# Hell's Grannies: Driving in Old Age

Mobility matters. Losing the right to drive is, for many elderly people, as traumatic as being widowed. And, as the population ages, that trauma will be felt by more and more people in the future. Yet the **safety** of other road users, let alone that of the elderly driver, is paramount. So, an awful lot **depends** on the licence-renewal tests older drivers face in certain places.

Normal driving tests are problematic. One problem is that licensing is usually a simple decision; either someone is permitted to drive or not. But this is silly. Reactions do slow with age, but **gradually**. Eyesight **deteriorates** similarly. Some people may be safe to drive during the day, but not at night. Others may not be safe on long trips, because of loss of concentration, but would be fine to drive to the shops. Some might be okay at low speeds. Unfortunately, neither the **authorities** nor drivers themselves have **reliable** methods of telling the difference. A **minor** health problem or medical condition might end someone's driving career **prematurely**. Alternatively, a person who should have stopped driving long ago might cause a serious accident.

One answer would be customised **licences** that, for example, **prohibit** long-distance driving but **permit** trips to the supermarket. But knowing how to **tailor** these licences to individuals requires a sophisticated and systematic way to **assess** people's **capabilities**. This is the **purpose** of DriverLab, a simulator being built at the Toronto Rehabilitation Institute, in Canada. It is designed to test how good existing licence-holders are.

The researchers behind DriverLab, led by Geoffrey Fernie, have taken an actual vehicle (an Audi A3), **removed** its engine, and surrounded it with a projection screen. The car's rear-view mirrors look **ordinary**, but they are actually the screens of computers. That means the team can show the driver only what they want them to see.

The main screen **displays** the combined computer-generated images from 12 **projectors** placed above the car. When difficult conditions or rapid acceleration need to be simulated, the car can be moved around. The resulting illusion can take the occupant of the car on virtual journeys **ranging from** busy streets to mountain paths, in broad daylight or in the middle of the night, in rainstorms, fog or clear weather. It can even **mimic** that dangerous moment towards the end of the day when the sun is nearing the horizon and oncoming traffic seems to **appear** suddenly out of it.

While all this is happening, cameras **continuously** track where the driver's hands, feet and eyes are, and a voice recorder preserves their every word. The system **measures** how much distance the driver keeps between their car and the one in front, how well they stay in lane, how accurately they steer and whether they brake smoothly. It can also throw up **unexpected** dangers, to see if they react **appropriately** to a bicycle turning into the road in front, or a toddler running into their path.

Dr Fernie and his colleagues are putting **effort** into making all these effects seem real, using **features** not found in any **previous** driving simulator. To simulate the sun the system uses a special lamp which is held in front of the screen on a robotic arm. Oncoming headlights are mimicked by bright LEDs. To create the illusion of rain, the system is fitted with a specially designed nozzle that can spray different kinds of raindrops onto the windscreen.

According to Dr Fernie, Ontario's Ministry of Transportation is interested in his **approach**. Though more costly than a standard driving test, it would be more **detailed**. Changing the law to allow **restricted** licences to be issued on the basis of a test like this would, though, depend on its working **in practice**. Initially, therefore, Dr Fernie imagines that DriverLab's customers will be the elderly themselves, or possibly their concerned children. He imagines people using evidence from DriverLab to **persuade** the authorities not to stop them driving.

Before this happens, though, the system must go through **trials** of its own. Early next year, Dr Fernie and his colleagues will let driving instructors test the equipment with volunteer clients. The researchers worry that standard driving simulators have a **tendency** to induce nausea, because they do not quite mimic the world correctly and can **disrupt** balance. They hope DriverLab will not suffer from this problem, since they have worked hard to **ensure** that when scenery is moving around the car, the car is moving appropriately too.

Making this prototype suitable for **widespread** use will take several years. But if it does work for old people it might also be used to help learner drivers, by giving them experiences of difficult driving, such as on the motorway. However, even if it only achieves its objective of keeping people driving for as long as it is safe, but no longer, it will have proved its **worth**.

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