the highest automation level that the parties can realistically strive for in this timeframe is SAE 3. CEAI's main leverage is the influence that its members have and in its submissions for an upcoming Senate committee hearing on ACVs. CEAI also thinks that testing should be done by the government rather than by Motorco or by Motorco and Teleos jointly. Its submissions to the Senate committee are likely to be skeptical of leaving testing to the market, though CEAI could be persuaded otherwise if the parties engaged in their own testing with a high level of government oversight.

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