Tech In The News
Assignment: Autocar Sickness

Toward a less queasy future

Headphones Needed: ☒ YES ☒ NO

Step One:

WATCH THIS VIDEO
Monica Jones, assistant research scientist from the University of Michigan Transportation Research Institute, is looking to find ways to quantify the causes of motion sickness, in particular how it may affect passengers in future driverless cars.

Step Two:

Read the articles at the bottom of this document **Review the information**

Step Three:

With a partner, create a Word/GoogleDoc. List the 5 W's of the story. Discuss the pros and cons of this technology, why it could reduce auto car passenger sickness. Do you think this will be a problem in the future. What should passengers do to prevent motion sickness?

Step Four:

Submit Your Assignment :

Carsickness-Yuck_ YourNames

To Mr. Amerikaner Using:

Gdrive

THE MICHIGAN ENGINEER NEWS CENTER

Measuring motion sickness for driverless cars

by Nicole Casal Moore • Michigan Engineering • August 20, 2019

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Carsickness incidence could increase if we all become passengers, but new research aims to help address that. | Medium Read

What good is a driverless car if riding in it makes you nauseous?

Up to one-third of Americans experience motion sickness, according to the National Institutes of Health. In a car, the condition

RESEARCHERS

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tends to flare when you're a passenger rather than a driver, and when you're engaged in something other than looking out the window—reading or using a handheld device, for example. This sizeable segment of society stands to miss out on some of the key benefits of self-driving technology.

"One of the great promises of autonomous vehicles—to give us back time by freeing us from driving—is at risk if we can't solve the motion sickness problem," said Monica Jones, an assistant research scientist in the Biosciences Group at the University of Michigan Transportation Research Institute (UMTRI). "If it's not mitigated in some way, motion sickness may affect people's willingness to adopt driverless cars."

> ONE OF THE GREAT PROMISES OF AUTONOMOUS VEHICLES—TO GIVE US BACK TIME BY FREEING US FROM DRIVING—IS AT RISK IF WE CAN'T SOLVE THE MOTION SICKNESS PROBLEM.
>
> — *Monica Jones*
>
> Tweet

Jones is the lead investigator on a one-of-a-kind research project to identify and quantify motion sickness in passenger vehicles. Jones's interest is not purely academic. She's coped with motion sickness since she was a child and is the primary driver for her family today because of it.

The research team has developed a repeatable and reliable testing protocol for evaluating specific real-world driving maneuvers and passenger activities that make people carsick. No such methodology existed before. The study is the first to conduct a large-scale comparison of reading task performance and urban acceleration levels on motion sickness response in a passenger vehicle. A white paper about the protocol was published today by Mcity.

Why we need a motion sickness testbed

The factors that cause motion sickness in cars are not well understood today.

"Very few studies have been conducted in cars; instead a lot of the work has been done for sea and air transportation modes, performed in driving simulators or on motion platforms," Jones said. "These results are not translating very well to road vehicles."

Beyond that, previous research hasn't asked the right questions.

“A lot of scales that exist in the literature are based on nausea,” Jones said. “If we design to a vomiting response, we have really missed the mark on autonomous vehicles. We need to target comfort levels. Can a passenger engage with a handheld device while riding? Can a passenger be productive with their time?”

The testbed: How to make car passengers sick

The team’s protocol defines how to measure the range of sensations passengers experience and identifies the type of conditions that prompt feelings of motion sickness in cars. Researchers put 52 participants through a series of normal driving maneuvers at the Mcity Test Facility on U-M’s North Campus to develop the scripted route, instrumentation and measurement protocol.

The testbed consists of:

- A 20-minute test drive developed based on data from a separate real-world driving study. On average, it includes 25 braking events, 45 left turns and 30 right turns, and is conducted at both 10-15 mph and 20-25 mph.
- Tasks done on a handheld mini-iPad. At each speed, passengers complete the test drive once with no task, and again while performing a task. Using restaurant reviews, news articles and local maps, participants answer a range of questions that involve reading comprehension, visual search, text entry, and pattern recognition.

- Sensors that record vehicle acceleration and geospatial location and participant's physiological response, including sweat, skin temperature and heart rate. Cameras and sensors also record passenger head movement and posture.
- A new motion sickness rating using a 0-10 scale, with "0" indicating no motion sickness and "10" indicating "Need to stop the vehicle."
- An open-ended conversation during the test drive. Once every two minutes or whenever they feel a change, participants describe sensations in their own words, in order to more specifically capture the effects of motion sickness. For each sensation, participants rate the intensity as mild, moderate or severe.

Toward a less queasy future

With the protocol, the researchers hope to develop a nuanced mathematical model of motion sickness—one that automakers can use to build products that operate below the threshold. Data from this testbed could inform decisions like how driverless cars brake and accelerate during turns, for example, or how the seating area and windows are arranged. Different control algorithms and car concepts can be tested and measured, apples-to-apples.

"We have found that passenger responses are complicated and have many dimensions, Jones said. Applications of this testbed will result in the data we need to identify preventative measures and alleviate motion sickness in autonomous vehicles."

The white paper from Mcity titled, “Queasy Passengers: A Testbed for Motion Sickness in Driverless Vehicles,” was published today. Mcity is a public-private partnership based at U-M that is working to advance connected and automated vehicles for the benefit of society. Mcity and UMTRI provided funding and other support for Jones’s research.

Cara Gonzalez contributed to this story.

EXPLORE: *Research, Transportation, Automotive, Autonomous Vehicles, Connected and Automated Vehicles*

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TECH

Uber has an idea to keep you from getting sick when you read in self-driving cars

PUBLISHED MON, NOV 20 2017•3:12 PM EST UPDATED MON, NOV 20 2017•7:47 PM EST

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KEY POINTS

Ride-hailing company Uber patented an idea to address passenger nausea when reading in the car.

It works with self-driving cars — potentially freeing up passengers to multitask while a computer does the driving.

The car would use data from its self-driving “eyes” to create a “sensory stimulation system.”

As anyone with a long commute knows, motion sickness can be a major deterrent to reading during a car ride.

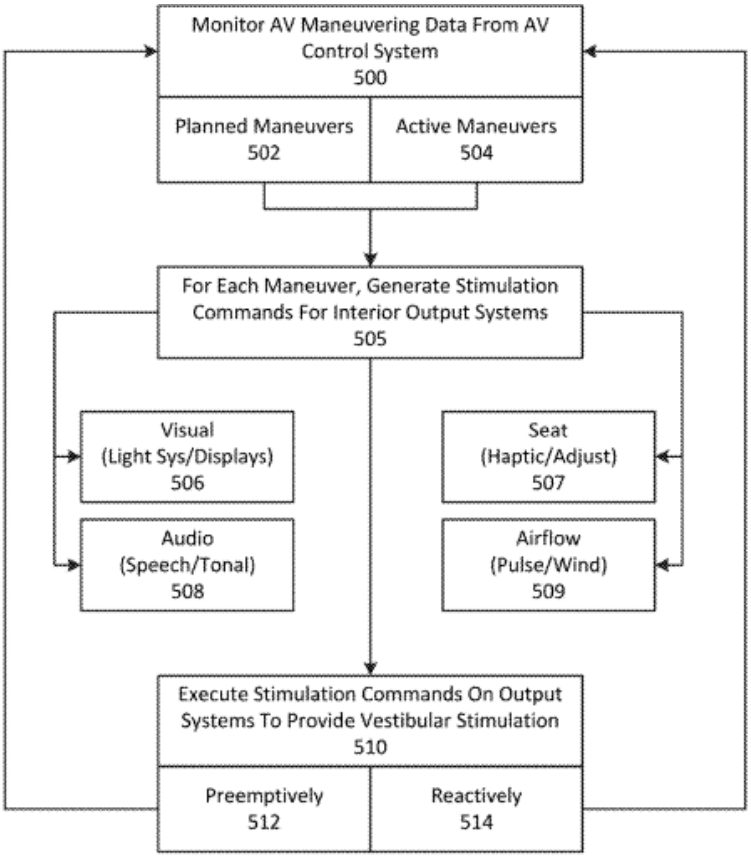
Ride-hailing company Uber has an idea to address this frustrating problem, according to a patent application published this month

And it's not about protecting the upholstery. It works with self-driving cars — potentially freeing up passengers to multitask while a computer does the driving.

According to Molly Nix, user experience design lead at Uber's Advanced Technologies Group, much of the design thinking around cars in the past has been about the power of the driver, rather than the passenger experience. That's something that Uber hopes to be a design leader in, as more and more rides are taken in self-driving cars.

"In general when we think about Uber as a product, the magic is that it gives you your time back," Nix said.

Nix couldn't discuss the specifics of the motion-sickness patent, but here's how it works: The car would use data from its self-driving "eyes" to create a "sensory stimulation system" that syncs up your eyes and ears. That could be done with controllable seats that move and vibrate with the car, bursts of air, or using a display or "light bar" within the car to create visual stimulation such as an augmented reality live stream of the surrounding environment.



Source: Patent filings

It helps because like seasickness, nausea in the car can happen when your eyes sense the environment as still, while your inner ear senses the twists and turns of the car ride, creating a sensory conflict, a professor told Scientific American. For souls with sensitive stomachs, that can mean buses and passenger seats are productivity-sapping reading-free zones.

"With the advent of autonomous vehicle (AV) technology, rider attention may be focused on alternative activities, such as work, socializing, reading, writing, task-based activities (e.g., organization, bill payments, online shopping, gameplay), and the like," the patent says.

To be sure, most patents are never commercially produced or even seriously tested internally. But it's one example of a safety precaution, to give passengers to prepare for a sudden braking event or collision, the patent said.

That's important because more Americans are worried about self-driving cars than are enthusiastic, according to a survey published last month by the Pew Research Center. Nix said that as a company that's already focused on passenger experience, Uber is investing more and more resources into how to make riders more comfortable in autonomous vehicles — even with an idea like multi-tasking.

VIDEO 01:27

Volvo and Uber join forces

Nix compares self-driving cars to elevators — which for many years were operated by elevator operators because of the "Tower of Terror"-fear that riders would get trapped or would not be able to control a machine, which was taking them potentially hundreds of feet in the air.

But design features like light-up buttons and arrows, standardized across most elevators, now give riders the needed transparency to understand where the machine is taking them. That's why Uber is working on screens that will show drivers what the car "sees" and allow riders to reroute their ride as they would with a human at the wheel.

Nix said it's important that riders are able to engage or disengage with the screens as much as they'd want to — perhaps less after a night of drinking but more when you want

"Often when riders first get in [a self-driving car], they are surprised and about five minutes later they forget and it becomes a boring car ride, it becomes every day," Nix said. "That's our goal, we don't want you to have to think about this stuff. It should just be normal and you can forget about it, check Facebook on your phone ….Something that people can connect to and feel like they know already."

WATCH: Uber confirms potential investment from Softbank

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