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DEVICE TO CHECK FOR HARMFUL CHEMICALS IN FRUITS AND VEGETABLE

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1. Abstract

Fruits and vegetables are highly nutritious and form as key food commodity in the human consumption. Fruits and vegetables are highly perishable due to their low shelf life. This food commodities are reported to be contaminated with toxic and health hazards chemicals. Chemicals like calcium carbide and oxytocin are used in fruits and vegetables crops for artificial ripening of fruits and for increasing the size of fruits and vegetables. Calcium carbide is a carcinogenic agent and banned under PFA rules, calcium carbide is a pesticide and so it is not recommended as a ripening enhancer. Oxytocin is a mammalian hormone, used as a drug in veterinary services which is not advised for use in fresh fruits and vegetables. To detect that, gas sensor is placed and estimate the chemical levels present in fruits and vegetables. For this DHT11 and the gas sensor are used, if any abnormality is detected immediate alert is sent through GSM to the owner in the form of message.

2.Introduction: Most of the fruits and vegetables that we eat are loaded with chemicals and pesticides. Fruits and vegetables are primarily used by the farmers during the cultivation to save the fruits and vegetables from pests and harmful insects. However, the residue pesticides and chemicals stay on the surface of the fruits and vegetables. Rinsing with water doesn't remove "Harmful chemicals of pesticides on fruits and vegetables". Pesticides play a major role in the

production of fruits and vegetables. Mainly pesticides are used to flourish the growth of fruits, but there is a level of safe consumption of pesticides. There are many methods by which the pesticides could be detected. A hardware and software simulation using IoT and Embedded has been done in this project to improve the efficiency and accuracy. An IoT (Internet of Things) system mainly consist of sensor devices that have to be connected to the cloud with the help of an internet connectivity.

3. Proposed system:

In this system, we have arduino UNO microcontroller which acts as brain of our system, hence, the entire system program is stored in it. By using gas sensor and DHT11 sensor it senses the level or percentage of chemicals or pesticides present in the fruits and vegetables. It sends the message to mobile through GSM and display the level or percentage of chemicals present in fruits and vegetables on LCD display.

4. Block diagram:

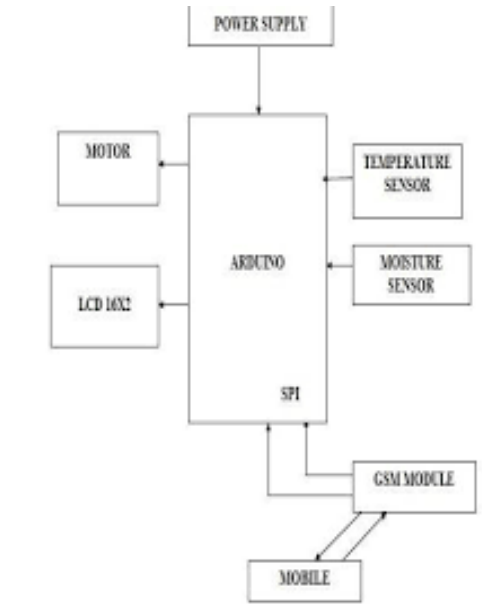

Fig 4.1 : Schematic.

5. BLOCK DIAGRAM DESCRIPTION:

5.1 Arduino Micro-controller: Arduino Uno is an open-source microcontroller board based on

theMicrochipATmega328P microcontroller and developed by Arduino.cc. The board is furnished with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits.The board has 14 digital I/O pins (six is of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB port.It can be powered by the USB cable or by external 9-volts battery, though it accepts voltages between 7 and 20 volts.

5.2 Humidity Sensor: A humidity sensor is an electronic device that measures the humidity in its environment and converts thereadings into a corresponding electrical signal.Relative humidity is calculated by comparing the live humidity reading at a given temperature to the maximum amount of humidity for air at the same temperature. Humidity sensors vary widely in size and functionality; some humidity sensors can be found in handheld devices (such as smartphones), while others are integrated into larger embedded systems (such as air quality monitoring systems). Humidity sensors are commonly used in the meteorology, medical, automobile, HVAC and manufacturing industries.

5.3 Temperature Sensor: A temperature sensor is an electronic device that measures the temperature of its environment and converts the input data into electronic data to record, monitor, or signal temperature changes. There are many kinds of different types of temperature sensors. Some temperature sensors require direct contact with the physical object that is being monitored (contact temperature sensors), while others indirectly measure the temperature of an object (non-contact temperature sensors).

5.4 Gas Sensor: Gas sensors (also known as gas detectors) are electronic devices that detect and identify different types of gasses. They are commonly used to detect toxic or explosive gases and measure gas concentration. This type of sensor employs a chemiresistor which comes in contact and reacts with target gasses. Gas sensors are employed in factories and manufacturing facilities to identify gas leaks, and to detect smoke and carbon monoxide in homes. Gas sensors vary widely in size (portable and fixed), range, and sensing ability. They are often part of a larger embedded system, such as hazmat and security systems, and they are normally connected to an audible alarm or interface. Because gas sensors are constantly interacting with air and other gasses, they have to be calibrated more often than many other types of sensors.

5.5 LCD: This is the first interfacing example for the parallel port. We will star with something simple. This example does not use the Bi-directional feature found on newer ports, thus it should work with most, if no all Parallel Ports. It however does not show the use of the status port as an input. So what are we interfacing? A 16 Character X 2 Line LCD Module to the Parallel Port. These LCD Modules are very common these days, and are quite simple to work with, as all the logic required running them is on board.

5.6 GSM: A GSM modem or GSM module is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks. They use SIMs to identify their device to the network.GSM (**Global System for Mobile communication**) is a digital mobile network which is widely used by mobile phone users in Europe and other parts of the world.

6. Experimental Results:

Fig 6.1 : Message from GSM to phone when we check with fruits.

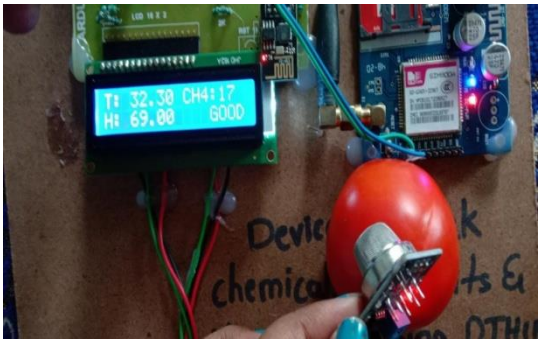

Fig 6.2: Chemicals composition when we check with tomato.

7. Conclusion:

Most of the food we consume consists of harmful chemicals. So, before consuming them please get test whether they are chemical free or not and then eat them. After testing then we can eat them and becomehealthy. After connecting all the components we place a fruit or a vegetable near the gas sensor it senses whether the presence of chemicals is present in it or not. If chemical is present in it then it display the levels of methane, humidity and temperature on the LCD display as well as it send sends message through the GSM to mobile phone that "YOUR FRUITS/VEGETABLES ARE UNDER PROBLEM PLEASE CHECK". And it gives the buzzer as well.

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