

Artificial Intelligence & Intelligence-Powered Parking Solutions

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Problem:

Parking within urban areas and areas surrounded by social and commercial buildings remains a big challenge for motorists. The challenge is worsened by the numerous by-laws and regulations enacted by various municipalities and local authorities which prohibit unplanned parking within certain areas.

Solutions:

- Current solution: To achieve organized and sustainable parking, private entities and local authorities have designated different areas for the public at a certain prescribed fee. However, these parking spaces are never enough for the large number of cars that keep on increasing on the roads daily.
- One of the most sought after solutions: is the application of artificial intelligence to automate the parking process and thus solve the challenge of parking. Our paper explores the multiple ways through which artificial intelligence can be used to power parking systems to provide a long-lasting solution to the parking challenges faced by motorists in public and private parking spaces.

Conceptual Analysis:

- As cities and urban areas continue to record a significant increase in the number of vehicles driving into their jurisdiction, parking will continue to be a major challenge.
- Shortage of parking spaces will remain a major concern for local authorities, given that some areas lack space to build new parking spaces.
- many cities have not embraced this technology to manage and allocate free parking spaces to various motorists.
- cities and urban areas have no option other than re-imagining a sustainable urban community within their jurisdiction. In doing this, the local authorities will need to think of efficient ways of managing and allocating their parking spaces to deserving drivers who drive into their jurisdiction.

Solution by using artificial-intelligence parking:

- A sensor that performs the function of locating free parking spaces and then directing the driver to the free parking space.
- the sensor will use the bid data already collected by other sensors in other vehicles and submitted in the cloud to guide the driver.
- By enabling the vehicle to automatically identify a free parking space, the artificial intelligence-powered parking solution saves drivers the tedious work of navigating through traffic and covering long distances in search of free parking space.

Solution by using artificial-intelligence parking:

- The principle behind the artificial-intelligence-powered solution is the occupancy of parking spaces and motorists' guidance to the unoccupied parking lots.
- Its efficiency is facilitated by the ability to gather precise information relating to all parking spaces in a city or urban area using sensors fitted in vehicles. It eliminates barriers in the enforcement of allocation of free parking spaces, calculates dwell time, and promotes recognition of license plates while allowing the free flow of traffic.
- Parking attendants can easily compare the license plates of vehicles parked in various parking lots to the cloud data so that they ensure that all vehicles pay for parking.

Solution by using artificial-intelligence parking:

- To predict whether a vehicle will fit into the parking space available in the nearest parking area.
- It also predicts the driver's right to access the parking space available based on regulations that govern parking, such as reserved parking areas for the disabled, officers, government vehicles, and emergency response vehicles. It can easily help a driver to distinguish between a loading bay, a restricted parking area, and a closed parking space.
- Drivers rely on this feature of artificial intelligence parking solutions to park their vehicles in spaces will not cause conflicts with other interested parties who also use the spaces.

Solution by using artificial-intelligence parking:

- its ability to factor in the seasonality of traffic flow in the city to analyze the pattern of flow of vehicles in and out of the city during peaks and off peaks periods.
- With this capability, a vehicle fitted with an artificial intelligence sensor will predict whether the parking space will still be available upon the arrival of the driver to the parking lot (Belkhala et al., 2019).
- The technology factors in the driver's speed, traffic flow towards the parking space, and the speed of other drivers who have also expressed interest in securing the identified parking space.

Solution by using artificial-intelligence parking:

- Another notable advantage is that it will reduce the number of drivers driving around cities looking for free parking spaces.
- It also ensures that all available parking spaces are fully utilized to approach the free parking spaces in chronological order.
- These advantages lead:
 - free flow of traffic
 - reduced traffic snarl-ups
 - saves on pollution and congestion in cities.
- It also promotes fairness in the allocation of free parking spaces on a first-come, first-served basis, thus instilling discipline in motorists driving around the city.
- The overall result of these developments is:
 - Reduced emissions into the air,
 - Conservation of gas and gasoline,
 - Reduction in the motorist's environmental footprint
- By that making cities and urban centers livable and sustainable.

The Solution Being Tested & Sort:

- The Dearth of parking in a congested city, urban center, and social place remains a major challenge for both motorists and local authorities. However, this challenge can be solved with the implementation of an artificial intelligence-powered smart parking solution.
- Money incurred as motorists search for parking space add the pollution caused by the huge traffic on the road can only tell the extent to which this challenge of parking spaces has gone.
- The implementation of an artificial parking-powered solution will solve this challenge by alerting motorists to the exact location where a free parking space is available so that they move swiftly to the fire area and secure the parking slot.

The Solution Being Tested & Sort:

- Artificial intelligence-powered parking solutions work through the use of sensors fitted in vehicles. The sensors enable vehicles to record the traffic flow to various parking slots in the city and then identifies the ones that have been vacated by other motorists.
- The sensors can record the check-in and check-outs flow of motorists into the parking space, thus identifying the available free parking in all parking spaces within the city or any other private parking space.
- The data is then collected and then sent to the cloud for storage and analysis, and then shared with all motorists driving in and out of the city. Motorists fitted with artificial intelligence sensors will access the data from the cloud in real-time.

The Solution Being Tested & Sort:

- Artificial intelligence-powered parking solution is convenient in that it relays information on available parking space to all drivers who have signaled their intention to look for a parking space.
- The sensor also guides drivers looking for parking space to the spaces that have been identified by the sensors so that they are safe on costs, congestion, and pollution menace.
- The technology also alerts drivers on the potential obstacle they may encounter in their path as they drive to the free parking space. Some artificial intelligence-powered parking solutions can take data on the volume of traffic flow on the road or even the entire city. As a result, it alerts drivers on the parking spaces that have attracted huge demand and thus could cause traffic snarl-up in the roads leading to the same parking spaces.
- Drivers can use this vital information to identify the parking spaces that have not attracted huge demand and then book a parking space. This feature of parking data on the volume of traffic flow in the city and towards any parking spaces enables drivers to avoid congestion by following alternative routes to the parking spaces.

The Data That Are In Need To Be Collected For AI-Powered Parking Solution:

- While seeking to solve the challenge of allocation and management of parking space within a city or an urban area, big data will play a significant role.
- The data required to achieve this solution include the number of available parking spaces in the city, the definition and characterization of the parking spaces based on their segmentation, prevailing laws and regulations guiding the allocation of parking spaces.
- Data:
 - The number of vehicles in the city
 - the traffic flow pattern and seasonality of the city
 - and the design and planning of the city will also guide the implementation of this solution
- The perception and attitude of motorists towards this solution and their experience with the manual parking system will also provide an idea of how to effectively implement this parking solution in a city.

The Data That Are In Need To Be Collected For AI-Powered Parking Solution:

- With the analysis of the advantages and functionality of artificial intelligence-powered parking solutions, this report expresses confidence in this system and concludes that it is the perfect solution to the challenge of parking space in urban centers and cities.
- Therefore, this report recommends that local authorities rethink their design and development of parking spaces and factor in the option of implementing artificial intelligence-powered solutions to achieve sustainable parking solutions.
- With data gathered by sensors fitted in vehicles stored in the cloud, an artificial intelligence-powered parking solution will enable drivers to find a parking space that is close to them, fits the size of their vehicle, and meets all their needs whenever they want.

Reproducibility of Results of Artificial Intelligence-Powered Parking Solution:

- The implementation of artificial intelligence in cities and urban areas will lead to efficient management, allocation, and use of all parking spaces.
- It will also lead to improved utilization of all parking spaces that sometimes remain underutilized when drivers are left to identify these parking spaces manually.
- Artificial intelligence-powered parking solution also saves time for drivers since they will have an idea of the routes to follow, the paths to avoid, and all possible obstacles they may encounter on their way. Apart from increasing customer satisfaction among drivers, artificial intelligence-powered parking solutions save on the cost of operating parking spaces since they no longer allocate parking spaces manually to motorists.
- These results can be reproduced using error bars on graphs to perform statistical analysis so that a visual illustration of the outcome is displayed to stakeholders.

Conclusion:

Even though artificial intelligence-powered parking solutions are expensive for average drivers, the forecast shows that the automobile industry players have already expressed interest in embracing the technology fully. Besides, high-end vehicle manufacturers have already factored this technology into their last's luxury model cars. Today, vehicle brands manufactured by BMW, Volkswagen, Audi, Mercedes-Benz, Chevrolet, Ford, and Toyota have artificial intelligence sensors fitted in them. These sensors enable the vehicles to autonomously identify free parking spaces within their vicinity and then direct the driver to these areas. Therefore, the future of Artificial intelligence-powered parking solutions is bright and will continue to achieve positive feedback from industry players.

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Any Questions?

Thank You