

## Review Paper on Smart Parking

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**Abstract:** An increasing in number of auto-mobiles throughout the World was seems to be development of Human lives in past 10-15 Years. And at that time we had more resources of liquid fuel on which we are dependent most likely, if we talk about transportation system. Talking about a scenario in any developed city in our Country or any of the World, we can imagine a rush of auto-mobiles on road, mismanaged parking of Vehicles in society or near any market. Smart Parking, if applied correctly, can resolve this situation and a well-managed parking can be achieved with Smart Technology. Not only that, if we implement Electric Charging Hubs for Vehicles in Parking System, then it will help in spreading the word "Electric Auto-mobiles", which if succeed can help the World curing for Environment.

### I. INTRODUCTION

Every city has a limited area for parking nearby any mall or market. Talking about World Trade Park (WTP), Jaipur parking system, it can tell us that how much vacant and allocated parking is present right now in parking area, but it also needs an improvement. Any driver who wants to park their vehicle ultimately have to search for vacant area first. And when there is a very big parking area then it is almost so much frustrating for the driver. This situation can be avoided by providing the driver his/her spot for nearby parking and that place will not be allocated to any other until he/she leaves the parking. Moreover, that vacant spot may integrated with cameras so that it will allow a specified vehicle to park there based upon the Vehicle Number. Using RFID sensors, Smart Cameras, IoT technology this can be obtained easily.

Integrating electric charging hubs will comfort electric vehicle owners and will motivate others to go for electric or hybrid vehicles for transportation.

### II. RELATED WORK

While applying smart parking system to any parking area, we have to do some tasks very efficiently. These can be,

**Collecting Occupancy Information using Flap Sensor:** in this the flap plate will be raised whenever a vehicle is parked in that particular spot.

**Parking Route Navigation:** When allocated a space for parking, the parking area should have a good navigation system so that the driver does not have to do much work to find its parking spot.

### III. METHODOLOGY

Smart Parking system can be obtained using many techniques. For example, smart parking can be done based upon,

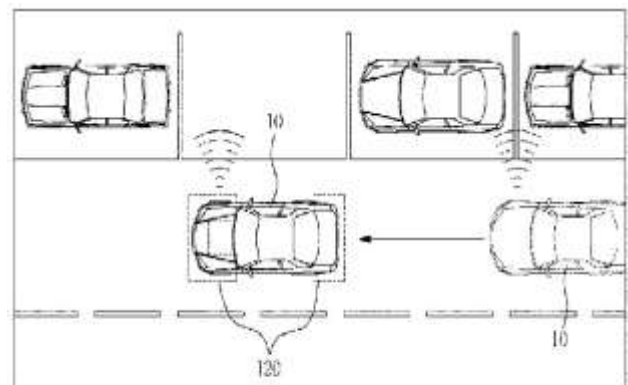
- Fuzzy Logic
- Wireless Sensor Network based System
- Vehicular to Infrastructure Communication (V2I)
- Global Positioning System (GPS)
- Computer Vision
- RFID Technology etc

Types of Traditional Parking System

**Random Parking:** Car select a parking slot, if it is taken then it will go for next parking slot randomly chosen.

**Billboard Advertising Parking:** It is also random but at first it will go for a zone where there are most chances to get a vacant slot, if the zone is full entirely then it will select the next randomly chosen spot

**Greedy Parking:** Popular zone is selected by 50% of cars as target, if the slot is full then it will go for second most popular zone and it can go till fifth most popular zone in case of failure. After fifth most zone it will go again for random parking.



**Fig. Vehicular to Infrastructure Communication (V2I)**

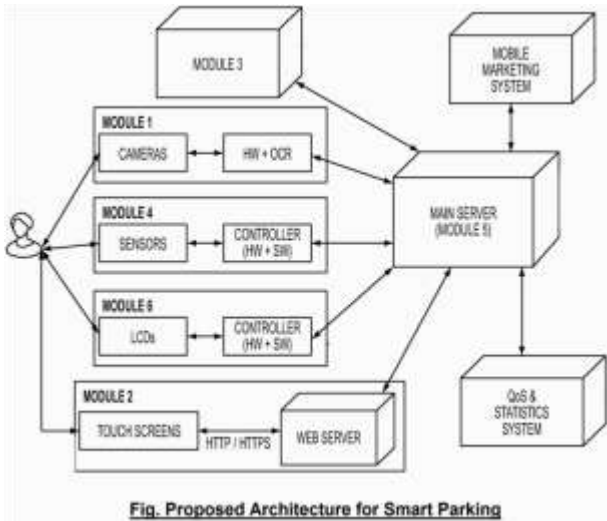


Fig. Proposed Architecture for Smart Parking

A table describing smart parking on different techniques is shown below,

Technique Based	Reliability	Communication method	Circuit Complexity	Detection Accuracy
RFID	High	Wi-Fi	Complex	Accurate
CCTV cams	High	Wi-Fi a, g	N/A	False detection may occur
Light sensor	High	Zig-bee	Complex	Accurate at day time Cannot be used at night
Acoustic sensor	High	RF	Complex	Seriously influenced by environmental noise
Optical sensor	High	Blue-tooth	Complex	Very accurate
Ultra-sound	High	Switch and LAN	Simple	Accurate
SMS	High	GPS	Simple	Accurate
Magnetic sensors	High	WIFI /RF	Simple	Accurate
Infrared	High	RF/Wi-Fi	Simple	Too sensitive Maximum accurate at day time

#### IV. CHALLENGES IN SMART PARKING SYSTEM

Numerous recent study have led to conclusion that new smart parking systems are needed in almost every metropolitan city in World especially in next ten years to alleviate many problems, such as petrol consumption and pollution emission, and to improve time-saving when looking for a parking. These are following basic factors and specifications for every Smart Parking System Model, these are,

- i. Be able to accurately sense vehicle occupancy in real-time.
- ii. Provide guidance to users about available parking.
- iii. Simplify the parking experience and value to parking stakeholders.
- iv. Be able to provide the user with all the necessary data about the status of any change in parking area that might happen in real-time.

#### V. CONCLUSION

The main purpose of this review is to find out the current research contributions by searching for valuable contributions, and so identify the issues that can help in developing a new smart parking system. These papers were then assessed for the quality of the evidence they produced and so were categorized. A major goal of this review was to gain greater clarity on the evolutionary patterns of smart parking, as well as its role. At least two research gaps have been identified, which was the primary focus of this research.

#### VI. REFERENCES

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- [2] Muftah Fraifer and Mikael Fernstrom, "Investigation of Smart Parking System and Their Technologies", Thirty Seventh International Conference on Information System, Dublin 2016.