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VEHICLE ACTIVITY OBSERVATION SYSTEM USING RASPBERRY-Pi

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Abstract :

Observing activities of working vehicles on a work site, such as a factory, is important in regard to managing the lifetime of vehicles and achieving high operational availability. However, it is a problem that an administrator cannot completely grasp the activities of a working vehicle. Existing systems cannot cover a large area, particularly in an indoor environment. A system is proposed for monitoring operating activities of working vehicles, regardless of whether they are operating indoors or outdoors. The system calculates the activity rate of a vehicle by analyzing the topology of a network configured by the wireless technology ZigBee. That network topology and RSSI can be used to estimate activities of working vehicles.

Keywords *: Raspberry-pi,zigbee,RFID,Camera..*

INTRODUCTION

Activities of working vehicles (forklifts, aerial work platforms, automatic guided vehicles, etc.) are essential in a work site, such as a factory. However, it is a problem that an administrator cannot easily monitor the operational activities of all working vehicles effectively. For example, 1,000 or more work vehicles often operate on a large-scale work site, such as construction of a new airport. An administrator is not able to answer questions such as how many working vehicles are actually in operation and how long they have been operating. Therefore, the activity of the working vehicles becomes inefficient. In addition, working vehicles equipped with automatic navigation often operate outside the field of view of the administrator. Consequently, the administrator might not notice if a working vehicle has stopped working. These problems can be solved by monitoring the activities of working vehicles on the basis of positional information. GPS is a typical way for achieving such positioning; however, it cannot be used in indoor environments because GPS signals are blocked by walls or ceilings. On the other hand, in recent years, a wireless technology called ZigBee[1] has been applied in the field of sensor networks. ZigBee can build a link between devices that are near each other regardless of whether their location is indoors or outdoors. It is also possible to use ZigBee to construct complex network topologies. In this study, aiming to improve work efficiency, a system for observing operating activities of working vehicles by utilizing ZigBee is proposed. The system estimates the relative positional relation of working vehicles on the basis of information concerning a

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ZigBee-configured network. The system then calculates the activity rate of each working vehicle from the time-series change of the positional relation.Finally, activities of all working vehicle are displayed on a tablet so the administrator can monitor them.

LITERATURE SURVEY

It is an "Activity-Observation System" utilizing location information. However, it cannot be used indoors because it utilizes GPS to measure positions of machinery units. Many Existing Systems using GPS have a similar problem. Other systems use RFID or Magnetic tape as a method of obtaining positional Information without using GPS. These Systems, However, cannot cover a wide area because numerous sensors need to be installed in the field. In addition, They cannot respond flexibly when the worksite changes. Other Methods Estimate Position by using radio Technology such as Wi-Fi and Bluetooth. However, Wi-Fi and Bluetooth require installation of access points for mutual communication. It is thus Difficult to cover a wide area in which more than 1,000 vehicles are operating. On the other hand, applying Zigbee wireless Technology for constructing Sensor networks is attracting attention. Zigbee can connect up to 60,000 units or even more devices. By constructing a mesh network, it also enables units to "multi-hop communications".In Existing System there is no Data Recording For Future Reference means at the gate level How many number of Vehicles Entered and their Details like Vehicle Number and Entering Time. Observing activities of working vehicles on a work site, such as a factory, is important in regard to managing the lifetime of vehicles and achieving high operational availability. However, it is a problem that an administrator cannot completely grasp the activities of a working vehicle. Existing systems cannot cover a large area, particularly in an indoor environment. A System is proposed for monitoring operating activities of working vehicles, regardless of whether they are operating indoors or outdoors. The System calculates the activity rate of a vehicle by analyzing the topology of a network configured by the wireless technology Zigbee. In addition, it was experimentally verified that network topology and RSSI can be used to estimate activities of working vehicles. In this System Disadvantages of Existing System are Overcome.

PROPOSED SYSTEM

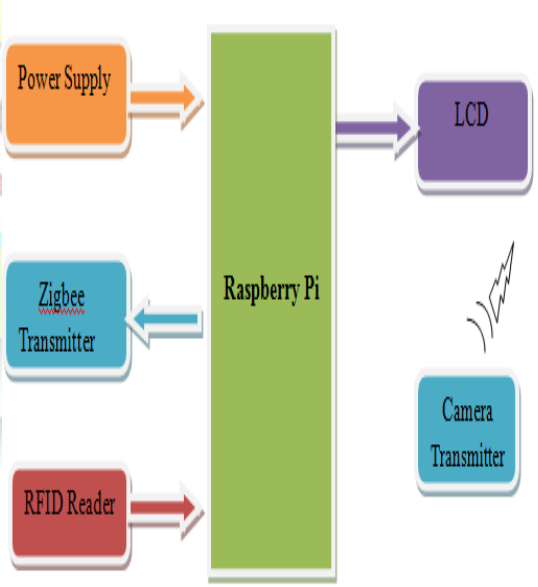

Fig:1:Block diagram Transmitter

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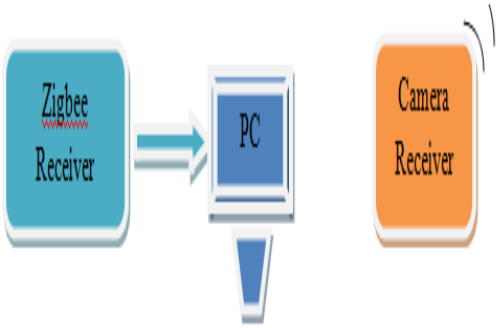

Fig:2:Block diagram Receiver

METHODOLOGY

Raspberry Pi:

The Raspberry Pi delivers 6 times the processing capacity of previous models. This second generation Raspberry Pi has an upgraded Broadcom BCM2836 processor, which is a powerful ARM Cortex-A7 based quad-core processor that runs at 900MHz. The board also features an increase in memory capacity to 1Gbyte.

Liquid-crystal display:

LCD it is a flat panel display, electronic visual display that uses the light modulation properties of liquid crystals. Liquid crystals do not emit light directly. LCDs are available to display arbitrary images or fixed images which can be displayed or hidden, such as preset words, digits, and 7-segment displays as in a digital clock.

USB Camera:

USB Camera is connected to the USB slot of the board, for live video streaming and if incorrect PIN is entered, it will capture the user's picture through the camera and sends it to the authorized person's mail using USB Wi-Fi r which connects the device 10 the router to access it over I F network, At the users end, we will have live videos and captured user's pictures on the display who entered the wrong pin.

Fig.3: Webcam

ZIGBEE:

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this case is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to 3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBee UART. The X-Bee RF Modules interface to a host device through a logic-level asynchronous Serial port. Through its serial port, the module can communicate with any logic and voltage Compatible UART; or through a level translator to any serial device. Data is presented to the X-Bee module through its DIN pin, and it must be in the asynchronous serial format, which consists of a start bit, 8 data bits, and a stop bit. Because the input data goes directly into the input of a UART within the X-Bee module, no bit inversions are necessary within the asynchronous serial data stream. All of the required timing and parity checking is automatically taken care of by the X-Bee's UART. [4] discussed about Intelligent Sensor Network for Vehicle Maintenance System. Modern automobiles are no longer mere mechanical devices; they are

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pervasively monitored through various sensor networks & using integrated circuits and microprocessor based design and control techniques while this transformation has driven major advancements in efficiency and safety. In the existing system the stress was given on the safety of the vehicle, modification in the physical structure of the vehicle but the proposed system introduces essential concept in the field of automobile industry. It is an interfacing of the advanced technologies like Embedded Systems and the Automobile world. This "Intelligent Sensor Network for Vehicle Maintenance System" is best suitable for vehicle security as well as for vehicle's maintenance. Further it also supports advanced feature of GSM module interfacing. Through this concept in case of any emergency or accident the system will automatically sense and records the different parameters like LPG gas level, Engine Temperature, present speed and etc. so that at the time of investigation this parameters may play important role to find out the possible reasons of the accident. Further, in case of accident & in case of stealing of vehicle GSM module will send SMS to the Police, insurance company as well as to the family members.

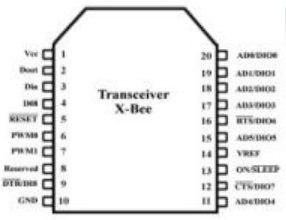

Fig4: ZIGBEE pin diagram

RFID:

Radio Frequency Identification (RFID) is a silicon chip-based transponder that communicates via radio waves. Radio Frequency Identification is a technology which uses tags as a component in an integrated supply chain solution set that will evolve over the next several years. RFID tags contain a chip which holds an electronic product code (EPC) number that points to additional data detailing the contents of the package. Readers identify the EPC numbers at a distance, without line-of-sight scanning or involving physical contact. Middleware can perform initial filtering on data from the readers. Applications are evolving to comply with shipping products to automatically processing transactions based on RFID technology RFID Reader Module, are also called as interrogators. They convert radio waves returned from the RFID tag into a form that can be passed on to Controllers, which can make use of it. RFID tags and readers have to be tuned to the same frequency in order to Communicate. RFID systems use many different frequencies, but the most common and widely used & supported by our Reader is 125 KHz.

Fig5: RFID Reader

Tags are classified into two types based on operating power supply fed to it.

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1. Active Tags
2. Passive Tags

Active Tags: These tags have integrated batteries for powering the chip. Active Tags are powered by batteries and either have to be recharged, have their batteries replaced or be disposed of when the batteries fail.

Passive Tags: Passive tags are the tags that do not have batteries and have indefinite life expectancies.

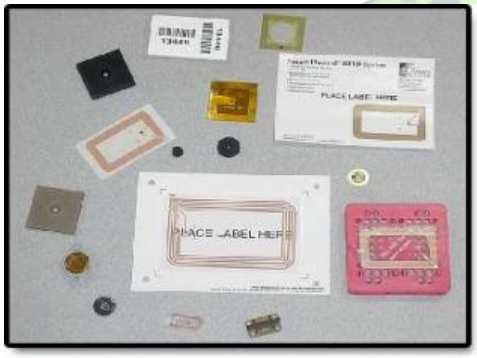

Fig6: Different types of tags

CONCLUSION

The project "ZIGBEE NETWORK SYSTEM FOR OBSERVING OPERATING ACTIVITIES OF WORK VEHICLES" has been successfully designed and tested.

Integrating features of all the hardware components used have developed it. Presence of every module has been reasoned out and placed carefully thus contributing to the best working of the unit. Secondly, using highly advanced IC's and with the help of growing technology the project has been successfully implemented. system is proposed for monitoring the operating activities of working vehicles, regardless of whether they are operating indoor or outdoor. The proposed system determines the relative positional relationship between the working vehicle from a change in the ZigBee topology and RSSI. The topology is estimated by a combination of response-time estimation and node search (a standard function of ZigBee). It was found that the response time between adjacent devices is 30 ms or less. Based on these experimental results, an algorithm for estimating the patterns of activities of working vehicles was proposed. This algorithm was used for in an experiment on collecting topology data from AGVs. The results of the experiment indicate that the operating activities of each AGV differ according to working hours.

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