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Humans cause most accidents. Is Grand Theft Auto the key to safer roads?

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Richard Gray



Getty Images

(Credit: Getty Images)

Smashing and crashing their way around the fictional cities of Grand Theft Auto is all part of the fun for players. But researchers have other ideas.

Grand Theft Auto's grimy dystopia is not the first place you'd expect the rules of the road to matter much.

The wildly successful video game series is built on the premise of players careening around sprawling cities in stolen vehicles. High speed pursuits with police, skids, spins and crashes are part of the thrill. Gamers can mow down passing pedestrians if they feel particularly inclined to do so.

So, it might be something of a surprise to learn that the automobilic mayhem of the franchise is being harnessed to make real-world roads safer.

From testing cycle-safety technology to teaching self-driving vehicles to avoid hazards on the roads, researchers have been jerry-rigging the Grand Theft Auto games into experiments that promise to make accidents and injuries on roads less likely.

"We wanted a way to test wearables and other new digital devices for traffic safety… in situations that would be far too dangerous to recreate on a real road," says Milena Jäger, an engineer and computer science researcher at Osnabrück University of Applied Sciences in Germany.

The realistic physics models used to create the playing environment in the most recent Grand Theft Auto games, combined with a wide array of road conditions, weather and traffic, provide researchers like Jäger with a cheap and ready-made test environment to do early-stage testing that even sophisticated driving simulators struggle to replicate.

"A polished product with a €200m-€1bn ($224m-$1.1bn/£170m-£830m) budget is miles ahead of average simulator set up," adds Pavlo Bazilinskyy, a human factors engineer at Eindhoven University of Technology in the Netherlands, who has used Grand Theft Auto V (GTA V) to study the gaze patterns of road users in different hazardous traffic situations to help inform future road design decisions.

Cyclists' 'sixth sense'

Jäger and her colleagues turned to the GTA games while developing devices to warn cyclists and pedestrians about hazards around them when on a busy road. One of their devices **attaches to bike handlebars**, vibrating with growing

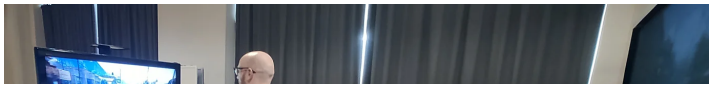
intensity as a vehicle approaches from behind, warning the cyclist. Another iteration was a vibrating – or vibrotactile – vest that gives the wearer a "sixth sense" for approaching vehicles.

Putting such technology through its paces on real roads, however, is tricky without putting volunteers in harm's way. But the team realised they could add a "mod" – a piece of software that modifies the game slightly – to GTA V that would allow them to control where the player starts and which scenario is played.

"Since GTA V does not enforce traffic rules on players, practically any traffic situation can be replicated on purpose," says Julius Schöning, a professor of engineering and computer science who led the research by Jäger and colleagues at Osnabrück University of Applied Sciences.

They set up a bicycle in their lab in front of a screen showing GTA V along with a screen behind showing a rear view when cyclists looked over their shoulders. They then sent their volunteers "cycling" down a stretch of road in the game's fictional city of Los Santos where large numbers of trucks come thundering past.

Both devices proved successful at warning cyclists of approaching danger, but have yet to develop into commercial products.





Jan Kettler

The experimental set up used by Milena Jäger and Julius Schöning while testing road safety devices (Credit: Jan Kettler)

In many traffic accidents, however, it is humans who are the root cause rather than technology. So understanding how and why humans behave the way they do in a potentially dangerous situation is key to figuring out how to make it safer.

Bazilinskyy and his colleagues wanted a way to track cyclists' reactions to hazards in a busy city. By wiring up eye-tracking technology to GTA V, they could follow exactly where volunteers looked as they **cycled towards hazardous situations in the game**, such as a car leaving a parking space, a car door opening, or a busy junction.

"The aim was to measure human behaviour to inform the design of future mobility systems and policy making," says Bazilinskyy. "Informing road layout decisions is a good example. With an ultimate goal of making roads safer and reducing the number of traffic fatalities and injuries."

Training self-driving vehicles

By far the most widespread use of the Grand Theft Auto games in road safety

At the Korea Advanced Institute of Science and Technology in Daejeon, South Korea, engineers used GTA V to create a huge dataset of in-game accidents and other situations. They then used this to train AI algorithms to **identify other dangerous vehicles on the road** so that a self-driving vehicle could learn to avoid them.

> *Should it swerve onto a pavement to avoid a motorcycle carrying two people but risk hitting an elderly woman walking there?*

Several other research groups around the world have been using the GTA games to **train AI software** to safely navigate through busy city streets **without hitting anything**.

But perhaps the greatest challenge for self-driving vehicles is less a simple instruction to avoid collisions, and more what it should do in situations where it faces a difficult decision.

Should it, for example, swerve onto a pavement to avoid a motorcycle carrying two people but risk hitting an elderly woman walking there, or hit the bike and put the passengers in both vehicles at risk?

Researchers at Eastern Michigan University in the US tried to tackle these exact issues by testing an ethical decision-making algorithm for self-driving vehicles. They were able to test it with nine different alarming scenarios in GTA V. They found the algorithm could **reduce the potential loss of life by about 24%** by weighing up the ethical dilemma, although it remains a controversial area of development.

With the newest game in the franchise – GTA VI – **due for release on 19 November 2026**, researchers are already looking forward to seeing how they can use its simulated world in their experiments. But to do so, they need permission from Rockstar Games, the company that makes the games.

"Its potential as a research tool remains immense," says Romain Delgrange, who used the game for **research on human navigation techniques** while at the Laboratory of Applied Psychology and Ergonomics in Paris.

(*Rockstar Games and its parent company Take-Two Interactive did not respond to the BBC's request to comment on this story.)*

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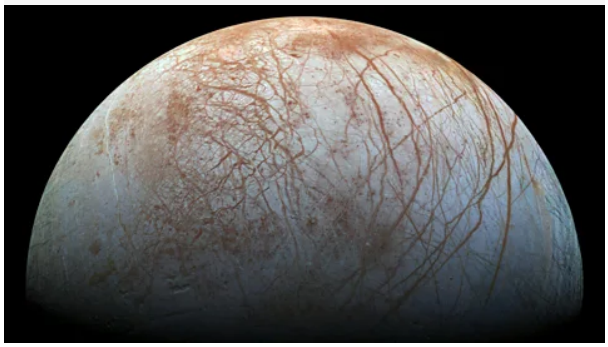


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