LITERATURE SURVEY

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Year of Pap-er	Title of Paper	Journal/ Conference Details	Methodology Used	Proposed Idea	Advantages/ Achieved Objectives In Paper	Disadvantages/ Limitations
2011	A Reservation Based Smart Parking System	Computer Science and Engineering: Theses, Dissertations and Student Research	RSP uses a Dynamic pricing scheme based on The real time parking Information given by the sensors	The Management system determines the dynamic parking prices based on real-time parking Information, and broadcast live Parking prices to users. Upon receiving dynamic parking prices, the user selects a desired parking lot and reserves a space in the parking lot.	1.Every parking lot has access to the Internet to communicate with the management system and users, and share parking information with other parking lots. 2.The sensor system deployed in parking lot is responsible for monitoring the real-time condition of parking lots and delivers the live aggregated sensing information to the management system. The sensing information is updated on demand. Based on the state of parking lots, the Management system analyzes their occupancy status and congestion level, determines the parking prices according to dynamic pricing scheme,broadcasts the prices to all users periodically, and stores the parking information and prices for further analysis	1.The system does not use a centralized system and hence there is no synchronization of the parking states.

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2015	Parking Management System using Mobile Application	21st LAAS International Science Conference: "Horizon 2020: Advances in Sciences and Technology"	Eclipse Based Mobile Application Using sensors	Sensors determines the presence/absence of car in The lot. Sensor Status is sent To database using Arduino Mega 2560 Microcontroller And W5100 Arduino Ethernet Shield. Mobile Application built Using Eclipse software interacts With the Database for Sending and receiving data From it in JSON Format. As client enters the mall Timer starts and depending on the Time spent Parking fee will Be withdrawn from clients account	1. This system successfully locate free space for the car 2. It locates the place of parked car 3.Manages the parking fees	1. This system can be used only when client id present in the mall. 2. It doesn't allow pre booking the empty parking slot.
2016	Research of Parking Management System Based on Centralized Control	6th International Conference on Mechatronics, Computer and Education Informization	PMS based on browser and server Structure and Centralized control	The system used automatic license plate recognition technology.If the vehicle has a membership then the system will recognise the plate number and let the vehicle in else a temporary card will be issued to the vehicle.When the vehicle exits membership vehicles have free parking and others should pay	1.The system is easy to maintain and update as it uses the browser and server instead of software which requires constant updating on the client side. 2.When system processes data, devices of workstation collect the data send it to the server and then returned to the workstation after being processed by the server.This improves the system's stability. 3.The system automatically recognises the license plate and	1.The idea proposed in this paper does not take care of available parking space in the lot. 2.The system does not allow pre booking the space.

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					checks for membership thus saving the time spent on payment.	
2017	Intelligent Parking System Based On Video Analytics	International Journal of Advanced Research in Computer Science and Software Engineering	Design a real Time optimized Parking Management System based on video analytics In multi-camera environment	In this paper, the video data obtained from Multiple cameras will be converted to picture frames and will be processed using feature Extractor and machine Learning algorithms. After processing the objects can be identified and the vacant parking space can be located In the parking lot	1.The system can recognise the vehicle and vacant parking space successfully. 2.The video analytics of real time data can also be used to get the vehicle details like number plate, type of vehicle also the entry and exit time of vehicles.	1.The system cannot detect parking space in the outdoor area or unstructured parking areas. 2.The system does not allow pre booking the vacant parking space.
2017	Parking Management System Using Image Processing And Distributed Approach	International Journal of Advanced Research in Computer and Communication Engineering	Real time data Extraction Using Image Processing And Distributed approach	The surveillance camera will enable the system to perform image processing on live video tracking of a specific parking system.The number of parking slots available Is calculated and these data is stored in the database at the central server.	The proposed framework gives An alternative way to traditional parking management System, to deal with identification Of opportunities of parking spots. This approach Comprises of distinguishing empty Parking spots by means of a Surveillance camera. The framework likewise gives drivers' information assistance. This module gives a continuous refresh of parking slots to drivers through cellphone application with a specific end goal to guide them and encourage the errand of finding an accessible parking slot.	1.The system does not allow the users to prebook the vacant space.

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2018	A Low-Cost Smart Parking Solution for Smart Cities Based on Open Software And Hardware	Information Sciences, Technologies And Architecture Research Center	IOT based Parking Management System	Android App will help users to see the availability of parking spot. Car park uses WSN (wireless sensor network) which monitors the parking lots. parking gateway will be used for communicating with the backend	1. It uses real time visualization of parking space as it uses sensors. 2. The system uses both software and hardware based components which will enhance the quality of system	1. Online payment is not available. 2. If the parking space is not available then the system does not redirect the user to another place.
2018	Development Of an Android Application For Smart Parking System	Department of Computer Engineering, Government Engineering College Gandhinagar, Gujarat, India	PMS based on Smart Reservation And Management System using Android Application	Latitude and Longitude of the slot is stored in the database. after booking the slot,user has to reach within 2 meters radius of that location. if he is unable to reach within the 30 min booking would be cancelled.	1. Pre Booking facility of the parking slots. 2. User can view the path from current location to parking location. 3. User can view his booking details and cancel the booking.	1. Online payment is not available. 2. If the parking space is not available then the system does not redirect the user to another place.

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2019	A Novel Parking Management For Smart Cities, to Save Fuel, Time and Money	The 9th Annual Computing and Communication Workshop and Conference (CCWC 2019) At Las Vegas, NV	Raspberry PI Device and Google cloud Vision API Based Parking Management System	Hardware and Software is Continuously Working. Distance sensors sense the incoming car.The 16 Raspberry Pi device in front lane take photos of car by camera and sent to google cloud vision api which Checks the License number of the car. Each caris given a Device which gives pager to driver and direction to location. Accordingly Nearest parkingSpot is allocated and data is Stored in Database and updated on display board	1. Cars are properly Parked as Instruction are given to car using pager 2. If any car is parked at wrong spot , car will be informed about the mistake. So problem of mistakes usually Made by drivers are solved . 3. If 2 empty spotsAre assigned to two Different cars. If one of the driver parksthe in place assigned to other.Then other driver will be automatically assigned new empty spot.	1. System does not allow pre booking the vacant place. 2. Online Transactions are not available
2019	Smart Car Parking Management System	United Internati-Onal University, Dhaka, Bangladesh	RFID based Smart Parking System	RFID card is scanned at entry booth. vehicle's image is captured through camera. server stores image and rfid, The barrier gate is open. then the vehicle enter parking space	1. Response Time between entry and exit booths have decreased. 2. As less response time, the traffic in the parking area has decreased but not beyond a certain extent. 3. It's a automated system which will open barrier automatically after scanning RFID.	1. As there is no pre booking option, it might happen that parking space is not available. 2. The cost to implement this idea is higher than web base solution as this idea requires many hardware components.

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2020	The Smart Parking Management System	International Journal of Computer Science and Information Technology (IJCSIT) Vol 12	IOT based system that sends data to free and busy parking places via mobile application/net	The system works in 3 Stages. 1. Arduino Sensors will detect no. of free slots, booked Slots. 2. WIFI Module is used for communication between sensors and mobile app. 3. Mobile app provide interface between clients and systems.	1. System detects parking space using IOT 2. Calculates the time of entry and exit 3. Allows payment by calculating the expected cost	1.System doesn't allow Pre Booking of empty parking places.

CONCLUSION

The research papers mentioned above show the successful implementation of Parking Management System in different domains.Various techniques like IOT, video analytics, machine learning, web applications are implemented.Many of the techniques lack the centralized approach and costly hence we have proposed to implement a web application which uses the browser-server architecture.The system needs to be user friendly and easy to understand for both users and developers and MERN stack proves to be the easiest one to implement.

Though the research papers discussed above are able to detect the parking space availability on its own they do not provide the facility to book the parking space if it is available.Since the space is detected by the system itself it is limited to structured parking areas only and the owner of the space has less control over it.In our proposed system the owner of the space can update the status of the space thus giving the flexibility to rent space only in time when he wants, it also allows any user to prebook the space if it is seen available.