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## AI based Smart Parking

Parking lots now- a- days have become very redundant and require a lot of manpower to handle and maintain efficiently. These parking lots are not user friendly and do not provide data regarding the availability of free spaces. Researchers' committee has contributed to this issue a lot and tried to come up with various methods to optimize the parking lots to serve the purpose. Not only that, but it also has one more dimension to it which is, with increasing vehicle size in the luxurious segment and confined parking spaces in urban cities.

Searching for a parking space has become a routine (and often frustrating) activity for many people in cities around the world. This search roughly burns about one million barrels of the world's oil every day. As the global population continues to urbanize, without a well-planned, convenience-driven retreat from the car these problems will worsen.

***Fun Fact: According to a report, An "Intelligent Parking Solution" could result in 2, 20,000 gallons of fuel-saving till 2030 and approx. 3, 00,000 gallons of fuels saved by 2050 globally, if implemented successfully.***

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## Related Work

One of the earliest solutions proposed was based on RFID and NFC. Quite a few modern solutions propose the use of IoT and sensor networks which in turn increases the hardware cost which is directly proportional to the number of cars in the Parking lot.

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## Potential Clients

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We focus mainly on parking space owners. We enable power to watch and monitor parking spaces and provide real time data as per requirements. Some of our valued clients are

- Smart Cities Projects
- Municipal parking
- Hotel parking
- Shopping mall parking
- Truck parking
- Hospital parking

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# Problem Identification & Challenges

As mentioned earlier with the increasing number of vehicles in urban areas raised the parking problem. To ensure efficient use of parking space we need human intervention, which is anyway a costly affair in places like UK, UAE, USA and other European countries. An alternative solution to that was the introduction to sensor networks, which increases the installation and maintenance cost, as hardware is subject to failure. Further, IoT based technology is introduced to address this problem. Though efficient but at the same time most expensive and requires uninterrupted Internet connectivity.

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# Proposed Solution

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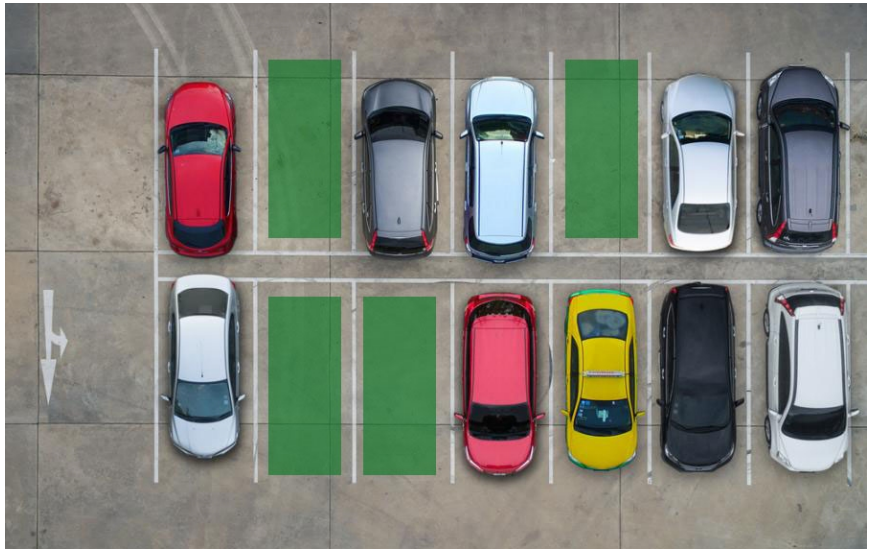
We propose a solution based on AI, Machine learning and image processing which is very cost-effective as it requires just cameras and an efficient software system.



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## Features of solution

- **Occupancy detection**

  Whether a particular parking place is occupied or not (in Real-Time)

- **Statistics on your fingertip**

  Customized stats as per your requirements on the go.

- **Automatic car license plates recognition**

  Automatic Car's license plate recognition using efficient OCR integration.

- **Book Parking by Mobile App**

  One can see the availability of parking space at public parking lots by using the mobile application further can book the parking with

the same (mobile app) and also make the payment, in case the parking is paid.

- **Online Payment integration**

  Payment gateway integration by PayPal, Debit and Credit Card.

- **API integration**

  Rest API enables easy system integration.

- **Almost No installation cost**

  Most of the components of the system are software, co one doesn’t need to.

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## Technology used, and Optimization

There will be 3 components of the solution. Technologies used for the development of backend, frontend, Website, Mobile app.

- **Website and Server Side Technologies**

  Microsoft Technologies, AI, Machine Learning, Image processing, Face Recognition, Online Payment Gateway, Cloud Platform, etc.

- **Android Mobile App**

  Android, Java, Web API, JSON etc.

- **iOS Mobile App**

  Swift, Web API, JSON etc.

- Parking availability monitoring based on high precision and detection of Parking space (Accuracy: - 99.7 %)
- Camera Refresh the data every second so parking search time reduction based on operator interest, user preference, and so on.
- Observed parking place by the camera so the user can book parking in advance by using the mobile app and website.
- Customize your Parking management solution based on requirements on the go.
- Implement the routine services easily such as reporting, integrated payment support (through mobile apps featuring pay-by-text, pay-by-voice, pay-by-phone, and other such functionalities)

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## Conclusion

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The AI-based Smart Parking consists of Video summarization, Digital Image processing, Cloud Computing, Mobile Application, Automated billing system with efficient and optimized use of parking space at its core. For authentication and security measures, we can use license plate no. for tracing the path of the vehicle and further feed the same to a machine-learning algorithm to provide the most optimized path tracking. Smart Parking not only prevents traffic congestion in parking lots but also give the liberty to the end-user to book the desired parking space in advance.

We can extend this solution not only for paid parking lots but also for various other entities such as smart cities, railway stations, airports, mall parking spaces and many more. This will make the management of the parking spaces efficient by eliminating manual labor.

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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
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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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