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VEHICLE MONITORING AND CONTROLLING USING MULTI-SENSORS IN AD-HOC NETWORKS

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Abstract: The complete area coverage problem in wireless sensor networks is where every point inside an area is covered by an active sensor. Complete area coverage problem has been extensively studied. For this scheme an effective method to save energy and prolong the network lifetime is to partially cover the area. Existing algorithms on partial coverage has very high time complexities, due to the hardness in order to verify the ratio of the covered area over the entire monitored area. These algorithms do not use a variety of exiting methods for the coverage problem. In this research work a framework is proposed that can convert almost any existing algorithm for complete coverage with any coverage ratio. This framework can preserve the characteristics of the original algorithm and the conversion process has low time complexity. It also guarantees a good degree of regular partial coverage of the monitored area.

Index Terms **- Wireless Sensor Networks (WSN), Ad-hoc Networks, Coverage Problem, Filtering Techniques.**

I. Introduction

Researchers have spent lots of effort to design algorithms for covering some areas – complete area coverage problem or complete coverage problem. Most of the coverage related works concern prolonging network life time through different techniques. One of the techniques to prolong network lifetime which recently attracts researchers' attention is to reduce the coverage quality to trade for network lifetime.

In some applications, the required coverage quality may be different at different points of time. For example, forest fire applications might require complete coverage in dried seasons which only requires 80% of the area to be covered in rainy seasons. As another example, bird's habit study may allow 70% coverage at light time when the birds are active. Thus, to extend network lifetime, that can decrease the coverage quality if it is acceptable. Partial coverage problem occurs if it covers only a portion of an area.

The foremost requirement for the partial coverage problem is that the ratio of the covered area over the whole monitored area has to be larger than some predefined value. This value can be a user-specific parameter. Consequently, the partial coverage problem is also known as α-coverage problem whose objective is to cover only α-portion of the area. Moreover, it is always desirable to schedule the sensors such that the area is uniformly covered. It is clearly undesired if the network only covers some particular sub-regions of the area while uncovering the other large and continuous sub-regions.

To valuate coverage quality, a metric named sensing void distance (SVD) is used. Here, to solve the α-coverage problem by utilizing various existing algorithms for the complete coverage problem is used. This framework has two strategies: one supports network where sensors have fixed sensing ranges and the other one is for networks where sensors can adjust their sensing ranges. For any particular area α, the framework also guarantees a constant bound of SVD.

A wireless sensor network comprises of spatially scattered independent devices by means of sensors which continuously monitors environmental conditions, such as sound, vibration, temperature, pressure motion or pollutants at different locations. It consists of sensors in an ad-hoc manner. In order to sense some physical phenomenon sensor work with each other and then the information collected is processes to get appropriate results. A wireless sensor network consists of protocols and algorithms with self-organizing capabilities.

For LAN users wireless LAN systems provides access to real time information anywhere in their organization. This mobility supports productivity and service opportunities is not possible with wired networks. Installing a wireless LAN system can be fast and easy can eliminate the need to pull cable through walls and ceilings. Long-term benefits are greatest in dynamic environments requiring frequent moves and changes. Wireless LAN systems can setup in a variety of topologies in order to gather the needs of specific applications and installation.

II. LITERATURE SURVEY

In this paper, [1] a new vehicle re-identification algorithm is developed for two successive detector stations on a freeway, whereby vehicle measurement is made at the downstream detector station which is coordinated with the vehicle's corresponding measurement at the upstream station. The methodology is adopted by using effective vehicle length measured at dual-loop speed traps, but it is convenient to other detectors which is capable of extracting a vehicle signature such as video image screening.

In this paper [2] it is found that traffic analysis can be done by Background subtraction, by non-drifting mean shift using projective kalman filter using radar interferometry. Robust vehicle tracking is essential in traffic monitoring because it is the ground work to high level tasks such as traffic control and event detection. This technique has a good functionality for traffic analysis in real time.

In this paper [6] it is identified that vehicle detection is a key problem in computer vision, with applications in driver assistance and active safety. A challenging aspect of the problem is the common occlusion of the vehicles of the scene. In this paper a vision based system for vehicle localization and tracking for detecting partially visible vehicles. Consequently, vehicles are localized more reliably and tracked for longer periods of time. The proposed system detects vehicles using an active-learning based monocular vision approach based motion (optical flow) cues. A calibrated stereo rig is utilized to acquire a depth map and consequently the real world coordinates of each vehicle.

In this paper [3] it is found that the tracking system is used for tracking the vehicles in hill stations with quality of service (QOS). With the help of subscriber station (SS) tracking of vehicles is done. Subscriber station will provide signals to the mobiles and vehicles. The idea is to track the vehicles in the roads of hill stations which are coming in opposite direction and back of the vehicle. Simulation and analysis results in confirm that the proposed system can track the vehicles with the help of subscriber station by given quality of service.

III. PROPOSED WORK

As one of the most prominent applications of computer vision is the vision-based vehicle detection for driver assistance which has established significant attention more than the last 15 years. There are yet several reasons for the up-coming research in this field. Vehicle accidents is caused by amazing losses both in human lives and finance: second the availability of feasible technologies accumulated within the last 30 years of computer vision research: and for running computation-intensive video-processing algorithms exponential growth of processor speed paved the way even on a low-end PC in real time.

Monitoring of vehicle using multi-sensors is a digital measurement system for checking the temperature condition of engine. In addition to that it detects the object and also the distance of the object from the vehicle.

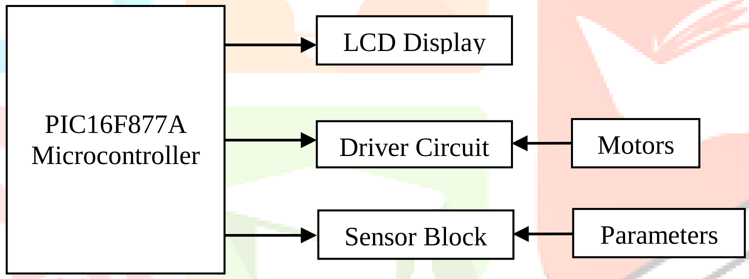

Figure 1: Block Diagram of the proposed work

This paper is designed using the PIC microcontroller which gets the physical parameter input through multi-sensors. In general, sensor measures and produces the analog signal as output. The analog output is given as input to the PIC microcontroller which has built in analog to digital converter. It converts analog into digital form. This digitized output signal is given to the liquid crystal display which is connected to one of the ports of PIC. The sensor block consists of flame sensor, gas sensor and ultrasonic sensor.

The driver circuit is used here through which the power supply for the motor is given. When the 12V DC motor is directly connected to the PIC microcontroller, the 5V supply is given to the PIC is entirely utilized by the motor. The motor run with low RPM (Rotation per Minute) and the driver circuit gets connected.

IV. RESULTS

This window shows the basic circuit diagram where PIC is connected with sensors, LCD display and driver circuit. The left side window shows the devices which are used. Figure 3 represents flame sensor output, figure 4 represent gas sensor output and figure 5 represent ultrasonic sensor output.

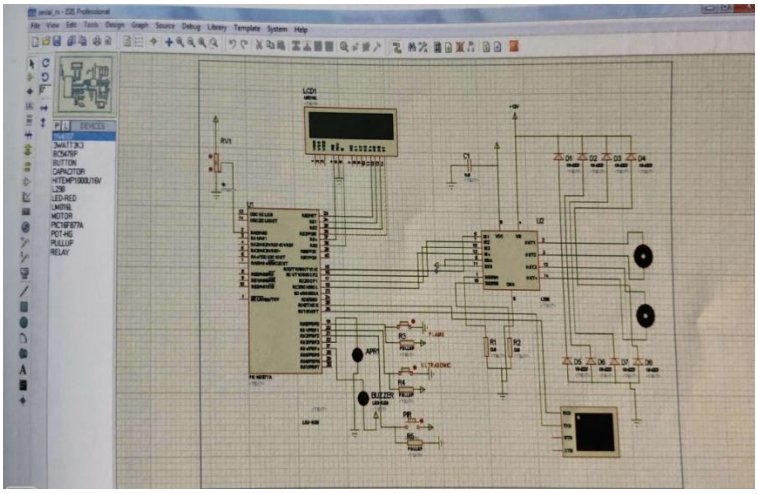

Figure 2: Schematic window

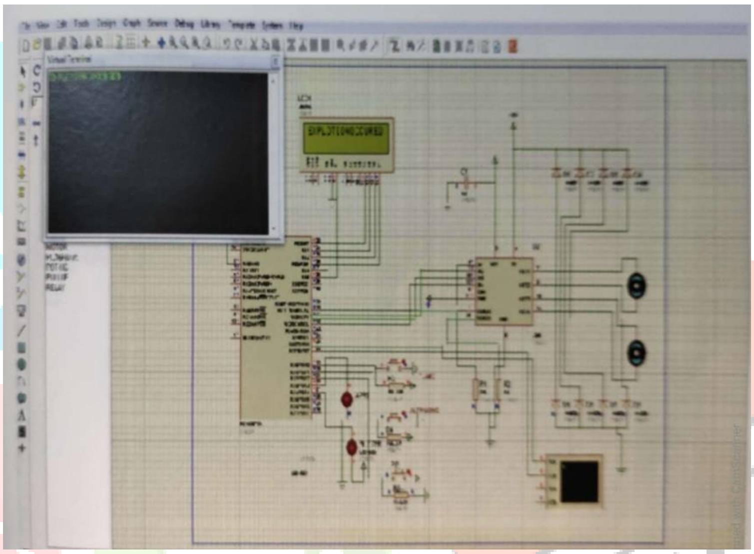

Figure 3: Output of Flame sensor

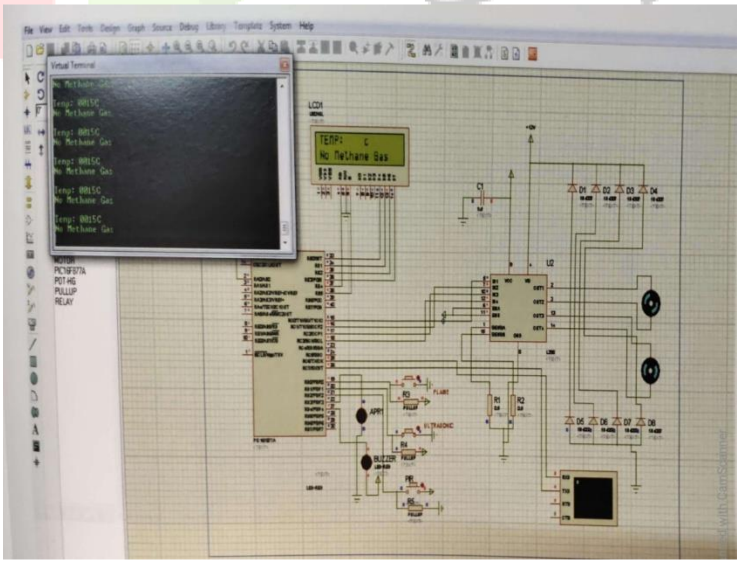

Figure 4: Output of Gas sensor

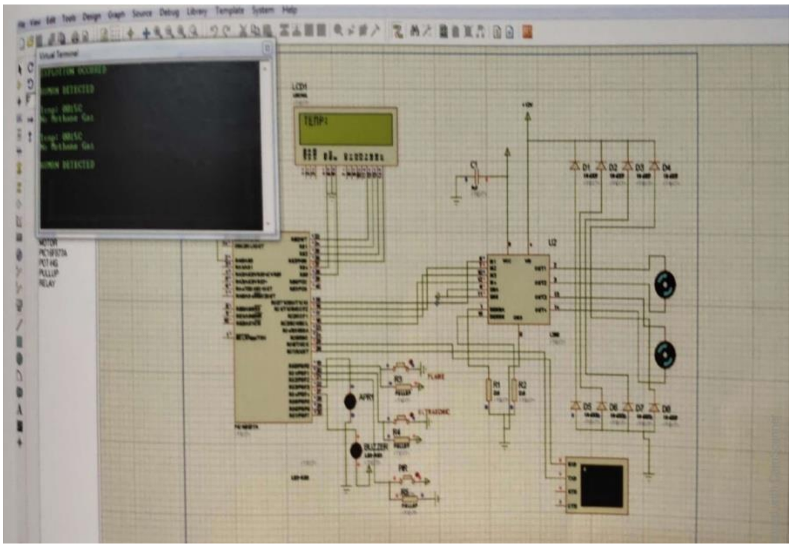

Figure 5: Output of Ultrasonic sensor

V. CONCLUSION

In this paper the software has been successfully designed and tested. Nowadays accidents are rapidly increasing; with this paper can have control on it. This setup can be made interactive by adding a display to show some basic information. The advantages of this work are: low cost, easy to implement, automated operation and low power consumption.

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