IOT BASED MILK MONITORING SYSTEM FOR DETECTION OF MILK QUALITY USING SENSOR

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Abstract: The project presents a modern device for quality inspection of milk based on smart sensor technology. As milk is the major food for all the infants, it has to be monitored for the safety of the child. The main objective of the project is to bring out the product which determines the quality and the safety of milk for consumption. This project determines many parameters of milk by using smart sensor technology. Here, we consider parameters like temperature and pH to determine the quality of the milk. The Temperature sensor is used to determine the hotness or coldness of milk. The pH sensor is used to determine the pH of the milk. The nitrogen sensor is used to determine the protein content in the milk. The protein content can be used to determine the melamine is present in the milk or not. All these sensors are thus inbuilt inside the case and the output is thus shown with the help of monitoring displays (LED) externally.

Key Words: PH Sensor, GSM Module, Internet of Things, Milk

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1. INTRODUCTION:

In recent years, there are three major problems namely food safety, human safety and water safety. Our project is choose to the food safety. Now a day, the need of milk for children is very important that providing good quality milk by milk quality tester. This project consists of temperature sensor can be used to measure the temperature in the milk. The pH sensor can be used to measure the pH of the milk. It also display whether milk is edible or not. LCD interfaced with microcontroller to display the value of temperature, pH in the milk.

Milk is a white liquid produced by the mammary glands of mammals. It is the primary source of the nutrition for young mammals before them able to digest other types of food. As an agricultural product, milk is extracted from mammals during or soon after pregnancy and used as food for the humans. Throughout the world, more than 11 billion consumers of milk and milk products are there and 70% of child deaths every year are attributed to malnutrition. Thus milk is a major food for the infants. Milk testing and quality control is an essential component of any milk processing industry whether small

2   DESIGN METHODOLOGY:

2.1 ARDUINO UNO CONTROLLER:

The Arduino Uno can be programmed with the (Arduino Software (IDE)). Select "Arduino/Genuino Uno from the Tools > Board menu (according to the microcontroller on your board). For details, see the reference and tutorials. The ATmega328 on the Arduino Uno comes pre-programmed with a boot loader that allows you to upload new code to it without the use of an external hardware programmer. It communicates using the original STK500 protocol (reference, C header files). You can also bypass the boot loader and program the microcontroller through the ICSP (In-Circuit Serial Programming) header using Arduino ISP or similar; see these instructions for details. The ATmega16U2 (or 8U2 in the rev1 and rev2 boards) firmware source code is available in the Arduino repository.

2.2 CONTROLLING A SMALL DC MOTOR:

The Arduino can control a small DC motor through a transistor switch. You will need a TIP120 transistor, a 1K resistor a 9V battery with battery snap and a motor.

Pin 2 can be any digital I/O pin on your Arduino. Connect the minus of the battery to the emitter of the transistor (E pin) and also connect the emitter of the transistor to Gnd on the Arduino board. To check if things are working, take a jumper wire and short the collector to the emitter pins of the transistor. The motor should turn on. Next, disconnect the 1K resistor from pin 2 and jumper it to +5V.

2.3 PH SENSOR:

The pH Sensor can be used for any lab or demonstration that can be done with a traditional pH meter, including: acid-base titrations, monitoring pH in

an aquarium, and investigating the water quality of streams and lakes.

3.Block Diagram:
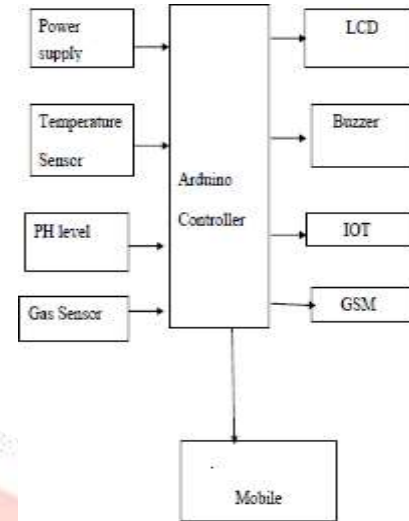
Fig 3.1. Block Diagram of Milk Analyser

3.1 BUZZER:

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric. Typical uses of buzzers beepers include alarm devices, timers and confirmation of user input such as a mouse click or keystroke.

Buzzer is an integrated structure of electronic transducers, DC power supply, widely used in computers, printers, copiers, alarms, electronic toys, automotive electronic equipment, telephones, timers and other electronic products for sound devices.

Fig. 3.2 BUZZEER

3.2 INTERNET OF THINGS:

The Internet of things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and network connectivity which enable these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure. Experts estimate that the IoT will consist of about 30 billion objects by 2020. It is also estimated that the global market value of IoT will reach $7.1 trillion by

2020.The IoT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IoT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. "Things", in the IoT sense, can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, cameras streaming live feeds of wild animals in coastal waters, automobiles with built-in sensors.

3.3 GSM MODEM:

GSM (Global System for Mobile communication) is a digital mobile telephony system that is widely used in Europe and other parts of the world. GSM uses a variation of time division multiple access (TDMA) and is the most widely used of the three digital wireless telephony technologies (TDMA, GSM, and CDMA). CDMA and GSM networks are two types of cellular phone networks and generally if you have a device made for one, it can't be used on the other. In the US, Sprint®* and Verizon run on CDMA networks while AT&T and T-Mobile run on GSM networks.

3.4 TESTING RESULT:

The sketch above is a blink which is also applicable for LEDs. The output is the turning on and off of the buzzer every other second. The picture below shows the setup of your module and Arduino.
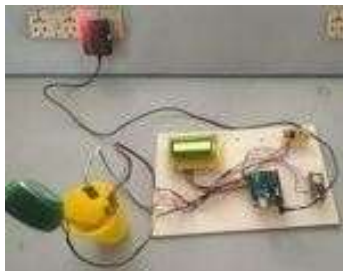
Fig 3.3 Milk Tester

"Comparative shelf-lives of skimmed, semi- skimmed and whole milks," International Journal of Dairy Technology, vol. 37, no. 4, pp. 2–5, 2018.

4 CONCLUSION:

Everyone in the society need to know the quality of milk before consuming it. Milk testing and quality control is an essential component of any milk processing industry whether small, medium or large scale. Milk quality control is the use of approved tests to ensure the application of approved practices, standards and regulations concerning the milk and milk products. Testing milk and milk products for quality and monitoring, that milk products, processors and marketing agencies adhere to accepted codes of practices costs money.

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