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**Connected Vehicles in  
Smart cities**

When we talk of smart cities, the first thing that comes to mind is automatically moving vehicles. Talking of that it is quite possible a scene from some futuristic sci-fi flick flashes in front of your eyes. But it takes a lot to achieve that. What it takes is a vehicle, quite a few sensors, actuators, cameras, microcontrollers and not to mention a highly robust piece of code to get all these things working in sync. To get things done in sync within a system communication among all the components plays a vital role otherwise the whole system will crash down. When it comes to a complex system like transportation where a crash may lead to loss of life.



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## **Connected Vehicles**

A Connected Vehicle enables cars, buses, trucks, trains, roads and other infrastructure, and our smartphones and other IoT devices to communicate with one another.

Vehicles on the highway may use short-range radio signals to communicate with one another so that every smart entity on the road is aware of where other nearby vehicles are. Drivers would receive alerts of dangerous situations, such as Hilly road, an oncoming car from the back, blind turns and not to mention red-light violations.

It makes driving relatively easy by providing additional information via notifications to the drivers. At the same time in case of heavy transport vehicles, the owner may track the real-time status of the vehicle to improve delivery.



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## **Autonomous Vehicles**

The definition of autonomous vehicles can be given as, “a vehicle capable of sensing its environmental surroundings and operating without human intervention”. A human passenger (driver) does not need to take control of the vehicle at any time, even if the human passenger is not required to be present in the vehicle at all. An autonomous car can do everything that an experienced human driver does.

The U.S. Department of Transportation has adopted 6 levels of automation driving ranging from Level 0 to Level 5 .i.e fully manual to fully autonomous and anything in between.

For levels 0-2 human monitors the driving environment for higher levels the automated system monitors the driving environment.

## **Level 0**

No Automation Conventional vehicles human performs all the driving-related operations and tasks.

## **Level 1**

Driver Assistance Various sensors installed like seatbelt alarm, speed monitoring, doors not closed properly, etc for aiding the driving experience.

## **Level 2**

Partial Automation Vehicle controls steering and acceleration but the human still monitors all the proceedings and can take control any time he needs.

### **Level 3**

Conditional Automation this level introduces environmental detection capabilities, can perform most of the driving tasks, but the human can still override at any given time.

### **Level 4**

High Automation this level introduces the requirement of Geofencing, Geofence is nothing but a predefined set of boundaries around a point location, which is generated dynamically. Human Intervention is optional.

### **Level 5**

Full Automation vehicle performs all the driving in all the circumstances human monitoring is still required.



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**Difference between Connected  
Vehicles and Automated Vehicles**

The Society of Automotive Engineers (SAE) uses the term automated instead of autonomous. The reason being a fully autonomous car would be self-aware and capable of making its own choices. For example, you say “drive me to work” but the car decides to take you to the beach instead because it senses your medical vitals are not good enough to work in the office, you need to relax or maybe it's Saturday and usually you visit the beach on the weekend. But a fully automated car would follow the instructions and then drive itself.

Often people use self-driving interchangeably with autonomous. However, it's a slightly different thing. A self-driving car can drive itself in more or less in all the circumstances and environmental

settings, but a human passenger must always be present and ready to take control. Self-driving cars would fall under somewhere between Level 3 (conditional driving automation) and Level 4 (high driving automation). Geofencing is required to achieve the next level of full Automation.



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## **Role of Connected & Autonomous Vehicles in Smart Cities**

Globally, there is a new buzzword in the concept of urbanization known as Smart Cities.

Whatever may be the concept, self-driving (electric) cars are integrated as part of the same. The objectives which are fulfilled by Autonomous transport regarding smart cities are:

- Lesser vehicles leads to less vehicle movement in the city,
- Less parking pressure
- Improvement in air quality.
- Considered to increase road safety greatly.

However, it is debatable these benefits can be derived from Automated vehicles. Arguments which can be given against above-mentioned points are as follows

- Lesser car movements are mainly the impact of carpooling or sharing. If autonomous transport leads to people leaving public transport, it could even lead to an increase in the number of cars and car movements. The new challenge can be to automate our public transport system effectively.
- Autonomous cars also need to be parked somewhere when they are not being used and need to stop and park to pick people up. Which will, in turn, increase the parking pressure.

- Driving autonomous does not, in itself, help improve air quality. Promoting electric vehicles will lead to a clean atmosphere due to huge reduction in carbon which is emitted by petroleum driven vehicles. The level of this reduction is dependent on the sustainability of the source of power. The question arises is electric power is efficient enough to serve as a replacement for petroleum products.
- Autonomous driving only has a positive effect on road safety provided all traffic becomes autonomous and the entire ecosystem is well organized around it. Until then, driving autonomously will most likely lead to more incidents.



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## **Conclusion**



## Conclusion

Nobody can deny the fact the Automotive vehicles will create a monstrous impact on the way we travel, not only that system will change current infrastructure drastically. Possibilities are it may lead us to a future of smooth and predictable traffic and more efficient and effective public transportation.

City residents like pedestrians and bicyclists have more free space to make use of because unlike humans machines will not compromise traffic rules. All of the benefits that autonomous vehicles together with smart cities could bring is the improvement in people's quality of life while taking next-level care both for humans and the ecosystem.

## Conclusion

In a Nutshell, Vehicle Automation is an opportunity for Smart Cities when done right, but a potential threat otherwise. Which means with sustainably sourced electric power and the capacity to transport multiple passengers with partly shared itineraries.



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## **About the Author**

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RAjeev Singh is responsible for all aspects of the company's engineering product and software development activities. Leading 70+ multi technologies engineering team including Drone, Robotics, Artificial Intelligence, Machine Learning, Analytics, Web, App development (iOS, Android and Windows), Chatbot, IoT, Cloud-based application and Other Software. Being the VP of engineering my focus stands on structuring and operation of the product development, envisioning products requirements, streaming lining its activities for delivering manufacturable designs maintaining the timeline and budget constraints as per agreed specifications.

- Robots : [https://www.youtube.com/watch?v=wCTLq\\_Y1cyw&feature=emb\\_logo](https://www.youtube.com/watch?v=wCTLq_Y1cyw&feature=emb_logo)
- Drone : [https://www.youtube.com/watch?v=YTFxaZps7PU&feature=emb\\_logo](https://www.youtube.com/watch?v=YTFxaZps7PU&feature=emb_logo)
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## **About MedRec Technologies**

MedRec Technologies is a London, UK based software development company. We have development facilities located in UK, USA, Europe, Middle East, Central and East Asia. Currently, we comprise of a team of over 70 + software engineers, technology consultants, creative designers and scientists with expertise in different technical domains. From Healthcare to Robotics, Finance to Autonomous mobility, Education to Manufacturing;

We are working on disruptive technologies such as Big Data Analytics, AI, Machine Learning, Deep Learning, Cognitive Computing, Internet of Things, Cloud, Security, SDN-NFV, RPA, Blockchain etc.

We deliver these services across industry sectors such Automation and Robotics, Retail, Banking, Insurance, E-Commerce, Education, Manufacturing, Travel, Transport, Hospitality and Maintains etc.

Our highly qualified staff offer expert skills in project support. Our team spirit and the company's management proficiency are successfully combined with creativity, dedication, and a development culture to produce solid, effective technological results. Our commitment is to deliver high-performance and scalable products to industries.

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## Our Services :-

- Automation and Robotics
- Web and E-Commerce
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- Chatbot
- Enterprise Software
- Real-Time Application
- Custom Application
- IoT and Cloud-Based
- Software Testing and QA
- Maintenance and Support of product
- IT Consulting (Outsourcing IT Consulting)



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