Why Do We Need Robot Cars?
Hank Eylicio, Max Sternlieb, Kelly Blasberg, Luke Martello, Riley Downes, Alex Enriquez, Mayank Verma, Sabrina Fletcher, Michelle Dan, Alexis Framness, Carol Ibrahim, Heather Ronci
Desert Robotics

Why Do We Need Robot Cars?

Autonomous - Self-Driving with No Controller

Vehicle: Anything that Transports

Autonomous Vehicle: A Self-Driving Transportation Device

Safety:

*45,000 people die in the United States

* Three times the number of the people who are murdered

* Double the amount of people who die from liver disease and Hypertension

* Causes more death then most diseases or Cancer

* If you are 15-34 years old, it is the number one cause of death

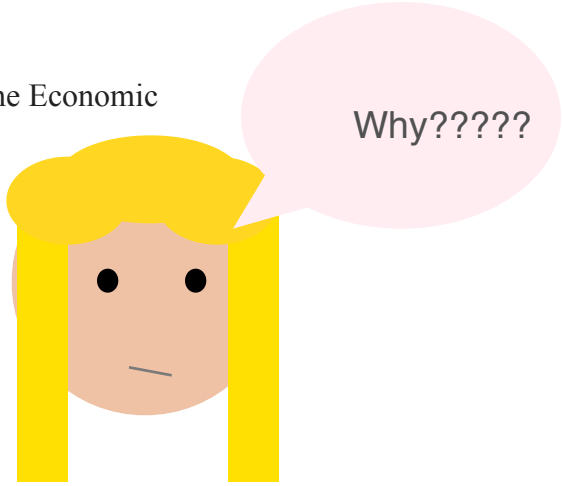
Cost:

*230 billion dollars are spent a year, by the NHTSA and The Economic Impact of Motor Vehicle Crashes

*World wide several trillion dollars are spent

‘Accidents cost emergency response systems

*We can replace 50 billion gallons of normal gas



Environment:

*Electric cars are more efficient

*Autonomous electric cars would be more efficient than mass transportation

*Electric or Solar vehicles can generate less amounts of greenhouse gases

Problems

There are many problems that could occur in the future with autonomous vehicles roaming the streets!

Such as :

* A malfunction in the programming
* The vehicle does not recognize an obstacle
* There is major traffic jam
* The robot is stuck in a natural disaster
* The vehicle experiences major damage
* The treads could fall off
* The circuit might blow, ect.
* The government may not agree to let them on the streets
* Germs might spread in public transportation with autonomous vehicles

The list goes on and on, and we need to try to resolve these problems. We can do this by designing our own designs, also by checking our designs many times before they hit the market. If an accident were ever to happen we believe the designer of the vehicle should be held charge, unless it was clearly the person's fault!

**Our team believes that people only at the age of 17 or older should be allowed to use autonomous vehicles. This is for safety reasons and knowledge issues. We decided this age because it is between the ages of 16 and 18, if at 16 you can drive a car, you must be able to use an autonomous vehicle at 17!

Liability

In a regular car crash one of the drivers is usually at fault, and if someone gets killed because of the driver's fault, the driver goes to jail. But who is at fault when an autonomous car has an accident?

Questions to Ask:

What if the computer was driving a person, would the Insurance company get involved?
Would the software makers get involved?
Are people afraid of being killed by robotic cars?
Would outside invaders such as terrorists try to use an autonomous car vehicle as a weapon?
If someone else was in the car and the computer killed them, who would be at fault?

Future of Autonomous Vehicles

To make autonomous vehicle transportation safer, engineers will have to build new sensors and designs. More sensors are needed because they will make transportation much safer and quicker for travelers. Engineers will need to add more high-tech navigation systems, so the vehicles will know all the short cuts and faster routes to take

Technologies We Already Have:

In our present time we already have many technologies, such as Anti-lock brakes which are on many common vehicles. Vehicles such as the Lexus LS460L and Lincoln MKS can parallel park itself. We already have have the Volvo S60 which uses the breaks if it detects an obstacle, or if you ignore a warning. The GM's Opel Insignia which reads road signs, such as speed limit.

Technologies In the Almost Here:

There are many technologies on their way right now, such as Crash Avoidance Systems. This will be a very good crash resistant vehicle, which will be very difficult to crash. We will also have sophisticated navigation, which can tell where there is a good place to park, and will even have traffic light timings. Robo-valet parking will also be available to us, we no longer have to park our own cars and drive around the endless parking lot to find an open space!

Technologies Around the Corner:

Autopilot is a technology we've heard of many times before, but it still isn't the best or safest process around. Autopilot is going to be used in the near future and hopefully it is more efficient and safe! Whistle Cars are small cars that drive themselves, we can make whistlecars more efficient and professional to do more tasks.

Technologies In the Far Future:

When we have robot cars in the future, people are thinking to make special lanes for robot cars to drive more efficiently. Special highways such as tracking lines on the ground, and sensors on the streets. Then in the farther future we want to be to get robot cars to drive on all highway lanes. Later on we hope to be able to have robot cars driving around on all the streets, and through your neighborhoods. [10]

Past Autonomous Vehicles

AUVs (autonomous underwater vehicles) are unmanned, self-propelled robots that search the sea for research. The present era of AUVs can dive a depth of up to 6,000 meters. The autonomous underwater vehicle does many tasks such as: monitor the water, ocean exploration, and some inspection and rescue operations. AUVs have been tracked all the way back to 1970's. [1]

Artemis is one of Virginia Tech's autonomous vehicles. Artemis has a three wheel design, it is smaller, and perfect for steering. This robot placed second in the Autonomous Vehicle Challenged and in Follow the Leader in 2001. Artemis also got first in the Road Debris Challenge, which is no longer held. It is a great autonomous vehicle! [2]

www.avt.me.vt.edu/Past_Vehicles.htm

Artemis - Design 2002

History of Autonomous Vehicles

Simple Self-Driven Vehicles:

1961 - Standford Cart
1979 - Moravec
1977 - Japanese Mechanical Engineering Lab

Standford Cart

Moravec

Earnst Dickmanns

First Real Robot Cars:

1980s - Earnst Dickmanns uses dynamic vision, computers to build 1st robot car.
1994 - Dickmanns' VaMP Mercedes 500 SEL
1995 - UniBW robot Mercedes, S-Class travels 1000 autonomous miles in traffic

S-Class

VaMP Mercedes

DARPA Grand Challenge:

2005 - Defense Advanced Research Projects Agency (DARPA) held the Grand Challenge on Oct. 8. Autonomous vehicles covered the 132 mile race course over desert terrain with the $2 million prize won by the Stanford Racing Team (6 hrs., 53 mins.). [12]

1st Place: Stanford Volkswagen

2nd Place: CMU Hummer

3rd Place: 2nd CMU Hummer

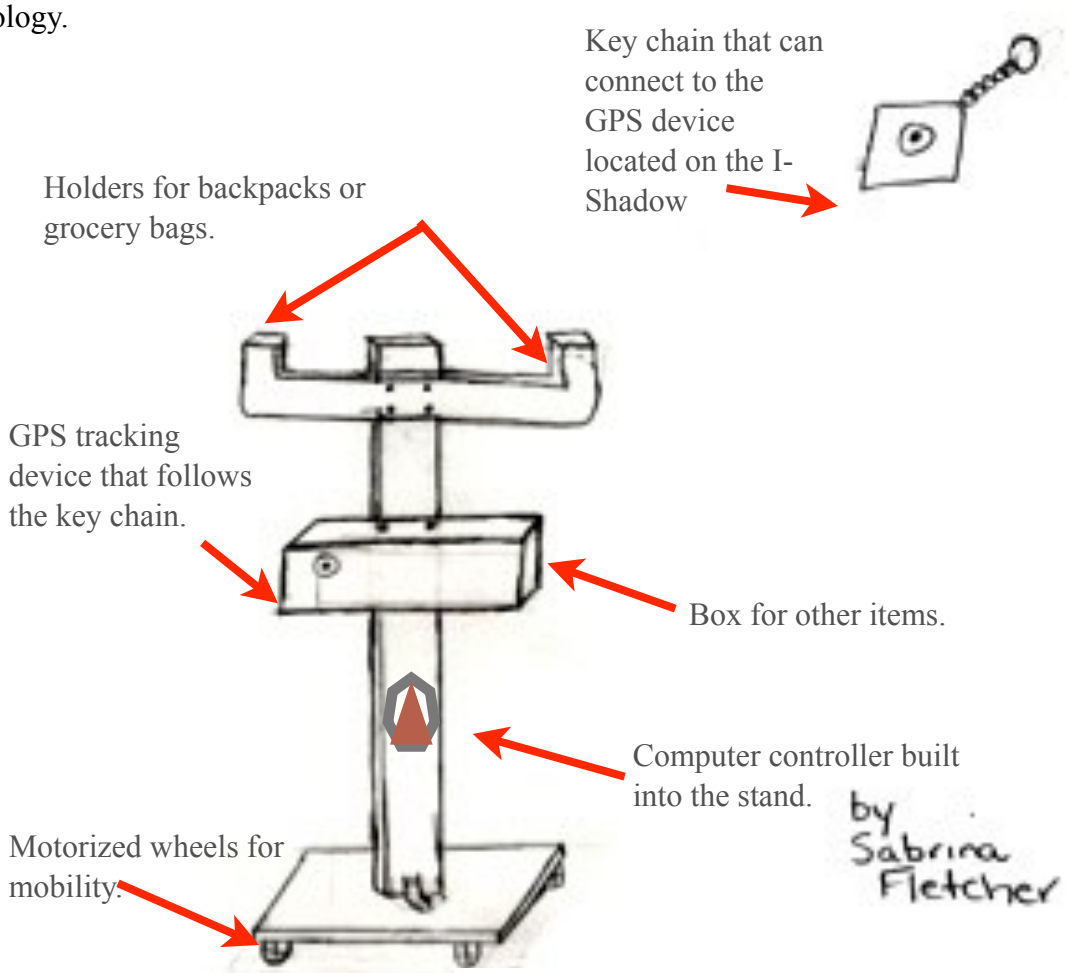
4th Place: Gray Team

5th Place: Terramax Truck

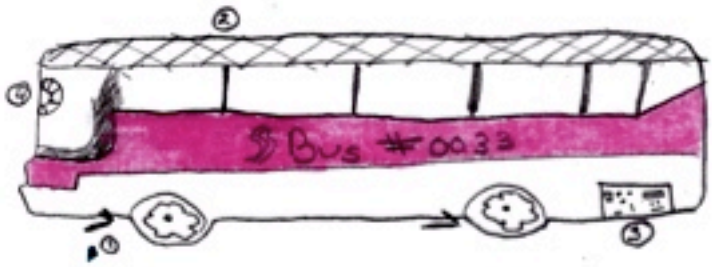
Our Designs

I-Shadow

One of our designs is the I-Shadow. The I-Shadow will help our fellow students or elders. Students can use I-Shadow to carry their backpacks and elderly people can use it to carry their groceries. I-Shadow is battery powered and follows the key-chain holder using future GPS technology.



myBuss



myBuss is another one of our designs! myBuss is an autonomous bus, that drives people with disabilities around the city. This bus includes emergency brakes, it is computer programmed, and it even has an emergency phone. This bus runs on solar panels, and on cloudy days it runs on its stored electricity. We hope to see myBuss on the streets soon!

Bibliography

< http://www.gizmag.com/rex-robotic-beast-of-burden-hits-the-market/13586/> [4]

< http://www.imtp.febras.ru/anpa/anpa_.html> [1]

< http://www.bostondynamics.com/robot_bigdog.html > [6]

< http://www.geeky-gadgets.com/petman-prototype-27-10-2009/> [7]

< http://www.avt.me.vt.edu/new_vehicles.htm> [2] [3]

<http://www-cs.stanford.edu/group/roadrunner/stanley.html< [5]

<http://www.templetons.com> [9] [10]

<http://www.thedesignblog.org/entry/atnmbl-autonomous-vehicle-offers-an-oozing-ride> [8]

<http://www.idsia.ch/~juergen/robotcars.html> [11]

<http://www.darpa.mil/grandchallenge05/overview.html> [12]

Research Team:
Mr. Clark's 4th Period Advanced Robotics Class