

Southport Pips

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Does a Car need to be Conscious to Drive Itself?

Presented by
Neil

Though a common question about Artificial Intelligence is "can AI become conscious", the more important question appears to me to be "Do we NEED AI to become conscious?" That is, would consciousness be useful for the functioning of AI?

The most high profile use of AI at the moment is in self-driving vehicles. This article makes the case that self-awareness would be necessary for a self-driving system:

<https://lance-eliot.medium.com/driverless-cars-must-be-self-aware-a-crucial-missing-ingredient-d35a9681e39c>

This article talks about "self-awareness" rather than consciousness. The situation it mentions as causing a problem for the AI doesn't seem convincing - the maximum braking force for a car is 0.75 g which is not enough to cause occupants to "fly around the inside of the car".

What's the difference between self-awareness and consciousness?

<https://blogs.scientificamerican.com/brainwaves/does-self-awareness-require-a-complex-brain/#:~:text=Scientists%20differ%20on%20the%20difference,that%20one%20is%20aware%20of>

The above article proposes that self-awareness is a kind of "meta consciousness", that is to be aware that you ARE a conscious, thinking entity. The article does, however, cast doubt on this by pointing out that children born with no cerebral cortex, and adults whose cortex has been badly damaged, do act as though self-aware.

This suggests that a system can be self-aware WITHOUT being conscious (that is, not being capable of "thinking").

Does a self-driving vehicle need to "think"? The most basic self-driving systems were designed for trains:

https://en.wikipedia.org/wiki/List_of_automated_train_systems

and aeroplanes:

<https://en.wikipedia.org/wiki/Autopilot#:~:text=An%20autopilot%20is%20a%20system,control%20by%20a%20human%20operator>

The former being in use for at least 50 years, the latter for 100 or more. Self driving train systems deal with accelerating, decelerating and obeying speed limits. Systems exist that can do everything that a pilot does other than taxi and take off, though these are rarely used other than for level flight. Only 1% of landings are automated, in the classic "the pilot's ill, can anyone land the plane" scenario.

<https://www.youtube.com/watch?v=rQbj9uvYL8I>

Self-driving technology is defined as having 5 levels:

https://en.wikipedia.org/wiki/Self-driving_car

1. Driver Assistance only.
2. System steers, accelerates and decelerates.

<https://www.youtube.com/watch?v=VQ4D1O3ADiE>

3. System drives, but human takes over if asked by system.
4. System drives, but human fails to take over when asked and system will stop the vehicle safely.

<https://www.youtube.com/watch?v=EpW03B-QNWQ>

(note this Chinese example requires roadside equipment to be installed at intersections)

5. Full automation i.e. human driver not necessary once the route is set.

At present, many cars have level 1 (e.g. parking assistance) and the most advanced systems have reached level 2, with varying degrees of success.

That's the background.

So, why would a car need to be conscious or self-aware?

Would it resolve any of the issues causing problems for self-driving technology? Not TECHNICAL issues (which may or may not be solvable technically) but is there any need for a self-driving system, IN PRINCIPLE, to be conscious or self-aware "by definition"?

Can we think of any specific scenarios which would require this?

Most driving tasks are done without much thought, to the extent that we can divide our attention and talk to fellow passengers, or make "high level" journey planning decisions whilst driving. These tasks that we do essentially on "autopilot" are the ones that current self-driving technology can, or is shortly likely to be able to, do successfully. Avoiding obstacles, turning, giving way to other traffic, lane holding and changing, starting and stopping and negotiating junctions.

So what do we want a self driving car to do, that "consciousness" and "self-awareness" would be required for?

What can't they do today (e.g. Tesla Autopilot and the Level 2 system)?

https://www.tesla.com/en_GB/support/autopilot-and-full-self-driving-capability

1. Operate in poor visibility.
2. Operate in bright light.
3. Operate in poor adhesion conditions, eg mud, ice or snow.

Aren't these essentially technical problems? So, if they can be resolved, don't they need better hardware rather than require the system to become either conscious or self-aware?

Are there any other AI applications that would require consciousness to work effectively?

Neil.