IOT BASED SMART PARKING WITH FLOOD ALERT SYSTEM

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ABSTRACT

Our goal is to implement Vehicle parking monitoring and management. Vehicle parking observation and management has become an enormous challenge for academic establishments with increasing enrolment's, high share of automobile possession and decreasing parking offer that in result triggering blockage of automobile, congestion, wastage of your time and cash. In university campuses notably in Kingdom of Asian nation, vehicle parking monitoring and management problem is getting worse and more frustrating due to the fact that majority of students, faculty and worker's members own cars and drive through them to the university campuses. Here Real- time system able to monitor sudden floods in parking lots, addressing the concern of water damage to vehicles; creating a personal opt-in alert that could reach an end user through their mobile phone. Locating or forgetting their lot location another issue that's typically faced by the scholars, faculty and worker's members. The existing cameras located at the parking lots are only for video surveillance and cannot help in such situations as there is a lack of proper vehicle parking monitoring and management system. To cope with abovementioned problems and to ensure a better parking experience by accommodating increasing number of vehicles in a proper convenient manner, we propose a smart vehicle parking monitoring and management system.

Keywors: Nericell, RFID, Wireless Network Sensor, Arduino, VTrack, Traffic Sense, Mobile Millennium

I. INTRODUCTION

Vehicle parking monitoring and management is challenging problem due to the growing number of vehicles at university campuses and also for catching the responsible persons for damaging the vehicles (like scratches, dents, scraps etc.) of other people's inside a campus who remain anonymous and also result in confusion, annoyance and wastage of time. The problem is getting more severe day by day due to the fact that the number of student enrolments is increasing year by year and a huge percentage of students and faculty own cars with the limited number parking lots. Blocking the other parked vehicles in the parking lots by people while parking their cars improperly is an important issue in vehicle parking. Due to this, finding the responsible persons and remain stuck and frustrated for the blocked vehicle owners until they get the vehicle out of the parking lot. The security guards at the arking heaps square measure unable to assist during this regard thanks to the shortage of any observance and management social control systems and policies. Due to this, it takes much time in pursuing the responsible person which consequently results in the wastage of precious time of students as well as faculty and staff members. Another critical problem (that arises due to the reserved and limited number of vehicle parking lots) is that students (for whom no reserved parking is available) may damage other parked vehicles while improper and wrong vehicle parking. The system can be defined to have two main components, Wireless Network Sensor (WSN) and a central server. The sensor network will monitor flood levels in the area of interest and send the gathered data to the server.

II. OBJECTIVE

In these days parking heaps there aren't any customary system to visualize for parking areas. The system heavily depends on human interaction with the physical area and entity. This results in wastage of human hands and conjointly parking areas sometimes. These parking lots are dependent on Human-to-Human Interaction (HHI) which is not efficient. People owning vehicles face parking issues in most metropolitan space, particularly throughout peak hours. The difficulty roots from not knowing wherever the parking areas are offered at the given time, even if this is known. Many vehicles could pursue a tiny low variety of parking areas that successively results in serious traffic jam.

III. PROBLEM STATEMENT

Parking facilities and flood in INDIA has become a huge problem. There is lack of proper free spaces for parking due to increased unplanned housings in many places of the capital. There has been increase in the number of vehicles, but without sufficient parking spaces. Such growing number of small vehicles especially motorcycles and micro buses have created mess in the city including the increase in traffic jam. Another challenge due to the increased number of vehicles is undisciplined driving, which created obstacle for the traffic management system in India. To improve all these, there is a need to create enough parking spaces Use Scene invariance. Capturing scenes from the real-world includes heavier-processing separating correct channels and to separate foreground symbols from the background. Lighting conditions also play an important role in scene separation.

IV. EXISTING SYSTEM

Flood Detection with SMS Text Alerts There have been many successful solutions on flood alerts using MS, yet most count on either having a constant power source or relying completely on solar energy as their main source of power. One example similar to our sensor design is the system proposed by. In that paper a sensing unit is built using a GSM module and a PIC18F452 micro controller with 3 different liquid level sensor as input. The system defines a level threshold and sends one SMS text alert via GSM per once the threshold reached; once the levels start receding it will also alert the user on said event. The drawbacks of this style are that the sensing and alert system are concentrated into one unit. Also, the system is designed to be only be triggered by the levels and does not store historical data. Finally, the system is supplied constant power through a 15V power supply, having the necessity of being tethered to the power grid. In the literature the available vehicle parking monitoring and management systems are either sensor based or FID based and they mostly address the issue of finding a vacant parking location in the parking lot. These systems are only helpful in determining the occupancy status of parking space but are unable to figure out the solutions for the above-mentioned problems like the information about responsible persons who either block or damage other cars while parking their own. So, of the parking problem encountered at universities campuses are studied in. The parking management systems based on sensors have a problem as mostly sensors are unable to detect obstacles that are not visible because of their flatness to the ground level and thus they cannot distinguish pedestrians or objects from the vehicles of interest, in result have more false positives. Another challenge in Sensor and RFID based systems is that they are prone to many attacks like denial of service attacks (DOS), selective forwarding attack node replication attack, Sybil attack, wormhole attack, black hole attack and Signal or Radio Jamming attack etc. RFID based systems are also suspect to many attacks like. Many mobile sensing-based systems are proposed for traffic monitoring for example monitoring road and traffic conditions, detecting road bumps, honks, potholes etc., these systems include Nericell, VTrack, Traffic Sense, Mobile Millennium, TARIFA and Road Bump Monitor. Disaster flood alert system using GSM and ultrasonic frequency sensors is one of the important technologies which is useful to make the people alert from disaster flood, in this project ultrasonic transducers are used to find out the water level of the flood. And then information given to the controller and GSM, this system continuously sends the messages towards control room about the level of the flood when water level will change.

V. PROPOSED METHOD

To Solve difficulties in parking problems in our work we are proposing an android application which helps the vehicle owners to check availability of parking slots, booking slots before

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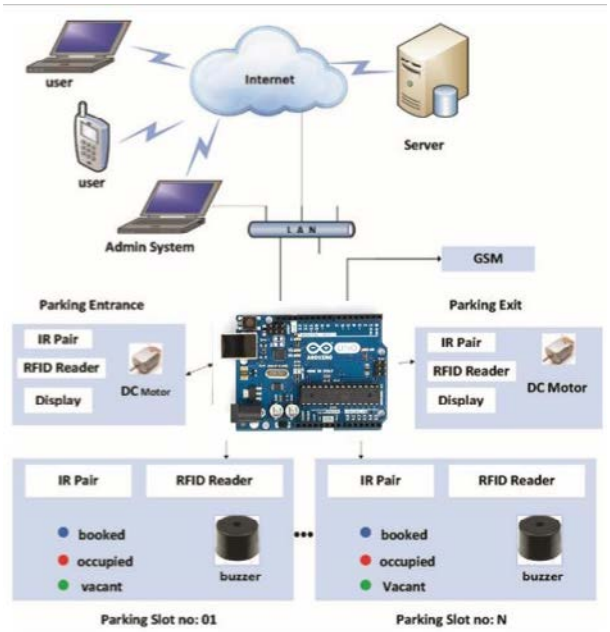
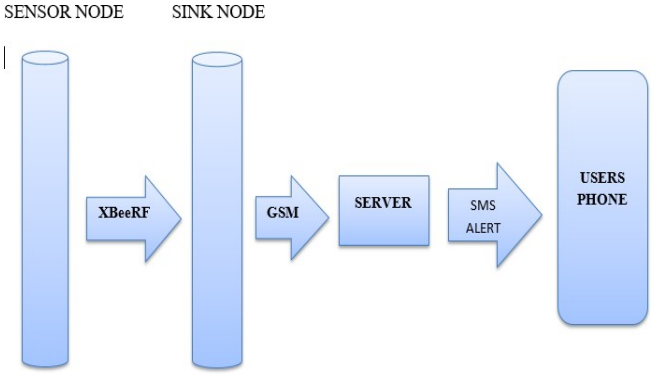
going to that parking area. By using this application user can make prior booking for parking slots which will reduces parking issues in cities. In addition, we planned to maintain the fuel history of vehicle to remember the users about vehicle management. For this we planned to use web server environment to update current status of parking area. In this system, parking area is established with sensor in each slot to detect whether slot is occupied or free. status of each slot will be keep on updating in to web server database. From user's mobile application web server database will be connected to get the status of the slots. At the time of booking slots its status will be changed to booked on web server. Parking area maintenance person have to look out this availability of slots to allow non app users to park the vehicle. The system also consists of flood alert unit, in this section we used one ultrasonic sensor to find the presence of water level if water level is exceeding the threshold value then two motor will start using relay by first motor is used to lift the entire parking area and second motor is used to through the water in water storage tank for future use.

A prototype is developed for making the car parking better, flexible and secured.



The proposed system consists of two main components: A Wireless Sensor Network (WSN) and a Server as presented on. The wireless sensor network will be used to constantly monitor the flood levels in the area of interest while the server will receive, analyse, store the data, and sends the alerts when level thresholds are reached. The sensor network defines two types of nodes: Sensor Nodes and the Sink node. Both node types will be powered and charged using a 10W Polycrystalline solar panel with a 1200mAh rechargeable battery pack. They also will be housed in a four-inch diameter, five feet tall PVC pipe. We discuss the individual details bellow.

Sensor Node: The sensor nodes, showed on are responsible of measuring flood levels and reporting it to a sink node. The main component for these sensor nodes is the Arduino UNO R3 micro controller unit (MCU). It collects and converts the analog data collected from a Milone eTape liquid level sensor. This sensor is a hydrostatic pressure level sensor; it changes its resistive output depending on the external pressure applied by the liquid. Having a solid state sensor allows us to have a smaller node footprint. When the MCU has the data converted, it sends the gathered data to a sink node using a 2.4GHz XBee Series 1 module (XB24-DMWIT-250). After transmission of the data, the node will go to sleep for a set amount of time. Having a solid state sensor allows us to have a smaller node footprint. When the MCU has the data converted, it sends the gathered data to a sink node using a 2.4GHz XBee Series 1 module (XB24-DMWIT-250). After transmission of the



data, the node will go to sleep for a set amount of time.

Basic System Design

The sink node will gather all data from the sensor nodes and send it to the server for processing via GSM. The main component in the sink node is the Arduino MEGA 2560. It uses the same XBee module (XB24-DMWIT-250) as the sensor nodes for communication with the WSN. Once it has aggregated the sensed data it sends said data via internet using a SIMCOM SIM900 GSM Module. Then sink node will also provide sleep coordination for the rest of the WSN. We can see this node's architecture.

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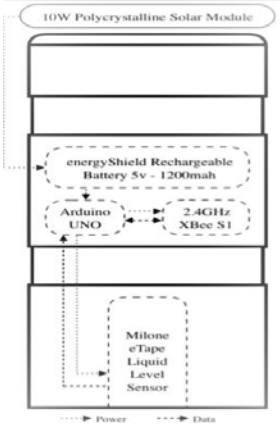
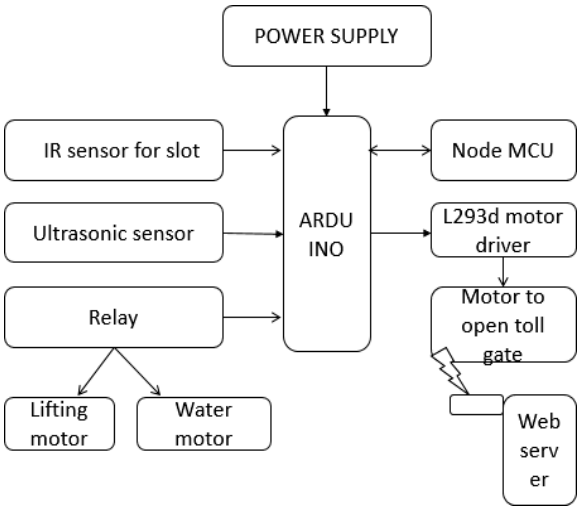


Sensor node architecture

Server action upon arrival of data

The systems server will be responsible for the processing of the acquired data sent by the sink nodes. Our design allows the server to manage multiple networks located in different locations. This server will keep and updated database with the registered users and the flood data. After it has processed all of the data it will send a text message notification to the registered users in the area when the flood level threshold has been reached. To have a clear understanding on the server's actions upon receiving the data from the network. In order to register for the service, the users will send a text message with the parking area to the email belonging to the lots network as can be seen on Figure 5. Registered users will be kept on the database for a total of 12 hours before being removed from the alert service. The server will send the text message alerts (SMS) to users via email; letting it be compatible with any phone with an SMS service, not just smartphones. The server will also make the flood data available online.

VI. BLOCK DIAGRAM



VII. CONCLUSION

The implementation of the sensor network for a real-time flood alert system for parking lots. With the use of Digi Mesh, we were able to implement a mesh network with a synchronized sleep cycle. The ability to sleep give sample time for the battery to recharge using the nodes solar panel. With this approach, we managed to get up to 52.4 hours of constant operation out of a 1200mAh battery. Better results could be obtained by building a more efficient voltage regulator for the Arduino since it is one of the main factors for the high current consumption while in sleep mode. Also a bare bones Arduino could be used, removing unnecessary LEDs and unused pins, this would allow us to lower the overall power consumption. Another way to improve on the system would be change to an event trigger instead of a cyclic approach, which would have the system in a shutdown state and turn it on in the case of rain or water being detected. As for the range of the nodes, the radio's antenna should be located on the outside of the housing in order to improve the line of sight and reduce dropped packets.

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