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RESEARCH ARTICLE

ODOR MEASUREMENT TECHNIQUES/METHODS USED IN KURKUMBH

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ABSTRACT

Odor pollution in the environment will be considered, together with its sources and smattering, the physical and chemical properties of odor, odor emission regulations in selected countries, odor control technologies as well as the state-of-the-art instrumentation and technology that are necessary to monitor odor, e.g., chemical sensors, olfactometry, gas chromatography, and electronic noses. With today's increasing levels of progress, residential areas are predictably built closer to odour generating facilities pharmaceuticals industries and chemical industrial plants. Odour measurements, which provide important information in the planning of the plants and odour treatment facilities, are needed to underpin the numerous decisions that will have to be made to reduce odour nuisance. An odour emission regularly consists of a multifarious mixture of many odorous composites. Analytical monitoring of individual chemical compounds present in such odour is usually not practical. As a result, odour sensory methods, in its place of instrumental methods, are normally used to measure such odour. Odour sensory methods are available to monitor odour both from source emissions and in the ambient air. These two different situations require different methodologies for measuring odour. Thus the sensitivity of the odour sensory method must be significantly greater for measuring ambient odour than for source odour emissions. For known compounds, the Odourstrong point can be steadfastly estimated by measuring the awareness of the chemical, while, for mixtures of unknown substances, sensory method is preferred. It consists of a sensor which is used to detect the presence of gases namely ammonia and hydrogen sulphide. As this is a daily activity, the sensors are also used to monitor them regularly for a better health. The main advantage of our model is that the sensor does a regular act in monitoring them from their daily activities. This paper describes the arduinouno based odor sensory measurement system used in kurkumbh industrial area.

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INTRODUCTION

Odor substances emitted from any source will be regarded important in the context of odor pollution if they are dispersed in the surrounding area. This means that odor particles are dispersed from the odor sources into the environment. Without any dispersion process odor production will not result in complaints by the people in the surrounding area. For that reason, many researchers have studied odor dispersion in the atmosphere, using not only a model but also direct measurements. Odor, which refers to unpleasant smells, is considered as an important environmental pollution issue. Attention to odor as an environmental nuisance has been growing as a result of increasing industrialization and the awareness of people's need for a clean environment. As a consequence, efforts to abate odor problems are necessary in order to maintain the quality of the environment. In this structure, understanding the odor problem and the origin and circulation of odors, reduction and detection methods are, therefore, very important phases of odor pollution in the environment. One of the challenges when dealing with the odor pollution problem is the technique for the finding of odor emissions. Detection is an important phase regarding capacity with the environmental techniques, since the detection results will be used as proof of the release of odorous substances to the environment. A successful and excellent detection technique will result in a sequence of accountably data. A reliable instrument, therefore, is necessary. There is a growing tendency in industry to develop a detection system that enables real-time measurements. In this way, a simple and quick online-monitoring system can be established and time-consuming methods avoided. Sampling and conventional analytical procedures are then no longer necessary, since the detection and measurement of the odorous compounds can be carried out quickly and the results presented on demand. Odour

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pollution has distinctly different characteristics and is undoubtedly the most complex of all the air pollution problems. The land-use in India is complicated, as residential areas develop close to industrial regions the impacts from odorous substances generated from industrial activities (e.g. pulp & paper, distillery, sugar, bulk drug, pharmaceuticals, petrochemical and pesticides) result in increasing public complaints. Besides industrial activities unpleasant odour is generated from open sewer, polluted rivers A number of researches on the development of odor detection systems are currently being carried out to improve the present systems. The development of new, appropriate systems that are based on devices rather than on the human sensory system are important for increasing the acceptance by stakeholders and avoiding subjectivity in odor measurements. In this paper two points will be covered and are devoted to describe the relationship between odor. Pollution and the detection instrumentation

MATERIALS AND METHODOLOGY

It consist two sensor sensed gases can be transmitted to a particular place for regular\ monitoring of them. This makes their work rather easier for them. The sensed gases can be transformed into signals so that a wireless communication can be established between the monitoring places where problem of odour. Hence a proper reading can be provided to them and their surroundings. Also their health conditions can be maintained in a better way which will increase their immune system. The main backbone of our proposed model is the odour sensor it consist two sensor i.e. ammonia (CH3) MQ136 and hydrogen sulfide (H2S) MQ135 sensor, display, 12 volt power supply etc. MQ136 gas sensor has high sensitity to Hydrogen sulfide, Low sensitivity for other combustible gas. It is with low cost and suitable for different application. It has good sympathy to H2S gas in extensive range, and has advantages such as long lifecycle, low cost and simple drive circuit &etc.

Methodology

Measuring odor can be accomplished in several ways: instrumental methods / chemical analysis, electronic methods and sensory test methods / olfactometry

1) Instrumental methods

Methods have depend on mainly on the solicitation of gas chromatography (GC), including gas chromatography-mass spectrometry (GC-MS), since this mature separation technology is capable of the efficient separation required for analysis of complex mixtures of odour. In gas chromatography a mixture of volatile substances is injected into a column, which separates the compounds based on their relative vapour pressures and polarities. The compounds are then detected as points, which have definite holding times and greatest areas, which can be used for qualitative and assessable strength of character, respectively.

2) Sensory methods (Olfactometry)

Accurate measurement of odorous compounds and their impact have been challenging because these compounds possess widely varying physical and chemical properties and are present at concentrations ranging from high parts-per-million (ppm) to low parts-per-billion (ppb). Moreover, each odorant has a distinctiveodour and odourrecognition threshold which means that complexes, even if present at the same concentration, may have markedly different odour impacts.

The sensory methods used for measuring odour level include:

a) Static dilution olfactometry
b) Dynamic dilution olfactometry
I) Free choice
II) Forced choice

a) Static Dilution Olfactometry

In Stationary dilution a sample of odorous gas is diluted in 100 ml glass squirt at various attenuation levels. The diluted samples are expelled into the nostrils of the panelists. The odour detection threshold is determined graphically from the dilution levels and panelist response data. A panel of eight panelists is preferred The American Society for Testing and Materials (ASTM D-1391) static dilution / syringe method was developed in 1978 and was withdrawn by the ASTM E-18 Committee on March 29, 1986, however, the procedure is still in use, principally in the USA.

b) Dynamic Dilution Olfactometry

A dynamic olfactometer provides a continuous and constant diluted odour stimulus by mixing controlled flows of sample and odourless air. With forceful methods, larger samples are used and dilutions are offered at more reproducible flow rates and for longer duration for panelists to evaluate. The presentation of odorous sample dilutions to panellists and their responses depend on three sensory effects: judgment criterion, expectation and revision. The judgment measure determines how the panelist is to reaction when asked whether or not an odour is sensed. This is the case particularly when a single stimulus is presented and a yes or no answer is requested as to the sensation of odour. The anticipation effect is a tendency to expect an odour to occur when odorless or weak samples are consecutively presented. The adaptation effect is a temporary loss of sensitivity after smelling an odour. When a weedyodour is noticedprimarily, the same odour may not be detected again after smelling a stronger odour unless the panelist has sufficient time to recover his or her olfactory sense.

III)Sensory Test Methods

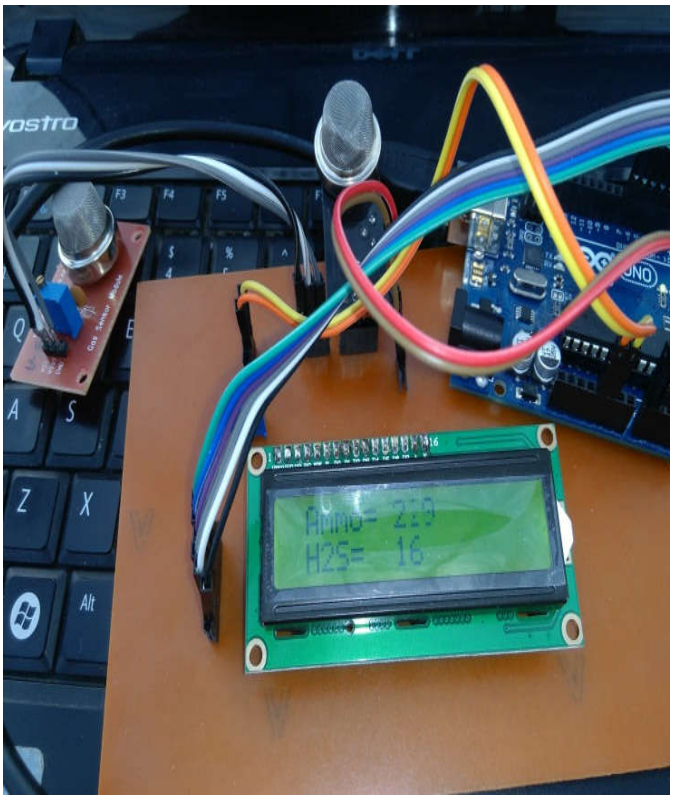
In my study Arduinouno based odor sensory measurement system is used for measurement of intensity of odor. In kurkumbh industrial area number of odour compounds is emitted from different industries i.e. ammonia, mercaptant, hydrogen sulfide, carbon dioxide, nitrogen etc. It was

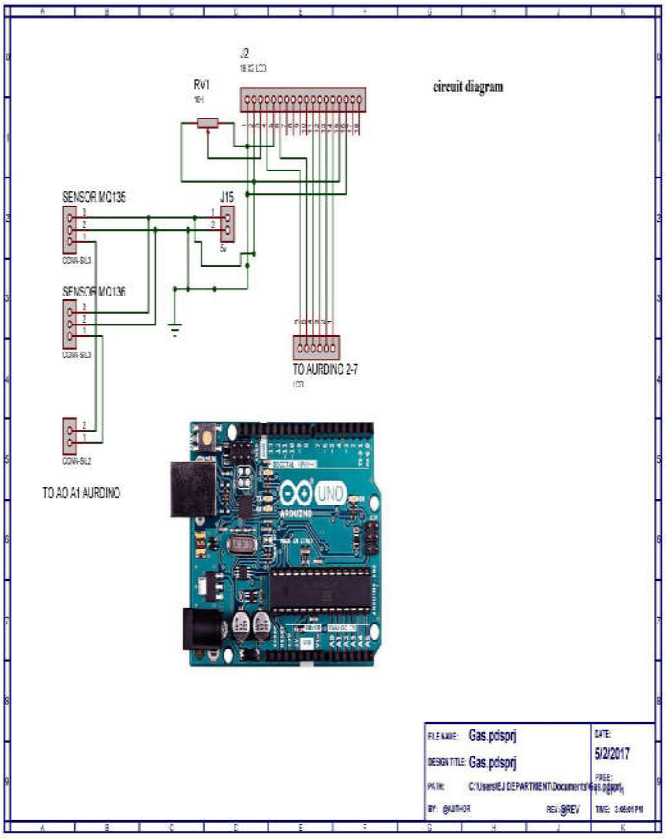
developed based on existing theoretical framework on evaluation of odor, covering the measurement of gases (H2S and NH3), olfactory perception and assessment of climate conditions at the time of measurement. The methodology was validated by evaluating odor at 9 different points (in areas near the pharmaceutical industries) in the kurkumbh near daund district pune chemical analysis were applied for detection of odors in this work, and the methodology applied was olfactory evaluation with the aid of a device for measuring gases Quantitative measurements of the gases H2S and NH3 were carried out using the equipment portable gas detector (measurement of H2S and NH3) which has a detection limit of H2S and NH3 ranging from 0 to 300 ppm. The temperature and relative humidity were determined from metrological data and the wind direction was determined by using pavanreka wind rose software. The quantitative determination of the gases was performed on a 5-minute period.in the sensory method use arduinouno based gas measurement system it consist two sensor (ammonia (CH3) MQ136 and hydrogen sulfide (H2S) MQ135 sensor), display (40x2) and power 5 volts. This method is best for monitoring and the measurement of different type of odor in the kurkumbh industrial area. As compare to all other method of measurement of odor in that area arduino based sensor method is most feasible.

a) Circuit diagram of Arduino Uno based sensor

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P. It consist 14 digital input/output pins out of 6 can be used as PWM outputs and 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

Circuit Diagram and Technical Specifications





Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 out of which 6 provide PWM output
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
LED_BUILTIN	13
Length	68.6 mm
Width	53.4 mm
Weight	25 g

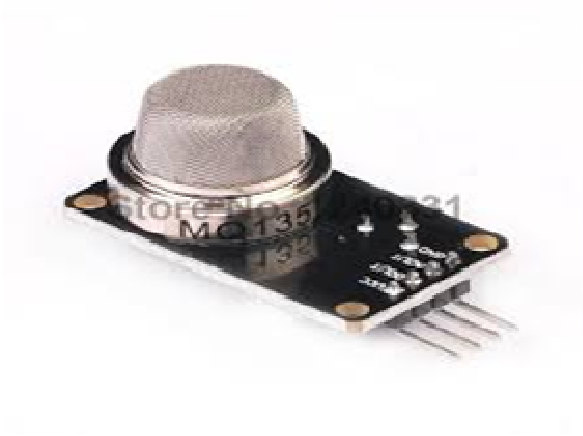
b) MQ136 Gas Sensor for Hydrogen Sulfide:

Sensitive material of MQ136 gas sensor is SnO2, which with lower conductivity in clean air. When H2Sgas exists, the sensor's conductivity gets higher along with the gas concentration rising. Users can convert the change of conductivity to correspond outputsignal of gas concentration through a simple circuit. MQ136 gas sensor has high sensitivity to H2S gas, also can measure carbon-based gas together with sulfur well. It a kind of low-cost sensor for kinds of applications. It has respectable sensitivity to H2S gas in wide range, and has advantages such as long lifecycle, low cost and simple drive circuit &etc. industrial H2S gas leakage alarm and portable H2S gas detector.

c) MQ135 Gas Sensor for Ammonia gas

Sensitive material of MQ135 gas sensor is SnO_2, which with lesser conductivity in fresh air. When the target combustible gas exist, The sensor's conductivity is more higher along with the gas concentration rising. Please use simple electro circuit,

Convert change of conductivity to correspond output signal of gas concentration. MQ135 gas sensor has high sensitity to Ammonia, Sulfide and Benzene steam, also sensitive to smoke and other harmful gases. It is with low cost and appropriate for different solicitation.



Conclusion

In this paper intensity of odour producing gasses i.e. hydrogen sulfide (H2S) and ammonia (NH3) gas are measured within kurkumbh industrial area of daund region district pune. Measurement of odor there are different method available out of these ardiunouno based odor sensor method is more suitable. Because it is low expensive and gives best outcome. We can use this method for measurement of odor intensity in industrial area easily.

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