



Moral Machines

- 1 Every day, drivers around the world have to make split-second decisions to avoid accidents. Often, they react without even having time to think. What if it weren't people making those split-second decisions, but cars instead?

Decisions Made by Driverless Cars

- 2 But what would a driverless car do? Self-driving cars are programmed to deal with all sorts of situations, from understanding traffic rules to planning the easiest route that avoids construction. These programming decisions are straightforward. **Ethics**, on the other hand, is not. How do you program a car to decide what to do in an accident? How do you choose which life is more valuable? And who gets to choose? Should it be the car owner? The manufacturer? The government? This is a problem that ethicists, lawyers, and carmakers are all wondering about.

The Ethicist Opinion

- 3 Patrick Lin teaches robotics and ethics at California Polytechnic State University. He says that it might seem easy to say that self-driving cars must follow certain rules, such as to **minimize** harm, but he says, "even that quickly leads to **morally** murky decisions." Lin gives an example: "On one side of you is a motorcyclist wearing a helmet, and on the other is a motorcyclist not wearing a helmet. If the car's computer tells it to minimize harm if an accident is about to occur, that might mean hitting the person with the helmet. After all, they are better protected and so less likely to be injured." But, Lin asks, "aren't you being unfair to the responsible motorist?"
- 4 In 2015, German carmaker Daimler-Benz started to look at some of the issues surrounding self-driving cars. They published a lengthy report, and in one chapter, Lin discusses the ethical problems. He wrote that any type of decision-making based on age, gender, or any similar factor would be discrimination and therefore against professional codes of ethics. He explained that even the safest car runs the risk of having accidents and that the responsibility for programming will lie with the manufacturer. Whether that decision is to protect passengers at all costs or to avoid the most damage, or something else entirely, Lin says it is a no-win situation. Just as with human drivers, there will always be accidents where someone gets hurt.

DIRECTIONS

Read the text, and complete the activities on page 3.

ethics: the study of right and wrong behavior

minimize: to reduce

morally: having to do with right and wrong behavior



The Legal Opinion

- 5 Some experts say we don't need to worry about this problem. Bryan Casey works at the Center for Automotive Research. He also teaches at Stanford Law School. Casey says that what a self-driving car does in a crash is not an ethical issue at all. Instead, it is a legal issue. If a driver is in a wreck now, the law decides if he was driving dangerously or if it was truly an accident. If the driver was dangerously careless, he faces punishment, often a fine or jail. If a malfunction caused the crash, the manufacturer might be at fault. Either way, laws exist to determine what is wrong and who is responsible. Casey says that will not change with the arrival of self-driving cars.
- 6 He does not believe that self-driving cars are capable of thinking and making decisions for themselves. So, who will decide what cars should do? According to Casey, laws will guide carmakers' choices.

Conclusion

- 7 We expect self-driving cars to be very safe—safer than human drivers because computers can react more quickly. And indeed, a well-designed autonomous vehicle should be able to make dozens of calculations at a time, slowing down or speeding up in relation to its surroundings. Nevertheless, accidents can always happen. This means that drivers, manufacturers, and lawmakers will need to deal with new problems as they arise.



Considering All Sides

As you read **Moral Machines**, take notes on the opinions included about self-driving cars. Record notes about the ethicist's opinion and the legal opinion while you read. Also, record your own opinions about self-driving cars.

Are Self-Driving Cars a Good Idea?

Ethicist Opinion

Legal Opinion

My Opinion

Writing a Summary

Reflect on the opinions about self-driving cars from **Moral Machines**, as well as your own opinions. Write an objective summary that represents both the ethicist and legal opinions.



Space Tourism Can Wait

- 1 Space **tourism** is becoming popular for citizens in this country and around the world. Many people love the idea of touring outer space, and those same people are excited by the possibility. However, space tourism comes with huge costs to people here on Earth and to our already struggling environment. I strongly believe that space tourism is not worth the price at this time.
- 2 Why do I say this? First of all, the actual **monetary** cost of space travel is definitely too high. For example, a short trip into orbit around Earth can cost around \$200,000. A trip all the way to the International Space Station is even more expensive, topping out at around \$20 million for just one person. According to my research, seven space tourists have already made that trip, and one person has done it twice. That adds up to about \$160 million! Citizens certainly are free to spend their money however they'd like, but I think their money could go to much more worthy causes. What if they each put \$20 million into improving schools, feeding the hungry, or providing low-cost health care for the poor? Instead of spending so much money on just one experience, the wealthy could improve the lives of many people not as fortunate as they are. That might not be as fun as a trip into space, but it is probably a lot more fulfilling.
- 3 Second, there are no guarantees that space travel is safe for the general public. As the website *traveltospace.com* points out, "When dealing with rockets, there's always a chance something will explode." The history of space travel shows that such disasters, although rare, can definitely occur. Moreover, the government has no laws about who can go into space. The only rules that space-tourism companies have to follow are that space tourists must be in good health, and people under the age of 14 must be accompanied by an adult. Otherwise, space tourism is open to anyone who can afford it. I believe these rules are not strict enough. Professional astronauts go through many years of training before they are allowed to fly into space. There is little doubt that astronauts are better equipped than the general public to handle any dangers that might arise during the flight.

DIRECTIONS

Circle words or phrases that signal an opinion. Then, complete the activity on page 6.

tourism: the business of serving visitors from other places

monetary: having to do with money



- 4 Third, the monetary cost of space tourism is nothing compared to the price our planet will certainly pay. Specifically, the rockets used to send tourists into space produce air pollution—and lots of it. Some experts say that launching a thousand space flights a year would produce as much pollution as all other air travel combined. At the moment, only a handful of private citizens travel into space each year, but those numbers are increasing. As a result, climate change is on the rise, too. We are already seeing melting glaciers, changing weather patterns, and shrinking food supplies in some parts of the world. Such changes have a greater effect on the people of poor nations than those in rich nations, and it is in the rich nations where our current space tourists live. In my view, space tourism would only intensify the threat to our planet and its people, especially those living in poor countries.
- 5 Finally, speaking for myself, I think that people need to spend a lot more time exploring Earth before they **venture** out into space. While space travel is tempting—just think of all the popular movies set in outer space—it has been my experience that there are places of equal (if not superior) natural beauty down here on the ground. For example, my favorite vacation I have ever taken was to the Grand Canyon. The view from the edge of the Grand Canyon left me in awe. Equally amazing was the journey down into the canyon itself. I was surrounded by beautiful sedimentary rocks like sandstone, shale, and limestone. Once at the bottom, I gazed up into the beautiful blue sky overhead. It was a view I had never had before.
- 6 Obviously, space tourism is an exciting idea. However, I think there are just as many amazing places to see here on Earth. Furthermore, space tourism needs to become less expensive and a lot safer for people and the planet. If and when that happens, it might be a great way for private citizens to participate in exploring the next frontier. But until we learn to take better care of our own planet and the people who live on it, space tourism can wait.

venture: to take a risky journey



Summary of *Space Tourism Can Wait*

Write a summary of **Space Tourism Can Wait**. Use the suggested phrases to describe opinions to help you separate facts from the writer's opinions in your summary.

Phrases to Describe Opinions

The writer argues...

The writer believes...

According to the writer...

Though the writer thinks...

The writer's point of view is...
