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WIRELESS SENSOR NETWORK BASED VEHICLE COMMUNICATION FOR AVOIDING THEFT

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ABSTRACT: Today, vehicles have been an essential part of our daily life. Unfortunately, we are also facing the high possibility of vehicle theft. Because of the high theft rate, vehicle tracking/alarming systems and camera based monitoring systems are become more and more popular. Generally, these systems can be classified into three types. Lock devices, alarm systems, and vehicle tracking/recovery systems. The commonly used lock device is the steering wheel lock. Although it is relatively cheap, it is inconvenient to use and may be easily disarmed by skilled thieves. This paper describes the design, implementation and evaluation of a Sensor-network-based Vehicle Anti-Theft System to address these limitations. In this system, the sensors in the vehicles that are parked within the same parking area first form a sensor network, then monitor and identify possible vehicle thefts by detecting unauthorized vehicle movement. When an unauthorized movement is detected, an alert will be reported to a base station in the parking area, technical issues specific to the system such as topology management, theft detection, and intra-vehicle networking. To address the limitations of existing vehicle tracking, alarming systems, we propose a Sensor-network-based Vehicle Anti-Theft System (SVATS which sends warning messages to the security office. Wireless sensor network consists of large number of small nodes. The nodes then sense environmental changes and report them to other nodes over flexible wireless network architecture. For example the car in parking system vehicle theft detected by using WSN, each car in car parking act as a node. Each car communicates with one another from the communication with other adjacent vehicle

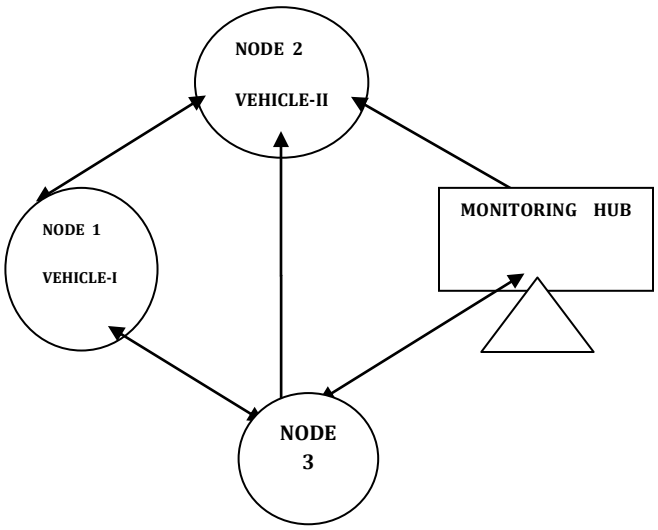
KEYWORDS: Automobile, GSM, GPS, Wireless Protocols, Sensor Nodes, Vehicles.

1. INTRODUCTION

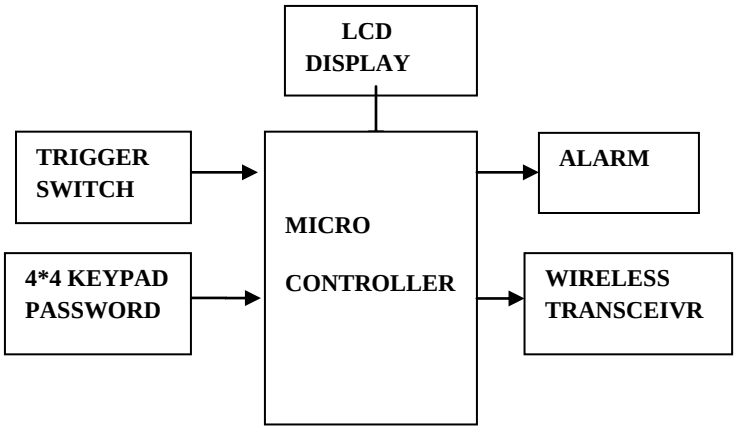
Today vehicle theft rate is very high, thus tracking/ alarming systems are being deployed with an increasingly popularity. These systems however bear some limitations such as high cost, high false-alarm rate, and easy to be disabled. This paper describes the design, implementation and evaluation of a Sensor-network-based Vehicle Anti-Theft System (SVATS) to address these limitations. In this system, the sensors in the vehicles that are parked within the same parking area first form a sensor network, then monitor and identify possible vehicle thefts by detecting unauthorized vehicle movement. When an unauthorized movement is detected, an alert will be reported to a base station in the parking area, which sends warning messages to the security office.

1.1. BLOCK DIAGRAM

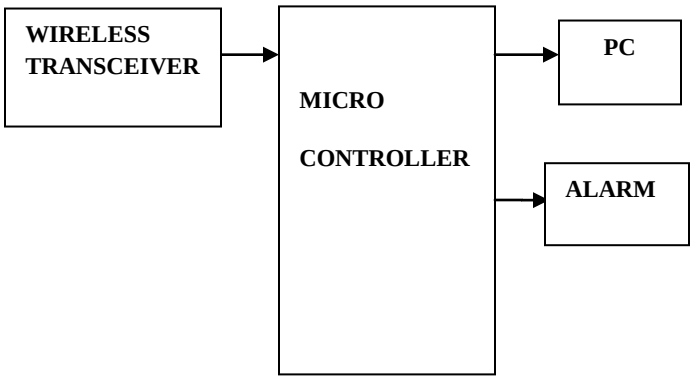
1.1.1. VEHICLE COMMUNICATION



1.1.2. SENSOR NODE:



1.1.3. BASE STATION:

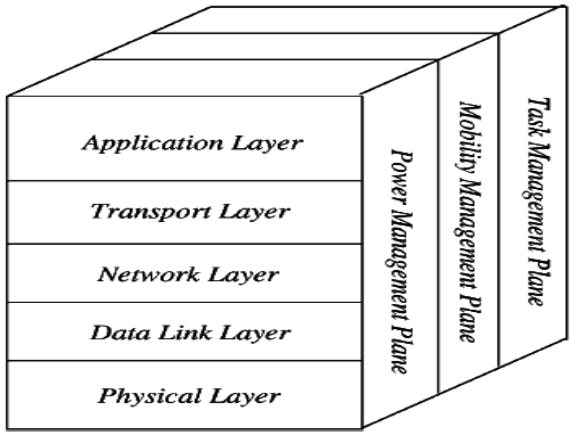


2. WIRELESS SENSOR NETWORK

Wireless sensor network (**WSN**) refers to a group of spatially dispersed and environment and organizing the collected data at a central location. WSNs measure environmental conditions like temperature, sound, pollution levels, humidity, wind, and so on. The WSN is built of "nodes" – from a few to several hundreds or even thousands, where each node is connected to one (or sometimes several) sensors. Each such sensor network node has typically several parts: a radio transceiver with an internal antenna or connection to an external antenna, a microcontroller, an electronic circuit for interfacing with the sensors and an energy source, usually a battery or an embedded form of energy harvesting. A sensor node might vary in size from that of a shoebox down to the size of a grain of dust, although functioning "motes" of genuine microscopic dimensions have yet to be created. The cost of sensor nodes is similarly variable, ranging from a few to hundreds of dollars, depending on the complexity of the individual sensor nodes. Size and cost constraints on sensor nodes result in corresponding constraints on resources such as energy, memory, computational speed.

2.1. WIRELESS SENSOR NETWORK ARCHIETECTURE

The most common WSN architecture follows the OSI architecture Model. The architecture of the WSN includes five layers and three cross layers. Mostly in sensor n/w we require five layers, namely application, transport, n/w, data link & physical layer. The three cross planes are namely power management, mobility management, and task management. These layers of the WSN are used to accomplish the n/w and make the sensors work together in order to raise the complete efficiency of the network.



3. RELATED WORK DONE

The PIC18f452 gets input from the sensor nodes. The IR sensor is fixed to the door inner frame. The user when he is driving or when he enters the vehicle can ignore the signal sent from the microcontroller. But when they are not near the vehicle for any case, they must always monitor the signals got. The IR sensor gives the data about the entry of the thief inside the vehicle in public places. The signal from the door frame will be interrupted. So the sensor will send a signal to the controller which will take into analysis. The next case is that the car may be broken by the thief. When an object is broken or beaten up it will produce a particular set of vibrations which will in turn activate the piezo electric sensors which are installed on the vehicle metal body. This is fixed here because it is the place where the vibrations are bound to take place. So the

micro controller receives the signal from the piezo electric sensor in case of above the threshold vibration in the vehicle frame, only in the absence of the user. The ADXL355 sensor is the axis detection sensor, which helps to check whether the vehicle is left at the same place it was parked by the user. In case of locked vehicles there is chance for the vehicles to be lifted directly into high end drives. This can be prevented if the ADXL355 sensor is used. It will exactly identify the axis in which it is being shifted and then it will send the same to the micro controller. So the vehicle position can be analyzed continuously with the help of the input signal from ADXL355. Now the PIC18F452 has to take up the input signal from all three sensor nodes. We are using three sensors here because of the uncertainty of data prevalence. So to avoid that we have to consider the signals and form the test cases here. If at least any two of the sensors give the signal of the thief then the micro controller must take the necessary action. The PIC controller will first activate the buzzer module attached to the output part. Next the door locker module attached to the door frame will be activated. This will ensure that the vehicle cannot be opened once the theft is detected. This leads to the trapping of the thief. He will not be able to escape as the door is locked and the buzzer will ensure that the public people nearby will be alerted that the particular vehicle has been thieved and bought to the place.

4. CONCLUSION AND FUTURE ENHANCEMENT

Thus the proposed system of thief identification and tracking in cases of vehicle theft has been implemented successfully. The product developed can be implemented in real life circumstances to get better results. The future enhancement for the work done is face recognition integration and automatic driving to the nearby police station with the help of the GPS navigation option available. This will ensure that the thief cannot get away. This can be implemented using Internet of Things also. The controller board can also be updated to recent controllers like raspberry pi, Arduino R3 etc., if appropriate features are needed. Thus a product whose efficiency has been tested is designed to serve society automobile world through the embedded and wireless communication technology.

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