

“Dustless Environment” Using NEAGH Device

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Abstract: -- Dust can be more than just a nuisance – it can be killer. Dust is simply small particles in the air. Often these particles are too small to be seen but deals with the major problem that is irritation in the eyes, coughing, sneezing, hay fever, asthma attacks etc. This project used to automatically clean dust particles from the road of the city. The system will be fitted on any vehicle, where DC motor used to collect the dust particles from the road and store it in a container. When the container is filled, then the system will give an alert.

Index Terms: DC motor, LCD, Solar Panel, Buzzer, Microcontroller.

I. INTRODUCTION

The type and size of a dust particle determines how toxic the dust is. However, the possible harm the dust may cause to your health is mostly determined by the amount of dust present in the air and how long you have been exposed to it. Dust particles small enough to be inhaled may cause: irritation of the eyes.

Dust particles small enough to be inhaled may cause:

- Irritation of the eyes
- Coughing
- Sneezing
- Hay Fever

For people with respiratory conditions like asthma, chronic obstructive airways disease (COAD) or emphysema even small increases in dust concentration can make their symptoms worse. Currently there is no hard evidence that dust causes asthma, however breathing in high concentrations of dust over many years is thought to reduce lung function in the long term and contribute to disorders like chronic bronchitis and heart and lung disorders. Industrial emissions may occasionally result in excessive dust in nearby communities. These may be harmful to health if poorly controlled. Road dust consists of deposits of vehicle exhausts and industrial exhausts, particles from tire and brake wear, dust from paved roads or potholes, and dust from construction sites. Road dust is a significant source contributing to the generation and release of particulate matter into the atmosphere.

II. EXISTING SYSTEM

Big machines make little progress in sucking dust off roads. A giant vacuuming machine crawls through the dusty

Mathura Road, rolling its brushes from the sides and making a whirring noise as it goes. But the promise of sucking in all the dust remains unfulfilled. The twirling bristles just push the dirt to the kerbs. These are the few techniques to clean the road from brushes, these does not make road to clean instead more to spread dust in the road. It did not provide proper mechanism to clean the road.



Fig. 1

Delhi government is vacuum cleaning roads to control dust pollution and bring down the overall pollution level in the city. The cleaning process started on December 8 on Mayur Vihar’s Ghazipur road. The overall ambient air of the region is saturated with pollutants due to traffic, smoke from Ghazipur landfill, and construction of flyover, metro rail and housing complexes. The vacuum cleaner truck used was in compliance with the Central Motor Vehicles Act, retrofitted with a sweeping device and a suction machine. The attached brush instigates dust particles and the suction machines collect the dirt. The machine can remove 4 cubic meters of dust in eight hours. The collected dust is dumped to the Ghazipur landfill site.

III. LITERATURE SURVEY

Among the list of initiatives announced by the Delhi government to reduce air pollution, the same time it

announced odd-even scheme, was road vacuuming, started by the Public Works Department (PWD) on April 2. A study released by IIT Kanpur in November 2015 showed road dust contributed to both PM10 (particulate matter below 10 microns) and PM2.5 (particulate matter below 2.5 microns) pollution in Delhi. About 56% of PM10 levels in the city comprise road dust. For PM2.5 levels, the percentage stands at 38%. The PWD has six vacuuming machines that operate around Naraina, AIIMS, and Mathura Road. Six more will be procured in the coming months. With regards to the condition of our roads, IIT Kanpur found that 56% of particles below 10 microns was caused by road dust. ADEC (Abu Dhabi Educational Council) conducted surveys in 2010, 2011 and 2016 to understand:

- Over 50% of the vehicles in communities are ATVs.
- Many communities responded that ATVs raise the most dust.

IV. WORKING PRINCIPLE

The proposed system is worked on ARM Controller. DC motor is used to suck the dust particles from the road and collects in the container. The container have 3 different levels of mark in it which have IR sensors in every level. When the dust particles reaches high level, it sends a message alert that your container has been filled and the person can clean it. The LCD shows the level of container. Solar panel is used to collect the power required to run the device. The power is stored in the battery. Keil Microvision is the platform where we will write the code and compile the code for validation. Toggle is used to operate the system properly when to ON and OFF. This is the working of the 'Neagh' device. Microcontroller used here is ARM7-LPC2148. It has a 128-bit wide memory interface. It is a electrical machines that covertes direct current electrical energy into mechanical energy. An intelligent LCD displays two lines,20 characters per line, which is interfaced to the ARM7 board. IR sensors range varies from 1-2meters.Embedded C is the programming language used in our device. The tools for programming the ARM is the Keil µvision which is used in the project for writing the code. IDE is used to write program and compile it. Flash Magic tool is a open source software that allows us to port the hexadecimal codes in to the microcontroller.

V. REQUIREMENTS

A. Hardware Requirements

1. ARM Controller
2. IR sensors
3. Motor Drivers
4. DC Motor

5. Solar Panel
6. Battery
7. LCD

B. Software Requirements

1. Embedded C
2. Flash Magic
3. Keil µVision2 IDE

VI. ADVANTAGES OF PROPOSED SYSTEM

1. No need for separate equipments
2. Cost-effective
3. The proposed system can be implemented in any vehicles.
4. The system will reduce the human effort who sweeps the road in the city.
5. It reduces the dust around the roads.
6. Solar panel is given preference to reduce the use of electricity.

VII. DISADVANTAGES OF PROPOSED SYSTEM

1. Range of IR sensor is limited.
2. Use of DC motor is less effective.

VIII. BLOCK DIAGRAM OF THE PROPOSED SYSTEM

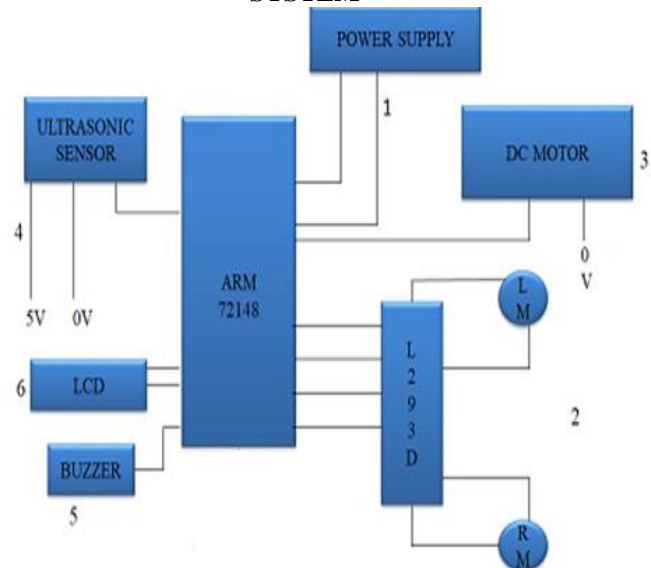


Fig.2: Block Diagram

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IX.FUTURE ENHANCEMENTS

1. Better mechanism to collect dust.
2. Enhancement of sensors.
3. Enhancing device with IoT.
4. Built better and smarter device.

X.CONCLUSION

Airborne contaminants can occur in the gaseous form (gases and vapours) or as aerosols, which include airborne dusts, sprays, mists, smokes and fumes. Airborne dusts are of particular concern because they are associated with classical widespread occupational lung diseases such as the pneumoconioses, as well as with systemic intoxications such as lead poisoning, especially at higher levels of exposure. There is also increasing interest in other dust-related diseases, such as cancer, asthma, allergic alveolitis and irritation, as well as a whole range of non-respiratory illnesses, which may occur at much lower exposure levels. This document has, therefore, been produced to aid dust control and the reduction of disease. This idea is to mainly focus on the health issues caused in children due to dust. It is possible to clean the city roads. Also with the health issues we focus on cleanliness of the environment. Cleanliness can be done by transportation means. An eco-friendly environment can be created with less cost. City can be kept clean with less human effort.

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