ROBOTIC PARKING – A CASE IN GREECE

Keywords: use of sensors, automated processes in measuring and prising, optimisation of space.

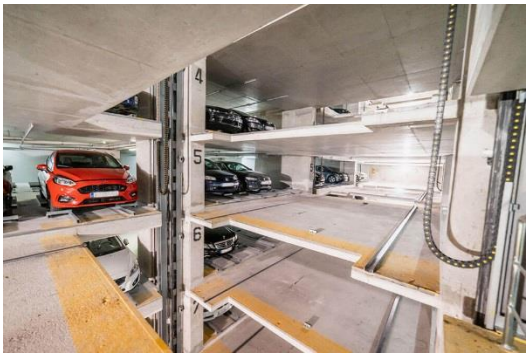
Background to Case Study.

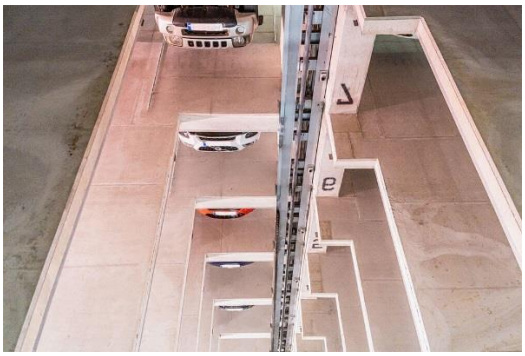
An automated car parking system (APS) is a mechanical system designed to minimize the area and/or volume required for parking cars. Like a multi-story parking garage, an APS provides parking for cars on multiple levels stacked vertically to maximize the number of parking spaces while minimizing land usage. The APS, utilizes a mechanical system to transport cars to and from parking spaces in order to eliminate much of the space wasted in a multi-story parking garage. The APS also uses a smart system with which the car is measured, and it is lifted to most suitable place in order to optimise the use of parking space.

While a multi-story parking garage is similar to multiple parking lots stacked vertically, an APS is more similar to an automated storage and retrieval system for cars.

In addition to the space saving, many APS designs provide a number of secondary benefits:

- The parked cars and their contents are more secure since there is no public access to parked cars
- Minor parking lot damage such as scrapes, and dents are eliminated
- Drivers and passengers are safer not having to walk through parking lots or garages
- Driving around in search of a parking space is eliminated, thereby reducing engine emissions
- Only minimal ventilation and lighting systems are needed
- Handicap access is improved
- The volume and visual impact of the parking structure is minimized
- Shorter construction time





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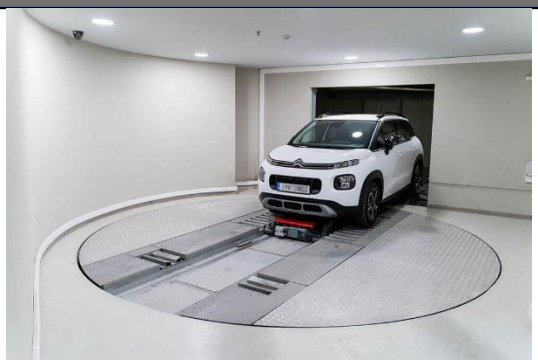

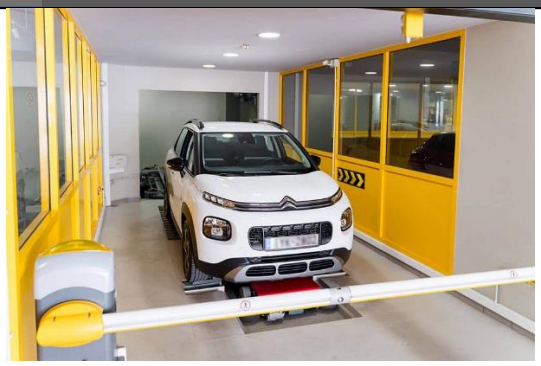

Introduction to the Case Study and it's growth within Industry 4.0

The process in order to use a robotic parking is very easy.

These are the steps a driver must take in order to park it.
The driver drives the car in one of the five specially designed entrances, whichever is free and suits him best! He aligns the car with the help of the mirrors, and he proceeds until the light marking "OK STOP" turns on. He puts handbrake on, turns off the engine, puts first gear, fold the side mirrors, lowers the car radio antenna and makes sure that he takes with him any personal things he needs until he comes back to pick it up, he locks the car and leaves. Then he goes to the specific exit to get his ticket. The robotic system will obtain the dimensions of the car on entry in order to place them in the smallest available parking space.

These are the steps a driver must make in order to pick it up.
He scans the Barcode of his ticket to the automatic payer. The details of his car and the payment amount will appear on the screen. He can pay with all coins and notes of 5, 10, 20 and 50 Euros. The Automatic payer gives change and at the end it issues the receipt. He follows the signage in the Parking that guides him to the exit that has been indicated to him. The mechanical system will bring his car right in front of him.

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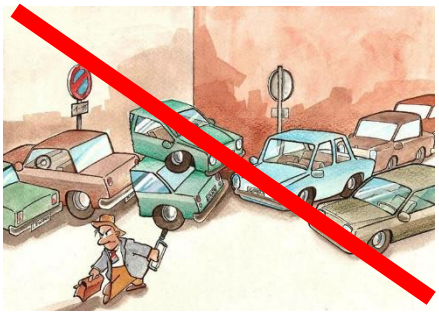
The Case Study and Industry 4.0 Elements: A Pictorial Overview



No Parking Space

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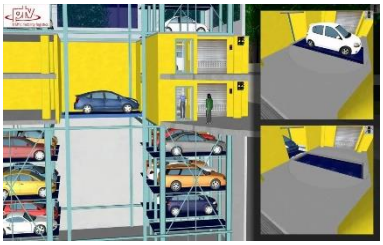

Robotic parking uses artificial intelligence and robotic systems to park cars items so humans don't have to, and measuring the dimensions of the cars and parking them in the most suitable place, it can minimize the space needed for parking.

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The Element Explored within Industry 4.0 Application. Robotic Parking of Heraklion.	Heraklion Robotic Parking is based in the centre of Heraklion, includes 9 underground stations and it is the first of this kind in Crete. The process of entry and exit from the parking is really simple and fast and is done by the driver! The automated system, having measured the dimensions of the vehicle, will receive it and put it in an empty space in one of the 9 underground stations! The driver can stay and watch the rest of the process from the TV screens of the station! When the driver returns, the mechanical system brings the car right in front of him. In any case there are specialized personnel 24/7 that will help clients with any problem and any questions they may have. Most standard, medium and small SUVs are supported. 1.95m height, 2m width, 4.4m from front axle to back of car and minimum underbody clearance of 20cm The parking process is fast and easy. No reason to drive through the parking floors looking for an available parking spot. No one gets into the car so: -no one adjusts car settings, -no transfer of bacteria or viruses to the car, -there is no way belongings in the car can be touched or stolen. The driver walks away with his keys. Generally, the robotic parking is faster than the traditional parking. Only trained staff have access to the underground parking.
Application Target Audience	*Drivers looking for parking*
Resources Used:	*https://www.plastiracenter.gr/* *https://en.wikipedia.org/wiki/Automated_parking_system*
Further Reading:	

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	https://www.stopa.com/en/parking-systems/references https://www.roboticparking.com/

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