

Human Robot - Interaction: Automated Transportation (Self-Driving Robot)

* **Mr. M. SHANKER PRABU**, Research Scholar, Department of B.Com BPS,

** **Dr. M. NANDHINI**, Associate Professor, Department of B.Com BPS,

*** **Dr. P. PIRAKATHEESWARI**, Assistant Professor, Department of B. Com PA,
Sri Ramakrishna College of Arts and Science, Coimbatore 641 006.

Abstract

Human – robot interaction plays an important role in our daily life such as manufacturing, medicine and domestic services. Industry 4.0 is about the significant transformation taking place in the way goods are produced and delivered – moving toward industrial automation and the flexible factory. People can used animals or have to walk to go another place before the starting the modern civilization. But now vehicle is one of the most needed things in the modern world. In today’s ever more inter-connected world, it appears like technology has something to add to absolutely every industry. The same is true of transportation, with self-driving cars fast becoming a hot topic. Relevant safety requirements are outlined and safety concept is devised which consist of various sensor system.

Key words: Human robot - interaction - civilization – vehicle - inter-connected world - self-driving.

INTRODUCTION

“Robotics and other combinations will make the world pretty fantastic compared with today.”

Bill Gates.

Robots will soon be able to read texts for us, engage in conversations, clean our windows, deliver packets and parcels, prepare our pill-boxes and even help us get back on our feet should we fall, or have difficulty just getting up. While industries have automated many processes, secure wireless connectivity empowers factory automation, making industrial automation possible on a much large scale. By creating a digital foundation, industrial automation will increase productivity and performance.

Robots replaced many workers at the factory assembly lines, and more recently robots have been discussed e.g. in the context of providing solutions to care for elderly people in countries with rapidly changing demographics. A specific example of human-robot interaction is the human-vehicle interaction in automated driving. After the innovation of human-controlled mechanical car, it will be the next generation to be changed in the Automobile industry. Surely it will lead us to the next level of transportation.

HISTORY OF AUTOMATED TRANSPORTATION

The idea of automated transportation vehicles dates back to Futurama, an exhibit at the 1939 New York World's fair. General Motors created the exhibit to display its vision of what the world would look like in 20 years, and this vision included an automated highway system that would guide automated transportation vehicles. In GM's 1939 exhibit, Norman Bel Geddes created the first automated car, which was an electric vehicle guided by radio-controlled electromagnetic fields generated with magnetized metal spikes embedded in the roadway.

In 1958, General Motors had made this concept a reality. The car's front end was embedded with sensors called pick-up coils that could detect the current flowing through a wire embedded in the road. The current could be manipulated to tell the vehicle that to move the wheel left or right. In 1977, the Japanese improved upon this idea, using a camera system that relayed data to a computer to process images of the road. However, this vehicle could only travel at speeds below 20 mph. Improvement came from the Germans a decade later in the form of the VaMoRs, a vehicle outfitted with cameras that could drive itself safely at 56 mph. As technology improved, so did self-driving vehicles' ability to detect and react to their environment.

ABOUT THE AUTOMATED TRANSPORTATION

What is automated transportation? It's nothing but a vehicle without human driver because it can drive itself automatically. It is also known as 'autonomous vehicle', 'driverless vehicle' or 'robotic vehicle' etc. it can be designed to detect the environment around the vehicle and it can navigate itself to go ahead without any human command or control. It can predetermine its destination and takes steps to go forward.

AUTOMATED TRANSPORTATION TODAY

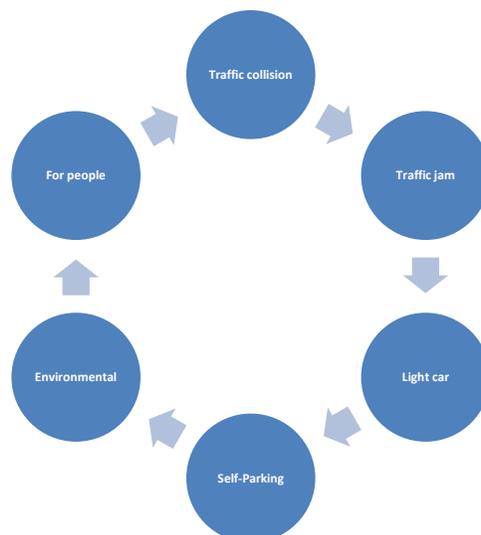
Today world can move on automated transportation. At present, many vehicles on the road are considered to be semi – autonomous due to safety features like assisted parking and braking systems, and a few have the capability to drive, steer, brake and park themselves. Automated transportation vehicle technology relies on GPS capabilities as well as advanced sensing systems that can detect lane boundaries, signs and signals, and unexpected obstacles.

Autonomous vehicles are expected to bring with them a few different benefits, but the most important one is likely to be improved safety on the roads. Autonomous vehicles are expected to bring with them a few different benefits, but the most important one is likely to be improved safety on the roads. On 2015 National Highway Traffic Safety Administration report found that 94 percent of traffic accidents happen because of human error: By taking humans out of the equation, self-driving vehicles are expected to make the roads much safer for all.

In automated transportation they can uses the camera, GPS system, computer vision, laser light, radar, odometry and many more sensors to drive the car smoothly over the roads. This car has advanced control systems which are used to analyze data from different sensors and cameras to plan a path to the desired location. This technology is safe, flexible, and efficient.

NEED FOR AUTOMATED VEHICLE

It is thought that self-driving car is the next level of technology. There are many reasons that are why we need a self-driving car as our next transportation system. Let’s look at the advantages of a self-driving car



- **Traffic Collision:** In most cases, driver's faults are the main reason behind car accidents. As a human, no driver can give 100% concentration on driving especially when they are on a long drive or at night. A self-driving car can make the difference because the computer will never be tired or they will not drive aggressively, by this car can save many lives and medical costs. It is thought that self-driving car can reduce 90% of accidents and can save more than \$500 billion every single year only in the USA.
- **Traffic Jam:** Self-driving vehicle technology is all about calculating the distance from other cars and objects around the car. For this, it can use every possible space on the roads without touching another car. So it will also be helpful to reduce the traffic around the big cities.
- **Light Car:** On the other hand, this type of cars does not need any driver seat. This will save a big space that will make the car more light, speedy and powerful. This space can be used for any other purposes also.
- **Self-Parking:** Parking is a big issue for the traffic jam in big cities. Self-driving car technology can park the car perfectly by using the best use of available spaces.
- **Environmental:** There will be some environmental benefits of the driverless car also. Almost 25% of energy is used by cars and a huge portion of greenhouse gases came from the car around the world every day. Most of the self-driving cars are run by fully electric energy. They use less gas and energy compared to today's mechanical car. This will make a huge impact on our environment.
- **For People:** Disabled people, blind or children, and old people will get a huge advantage from a self-driving car. It will increase human productivity by giving them more time to do other works.

SENSORS USED IN AUTOMATED VEHICLE

Automobile sensors are intelligent sensors which can be used to control and process the pressure of oil, temperature, level of emission, coolant levels, etc. There are different types of sensors used in automobiles, but knowing the working of these sensors is essential. In order to the function of these sensors, here we have listed some popular sensors used in automobiles which include the following Mass airflow sensor, Engine Speed Sensor, Oxygen Sensor, Spark Knock

Sensor, Coolant Sensor, Manifold Absolute Pressure (MAF) Sensor, Fuel Temperature Sensor, Voltage sensor, Camshaft Position Sensor, Throttle Position Sensor and Vehicle Speed Sensor.

Boon and Bane

Automated Vehicle was designed to travel in the absence of a human operator. It is similar to having personal driver except that this vehicle does not involve human interactions. Having this amazing vehicle gives a person a sudden advantage. However, this vehicle is still accompanied by disadvantages.

Safety

Automated Vehicle is programmed with safety in mind, and as such are crammed full of cameras, lasers, and other sensors that allow them to safely operate around personnel and structures. By contrast, equipment run by human operators, such as forklifts, do not have as many built-in safety mechanisms and ultimately rely on human input, which can be compromised in any number of ways. Whereas a human operator always has the potential to become distracted or fatigued, and therefore cause an accident, these are not concerns when using automated vehicle.

Accuracy and Productivity

Humans make mistakes. By replacing the human element with automated vehicle, you remove some of the potential for inaccurate workflows, ultimately reducing waste and increasing output, allowing your operations to become more productive and accurate. And whereas human personnel are limited in how long they can work, automated vehicle are capable of running 24/7.

Decreased the number of accidents

Automated Vehicle prevents human errors from happening as the system controls the vehicle. It leaves no opportunity for distraction, not just like humans who are prone to interruptions. It also uses complicated algorithms that determine the correct stopping distance from one vehicle to another. Thereby, lessening the chances of accidents dramatically.

LOWER FUEL CONSUMPTION

Automated Vehicle technology can improve fuel economy, improving it by 4–10 percent by accelerating and decelerating more smoothly than a human driver.

Expensive

Self-driving cars are so exciting because they are stuffed to the brim with space age technology, but all this technology is currently astronomically expensive. In general, technology grows cheaper the longer it is available to the public, so self-driving cars may eventually be something anyone can afford. For now, however, most companies have not released a price for their driverless cars.

Potential to be hacked

Driverless vehicles are the ability of computer technology to avoid becoming distracted. Yet, you could argue that driverless vehicles can become distracted in a less conventional way – through being hacked.

If a sensor failure

If driverless vehicles rely on sensors placed all around the car to assess conditions and navigate traffic, what happens if one or more sensors get damaged? How does the car respond? Does it just keep going and hope not to hit anything?

Fewer job opportunities for others

As the artificial intelligence continues to overcome the roles and responsibilities of humans, taxi, trucks, or even co-pilots may be laid off as their services will no longer be needed. This may significantly impact the employment rate and economic growth of a certain country.

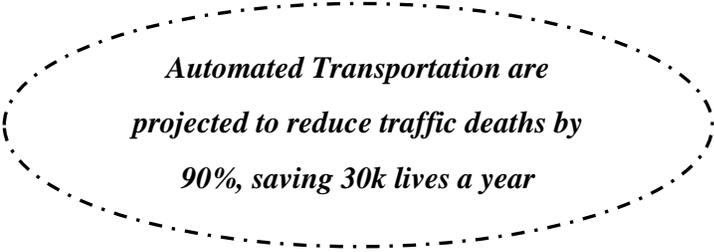
CONCLUSION

The future is now people can only take the decision whether to adopt it or avoid it. Technology development is associated with potential increases in safety and reductions in operating costs due to removing a driver from vehicles. However, user acceptance and perceived safety/security studies generally found that passengers prefer to have staff on board autonomous vehicle, which could negate operational cost savings. Planners and operators of autonomous vehicle systems should therefore strive to find the best combination of operational policies that achieve the potential benefits. There are many advantages and disadvantages of Automated Transportation Technology. Some of you may support it or some may deny it. Time will give the

answer will this technology rule the automobile industry and will it be the driver of your car or not. But it is true that it will lead us to a new transportation system that is safe, efficient, powerful and green for the environment.

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