Literature Review for Smart Parking System:

Definition: The system which facilitates users in parking their vehicles by assisting them in managing the parking area in order to reduce congestion. The system is currently used in multiple places which suffer from the problem of overcrowding. The system we are trying to develop will also be able to calculate the price to be paid by the owner after parking their vehicle for a certain period of time.

Almost all big towns and cities are experiencing parking troubles, not sufficient parking breathing space propose potential customers pollution side effects or anything else, the amount concerning parking improvement is incredibly excessive. Smart Parking can be a parking garage/system that will function several technological know-hows to help properly regulate that car port. That instant direction with parking lots just by adequate overseeing together with giving you product to the clients together with managers is usually offered by these awakening solutions. An inexpensive resolution for the following product will be provided by Wi-fi sensor communities which often comprises the plethora of sensor positioned in the market and with active parking lots without the need of investing in innovative, costly cables together which can handle fine-tuning along with the low-cost together with abundant detectors. E-parking utilizes sophisticated technological know-how to mix with reduced costs of parking booking together with charge solutions. Making use of this process, some taxi driver may well consult regarding the amount, arrange to get a parking breathing space for a offered spot, together with pay for as soon as departing.

Standard sensors are essential to help discover getting nearby vehicles. Nevertheless, the machine ought to be ready to discover clients and their vehicles producing booking together which enables the entry to arranged breathing space. That id approach in the parking lot may well use confirmation code access that site visitor gets with a mobile phone

Research Area and Methodology: The Area of the research is chosen to be the possibility of automation in the field of parking so as to reduce human intervention and develop a system which assists and adapts such that it manages the congestion better than the existing systems. Smart cities in future will have to be free from the trouble of chaotic parking which causes congestion and trouble not only for daily commutes but also for the tourists for this our team has proposed a smart parking system.

Research methodology used for this paper is search of keywords such as “smart parking”, ‘smart city parking’, ‘parking management’, ‘IoT in parking’, etc in other papers we found information over the research and idea proposed or implemented, we were also able to identify the advantages and disadvantages of the ideas.

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| **Sr.**  **No** | **Paper Name** | **Author Name** | **Year** | **Advantages** | **Disadvantages** |
| 1 | Smart parking reservation system using short message services (SMS). [9] | 1. Noor HazrinHanyMoham adHanif 2. Mohd Hafiz Badiozaman 3. Hanita Daud | 2009 | 1. Enhanced security due to password requirement. 2. System can be used and applied anywhere due to ease of usage. | 1. Cost of implementation is high. 2. GSM feature creates bottlenecks 3.The microcontroller will have to take a lot of load which can crash   the system. |
| 2 | ZigBee and GSM based secure vehicle parking management and reservation system. [11] | 1.Ashwin Sayeeraman  2.P.S.Ramesh | 2012 | 1. Parking lot vacancy module uses ZigBee along with PIC. 2. Security Feature: The exit password must be entered else the user is not allowed to get out of the parking bay as the barrier gate will not get open until correct exit password is entered. | 1. The GSM and SMS module   makes the system expensive.   1. The SMS contains entry/exit   password to the parking lot may not be received due to network congestion. |
| 3 | Smart Parking Service based on Wireless Sensor Networks. [12] | 1.Jihoon Yang 2.Jorge Portilla 3.Teresa Riesgo | 2012 | 1. Use of android application provides   ease of usage and better interface.   1. GPS helps in max coverage of available area, displaying various   options for parking. | 1. Reservation feature is not   available for the user.   1. Multilevel parking inside an infrastructure is   not available. |
| 4 | An Intelligent Parking Guidance and Information System by using image processing technique. [15] | 1.P.DharmaReddy  2.A. RajeshwarRao 3.Dr. Syed Musthak  Ahmed | 2013 | 1. By using image processing technique it identifies car only but if any object other than car   is at parking slot it doesn’t considered that slot is booked.   1. Shows real time information. | 1. High cost of implementation 2. User will have to inquire for   every slot available.   1. GSM system creates   bottlenecks. |
| 5 | Automated Parking System with Bluetooth access. [19] | 1.Harmeet Singh 2.Chetan Anand 3.Vinay Kumar 4.Ankit Sharma | 2014 | 1. The system uses the user mobile’s Bluetooth   for identification and registration.   1. The vehicle is transported to the   parking location with the help of a rack and pinion mechanism for linear motion.   1. It automatically detects the unique registration number   stored in the Bluetooth chip to check if the new vehicle is to be parked. | 1. Cannot be used in existing   parking system.   1. The whole parking lot is to be designed with   mechanical components such as rack and pinion mechanism. |
| 6 | Car Park Management with Networked Wireless Sensors and Active RFID. [20] | 1. ElMouatezbillah Karbab 2. DjamelDjenouri 3. SaharBoulkaboul 4.Antoine Bagula | 2015 | 1. The main advantage of the gate management model is its low cost and   simplicity over lot management model.   1. Gate management service: Another use of   RFID tags is gate management. As example, a gate can be opened automatically using an RFID reader and the vehicle’s tag at the gate. | 1. No driver guidance systems to guide towards the parking lot. |

Features of Smart Parking Systems:

Enables the driver to collect ticket upon entrance: Car Parking system should be able to allow the driver to get his ticket after he press the button of the gate barrier.

The system should allow the gate to open whenever a driver has pressed the button and take his ticket.

Allow the drivers to make payment: if it’s of commercial use, the system should enable the drivers to make payment of their charges before exiting.

Allow the driver to exit: if the driver has paid his charges and require exiting, the system should open the gate to allow him exiting.

Sensor solutions:

It was observed that the most used sensors are ultrasonic, whereas cameras and smartphones (accelerometer, gyroscope and magnetometer) are also used but not as much as ultrasonic sensors. This can be attributed to the fact that ultrasonic sensors can detect with greater precision the depth and thickness of surfaces in addition to working at high frequency, having high sensitivity and high power.