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# MOBILITY SENSOR NETWORK FOR COLLECTING ENVIRONMENTAL DATA

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**ABSTRACT:** ***In Vehicular Ad hoc NETwork (VANET) vehicles equipped with wireless communication devices communicate with each other to share information or achieve some collaborative goal. Mobile agents because of their adaptability and mobility can be well utilized in designing VANET applications. In this paper, the vehicles in VANET are shown to collect environmental data. Here vehicles equipped with sensors to measure environmental data are sent from a monitoring center to some particular monitoring area. Each vehicle has mobile agent platform that may host one mobile agent. The mobile agent spawned at the monitoring center migrates from one vehicle to the other to reach the monitoring area. It (the agent) collects necessary data, processes it and brings back the result. This helps to measure environmental parameters in different areas without deploying fixed infrastructure and mobile agents ensure better utilization of network bandwidth.The results indicate scalability of the application for larger networks. With more no. of vehicles, more area can be covered.***

***Keywords: Mobile Agent, Vehicular Ad hoc network, Environmental Data.***

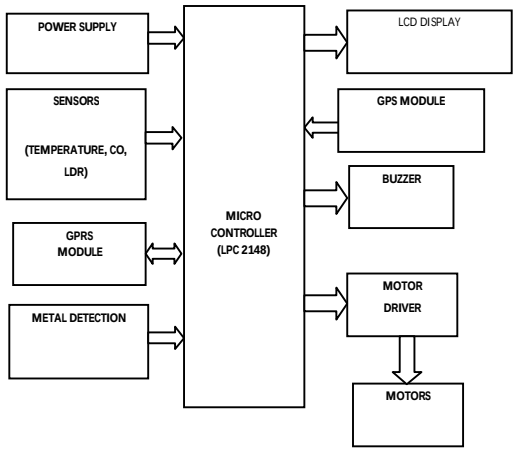
## I. INTRODUCTION

A vehicular ad hoc network (VANET) is a type of mobile network whose nodes are traveling cars/vehicles which communicate with one another using short-range wireless communications. These vehicles typically have mobile devices embedded in them in the form of on-board computers or GPS navigators to share different information among them. It can be about driver assistance and car safety or about fuel prices or information about road conditions. Thus interesting applications can be built based on cooperation among vehicles.

In this paper we use VANET for collecting environmental data. Measuring environmental data of a certain area can be done efficiently using sensor enabled vehicles without the need of fixed infrastructure of sensors. As sensors in vehicles are continuously moving, less number of them will be needed to cover a certain area. Disadvantage of fixed Wireless Sensor Network is that sensors deployed initially may not have total coverage of area for sensing. But in vehicular sensor network, moving cars with sensors provide flexibility in choice of area. Any area can be monitored if we deploy vehicles from a fixed monitoring center. Thus the coverage of area with fixed no. of sensors can be increased. In order to minimize network load during collection of environmental data, mobile agent technology can be used in VANET. Mobile agents are programs that can move from one node to another in a network and execute in the destination node. An agent consists of three components: the program which implements it, the execution state of the program and data. Mobile agents decide when and where to move. Mobile agents can be very useful in VANET because of their adaptability and mobility features. Mobile agents are created with information about specific target area, time period, and data to be collected. These agents are launched in the vehicles from a monitoring center. Agents migrate from one vehicle to another in order to reach the target area. After the time-period expires, mobile agents send results to the monitoring center. Benefit of using mobile agents is that they can move to different vehicles to collect only the relevant data. Thus data which are unnecessary will

be removed and it will reduce the network load. For example, if we want to know the average distribution of CO2 in a certain area, mobile agents may perform calculation every time after collection of data and return to monitoring center only with average value, thus removing the need to bring all the data to monitoring center.

## II. SYSTEM DESIGN MODEL




**Micro controller:** This section forms the control unit of the whole project. This section basically consists of a Microcontroller with its associated circuitry like Crystal with capacitors, Reset circuitry, Pull up resistors (if needed) and so on. The Microcontroller forms the heart of the project because it controls the devices being interfaced and communicates with the devices according to the program being written.

**ARM7TDMI:** ARM is the abbreviation of Advanced RISC Machines, it is the name of a class of processors, and is the name of a kind technology too. The RISC instruction set, and related decode mechanism are much simpler than those of Complex Instruction Set Computer (CISC) designs.

### A. Hardware Section

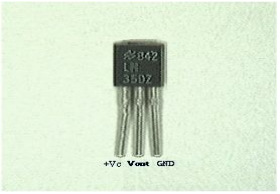
**CO SENSOR:** They are used in gas leakage detecting equipments in family and industry, are suitable for detecting of LPG, i-butane, propane, methane, alcohol, Hydrogen, smoke. The surface resistance of the sensor Rs is obtained through effected voltage signal output of the load resistance RL which series-wound. The relationship between them is described:

Rs\RL = (Vc-VRL) / VRL

Alterable situation of RL signal output measured by using circuit output signal when the sensor is shifted from clean air to carbon monoxide (CO) , output signal measurement is made within one or two complete heating period (2.5 minute from high voltage to low voltage ).

Co sensor

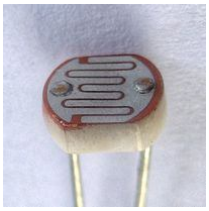
**TEMPERATURE SENSOR:** These sensors use a solid-state technique to determine the temperature. they use the fact as temperature increases, the voltage across a diode increases at a known rate. Technically, this is actually the voltage drop between the base and emitter - the Vbe - of a transistor. By precisely amplifying the voltage change, it is easy to generate an analog signal that is directly proportional to temperature. There have been some improvements on the technique but, essentially that is how temperature is measured. Because these sensors have no moving parts, they are precise, never wear out, don't need calibration, work under many environmental conditions, and are consistent between sensors and readings. Moreover they are very inexpensive and quite easy to use.



Temperature Sensor

**LDR:** A photoresistor or light-dependent resistor (LDR) or photocell is a light-controlled variable resistor. The resistance of a photoresistor decreases with increasing incident light intensity; in other

words, it exhibits photoconductivity. A photoresistor can be applied in light-sensitive detector circuits, and light- and dark-activated switching circuits. A photoresistor is made of a high resistance semiconductor. In the dark, a photoresistor can have a resistance as high as several megohms (MΩ), while in the light, a photoresistor can have a resistance as low as a few hundred ohms. If incident light on a photoresistor exceeds a certain frequency, photons absorbed by the semiconductor give bound electrons enough energy to jump into the conduction band. The resulting free electrons (and their hole partners) conduct electricity, thereby lowering resistance. The resistance range and sensitivity of a photoresistor can substantially differ among dissimilar devices. Moreover, unique photoresistors may react substantially differently to photons within certain wavelength bands.

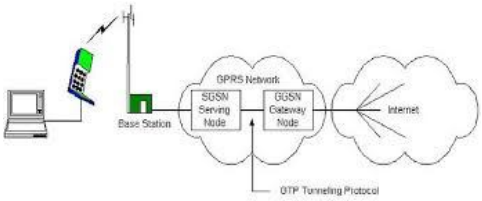


LDR

**GPRS:** GPRS is expected to profoundly change the mobile data services that GSM, CDMA and TDMA (ANSI-I36) network operators can offer. GPRS will increase opportunities for higher revenues and enable new, differentiated services and tariff dimensions to be offered (such as a charge for the number of kilobytes of data transferred). GPRS combines mobile access with Internet protocol (IP)-based services, using packet data transmission that makes highly efficient use of radio spectrum and enables high data speeds. It gives users increased bandwidth, making it possible and cost-effective to remain constantly connected, as well as to send and receive data as text, graphics and video.

The key drivers for operators to evolve to GPRS networks are to:

- increase revenues by moving into the mobile data market, especially since the voice market has had profit margins squeezed with the commoditization of voice services
- gain new subscribers who require mobile data services or do not want to invest in aPC to gain Internet access
- retain current subscribers by offering new services
- reduce costs due to the efficient use of network resources
- Ease of adapting applications for mobile users because high data speeds mean that middleware is no longer required to convert fixed applications for mobile use.




GPRS network

**GPS:** The Global Positioning System (GPS) is a satellite-based navigation system that sends and receives radio signals. A GPS receiver acquires these signals and provides you with information. Using GPS technology, you can determine location, velocity, and time, 24 hours a day, in any weather conditions anywhere in the world—for free.

**Control Segment**

The control segment is responsible for constantly monitoring satellite health, signal integrity, and orbital configuration from the ground control segment includes the following sections:

- Master control station
- Monitor stations
- Ground antennas

**Monitor Stations**

At least six unmanned monitor stations are located around the world. Each station constantly monitors and receives information from the GPS satellites and then sends the orbital and clock information to the master control station (MCS).

**Master Control Station (MCS)**

The MCS) is located near Colorado Springs in Colorado. The MCS constantly receives GPS satellite orbital and clock information from monitor stations. The controllers in the MCS make precise corrections to the data as necessary, and send the information (known as ephemeris data) to the GPS satellites using the ground antennas.

**Ground Antennas**

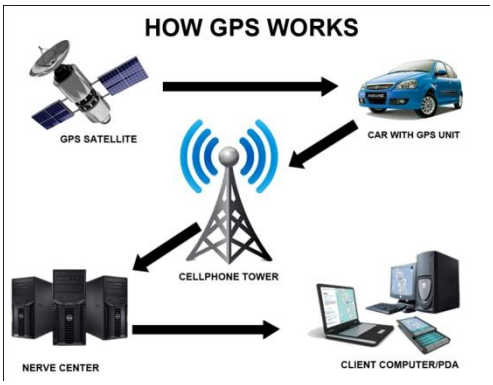
Ground antennas receive the corrected orbital and clock information from the MCS, and then send the corrected information to the appropriate satellites.

**User Segment**

The GPS user segment consists of your GPS receiver. Your receiver collects and processes signals from the GPS satellites that are in view and then uses that information to determine and display your location, speed, time, and so forth. Your GPS receiver does not transmit any information back to the satellites.

The following points provide a summary of the technology at work:

- The control segment constantly monitors the GPS constellation and uploads information to satellites to provide maximum user accuracy
- Your GPS receiver collects information from the GPS satellites that are in view.
- Your GPS receiver accounts for errors. For more information, refer to the Sources of Errors.
- Your GPS receiver determines your current location, velocity, and time.
- Your GPS receiver can calculate other information, such as bearing, track, trip distance, and distance to destination, sunrise and sunset time so forth.
- Your GPS receiver displays the applicable information on the screen.




GPS Working

**PROXIMITY SENSOR:** A proximity sensor is a sensor able to detect the presence of nearby objects without any physical contact. A proximity sensor often emits an electromagnetic field or a beam of (infrared, for instance), and looks for changes in the field or return signal. The object being sensed is often referred to as the proximity sensor's target. Different proximity sensor targets demand different sensors. For example, a capacitive or photoelectric sensor might be suitable for a plastic target; an inductive proximity sensor always requires a metal target.

The maximum distance that this sensor can detect is defined "nominal range". Some sensors have adjustments of the nominal range or means to report a graduated detection distance. Proximity sensors can have a high reliability and long functional life because of the absence of mechanical parts and lack of physical contact between sensor and the sensed object.

**B. Software Section**

This is an Operating System (OS) on which all the software applications required for our design are going to be run. This OS is flexible to any user to operate and easy to understood. Accessing the software and using them is very convenient to user. The µVision development platform is easy-to-use and it helps you quickly create embedded programs that work. The µVision IDE (Integrated Development Environment) from Keil combines design management, source code editing, program debugging, and complete simulation in one powerful environment, Code written in 'EMBEDDED C'. The µVision3 IDE is a Windows-based software development platform that combines a robust editor, design manager, and makes facility. µVision3

integrates all tools including the C compiler, macro assembler, linker/locator, and HEX file generator.

## III. CONCLUSION

Here in this paper we developed a system which is for accurate for monitoring environmental conditions. The scope of monitoring is very large area and is used for military, mining and industrial applications. Web page transmission which provides flexible to any where access.

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