

Smart Bin Implementation with Gas Sensor

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ABSTRACT

In city, ordinarily we see that the junk containers or dustbins set at open spots are flooding. It makes unhygienic conditions for individuals. Additionally, it makes offensiveness to that place. To address this issue, we have implemented a smart garbage management system with gas sensor using embedded system technologies. The main motive of this project is, if the pollution is over to the set point then gas sensor will detect and will send a SMS to the registered mobile number with the detected location by utilizing global system for mobile communication (GSM) technology and global positioning system (GPS). We also used ultrasonic sensor, when the garbage bin or dustbin filled, then the ultrasonic sensor will activate automatically and will send a message to the municipal officer.

Keywords: ARM7, gas sensor, GSM, GPS, ultrasonic sensor, Kiel and LCD

I. INTRODUCTION

Squander contamination increments at a disturbing rate everywhere throughout the world which is the real reason for air contamination [1]. In Bangladesh, it is mounted in a quick speed, particularly in the capital city Dhaka. One reason behind is that individuals are not utilizing the dustbin legitimately and occasionally the city partnership doesn't know enough to clean the city. Accordingly, various types of wellbeing sicknesses like unfavorably susceptible responses, pneumonia, asthma, and so forth assaults. It is likewise extremely troublesome for the general population to lead a sound life [2]. The Department of Environment in Bangladesh and the Norwegian Institute for Air Research measured the tidy fixation in Dhaka city for a time of 24 hours and they found that the outcome surpassed three circumstances as far as possible. Through this application, individuals would have the capacity to recognize adjacent dustbin areas with way on Open Street Map (OSM). This usefulness will restrict a client to toss squander in anyplace. Often, we have seen that the streets, channels and dustbins are not perfect in view of the carelessness of the power [3], [4], [5] and [6]. Thus,

we have prepended usefulness in the framework through which individuals can grumble to the city enterprise with appropriate proof and portrayal to make some fundamental strides. Along these lines, appropriate power would know and individuals would get help. This application additionally gives the important data about the adjacent police headquarters [7], [8] and [9]. Occasionally felonious question or dead body is found in the dustbin. In this sort of circumstance individuals need to educate the police as ahead of schedule as could be expected under the circumstances. Through this application, client can see the rundown of close-by police headquarters with subtle elements furthermore ready to make a call. Client can likewise submit gripe report namelessly on the off chance that he watches anything fishy and does not have any desire to uncover his character [10]. Many individuals are available in our public who needs to contribute himself for the advancement of the general public or needs to utilize their relaxation time by drawing in themselves in various social exercises. This application would have the capacity to incorporate them in a typical stage.

II. PROPOSED FRAME WORK

In city, ordinarily we see that the junk containers or dustbins set at open spots are flooding. It makes unhygienic conditions for individuals. Additionally, it makes offensiveness to that place. In the meantime, awful stench is additionally spread. We have watched that the civil officer or the legislature approved individual will screen the status of dustbin. For the most part we see that they have a consistent timetable of grabbing these refuse receptacles or dustbins. This timetable changes per the number of inhabitants in that place. It can be once in a day or twice in a day or at times once in two days. In any case, we see that if there is some celebration or some capacity, bunches of junk material is created by individuals in that specific territory. In such cases the refuse dustbin gets promptly full and after that it floods which makes numerous issues. To resolve this issue, we

have implemented a smart bin system using embedded system technologies.

The LPC2148 microcontrollers depend on a 16-bit/32-bit ARM7 TDMI-SCPU with ongoing copying and implanted follow bolster, that consolidate the microcontroller with inserted rapid blaze memory going from 32 kb to 512 kb. A128-bit wide memory interface and interesting quickening agent engineering empower 32-bit code execution at the most extreme clock rate.

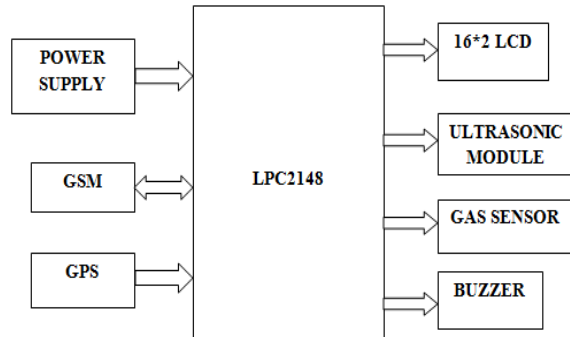


Fig.1 Block diagram of the proposed system

Serial correspondences interfaces extending from a USB 2.0 Full-speed gadget, various UARTs, SPI, SSP to I2C-transport and on-chip SRAM of 8 kb up to 40 kb, make these gadgets extremely appropriate for correspondence entryways and convention converters, soft modems, voice acknowledgment and low end imaging, giving both expansive cushion size and high handling power. Different 32-bit clocks, single or double 10-bit ADC(s), 10-bit DAC, PWM channels and 45 quick GPIO lines with up to nine edge or level delicate outer intrude on pins make these microcontrollers appropriate for modern control and restorative frameworks.

III. HARWARE DESCRIPTION

3.1. ULTRASONIC SENSOR

The sensor is primarily intended to be used in security systems for detection of moving objects, but can be effectively involved in intelligent children's toys, automatic door opening devices, and sports training and contact-less-speed measurement equipment.



Fig.2 Ultrasonic Sensor

3.2. GPS Technology

The Global Positioning System (GPS) is a satellite based route framework that sends and gets radio signs. A GPS collector gains these signs and furnishes the client with data. Utilizing GPS innovation, one can decide area, speed and time, 24 hours a day, in any climate conditions anyplace on the planet for nothing. GPS was formally known as the NAVSTAR (Navigation Satellite Timing and Ranging). Worldwide Positioning System was initially produced for military.



Fig.3 GPS Module

3.3. GSM Technology

GSM (Global System for Mobile communication) is an open, computerized cell innovation utilized for transmitting versatile voice and information administrations. GSM (Global System for Mobile correspondence) is an advanced cell phone framework that is generally utilized as a part of Europe and different parts of the world. GSM utilizes a variety of Time Division Multiple Access (TDMA) and is the most broadly utilized of the three advanced remote phone innovations (TDMA, GSM, and CDMA). GSM digitizes and packs information, then sends it down a channel with two different surges of client information, each time permitting space. It works at either the 900 MHz or 1,800 MHz recurrence band. It bolsters voice calls and information exchange rates of up-to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).



Fig. 4 GSM modem

Like a GSM cell phone, a GSM modem requires a SIM card from a remote transporter keeping in mind the end goal to work.

3.4. Gas Sensor

Electrochemical gas sensors are gas locators that measure the convergence of an objective gas by oxidizing or diminishing the objective gas at a cathode and measuring the subsequent current. The sensors contain a few cathodes, incidentally four, in contact with an electrolyte. The anodes are commonly manufactured by settling a high surface range valuable metal on to the permeable hydrophobic film. The working anode contacts both the electrolyte and the surrounding air to be checked for the most part by means of a permeable layer. The electrolyte most usually utilized is a mineral corrosive, however natural electrolytes are additionally utilized for a few sensors. The cathodes and lodging are ordinarily in a plastic lodging which contains a gas section gap for the gas and electrical contacts.

IV. EXPERIMENTAL RESULTS

Firmware implementation deals in programming the microcontroller so that it can control the operation of the IC's used in the implementation. In the present work, we have used the Orcad design software for PCB circuit design, the Keil $\mu v4$ software development tool to write and compile the source code, which has been written in the C language. The Flash magic programmer has been used to write this compile code into the microcontroller. Hardware set up has been implemented with the LPC 2148 ARM 7 board. The communication is properly done without any interference between different modules in the design. Design is done to meet all the specifications and requirements. In this system, we must connect gas sensor, ultrasonic sensor, GSM and GPS to the LPC2148. When the garbage bin or dustbin exceeds the pollution level or fully filled then gas sensor and ultrasonic sensor will be sensed and will return a value to the LPC2148 then after a message will be sent with the name of dustbin's location by utilizing GSM and GPS. Complete structure of hardware kit has been given in figure 6. Which consists of interfacing of all the modules, that have been used in our proposed system.



Fig. 6 Hardware kit model of proposed scheme

ADVANTAGES

- People can contribute themselves more swiftly order to keep their city clean.
- The application provides two types of reporting system- volunteer notification for help and report to authority.
- We have used OpenStreetMap to show the path and points of the dustbins.
- The application provides a list of nearby police stations and user can immediately make a call if needed.
- A user can notify other volunteer with a detail message. In the notification message, the volunteer can see his current position, the dustbin location and the user position.
- User can see the available volunteer in a city corporation on OpenStreetMap.
- User can submit reports to City Corporation if he noticed any wrongdoing in the management.

V. CONCLUSION

We do not want to discern our city wasteful anymore. The motivation of implementing this application is to make our city life superior. As the population increases day by day, it is becoming very difficult to manage everything swiftly. Our propounded application can act as an assistant to manage the complication. It would succour the city people to attain consolation from waste pollution and move freely on the roads and highways.

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