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Smart system for Milk quality analysis and billing system

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Abstract- *India's economy benefits from the dairy sector because agriculture is such an important part of the nation. Dairy goods require milk from farmers, who are paid according to the milk's quality. It is common knowledge that due to the world's rapid development, trends and consumer demands are being met by those who live more wealthy lives. Improvements must be made to India's agricultural way of life as a result. In milk, a number of variables are measured, including fat, pH, and the proper fat mass ratio. These parameters are calculated by the system, and the data is read by the microcontroller and sent to the Android phone.*

Billing computations and daily payments may be done using the Blynk app on the phone. To aid in determining the milk's fat content, this gadget offers a smart mobile application. The sensor may be used by Arduino boards as well as microcontrollers. The method for detecting fat in milk samples is fairly cheap. The industry pays farmers fairly and provides Real-time dairy value for governments and proportions using the Internet of Things (IoT) method. To make the system more sophisticated, humidity and gas sensors are included.

Key Words: **Micro-controller, IoT Module, LDR Sensor, pH Sensor, Humidity Sensor, Gas Sensor.**

1.INTRODUCTION

Depending on the time and conditions, modify current modules such as dairy and agricultural. First, you must determine the amount of fat [1] in milk. Manually checking the fat and quantity takes time [3]. Second, several dairy farms in town lack proper analytical equipment. Under these conditions, Testing can determine if the milk has been skimmed [5]. This might take up to two hours. Milk in plastic bottles or bags develops into harmful habits. Another concern is the manual nature of the operation, which can lead to mistakes. developed, most of which focus on heart failure diseases.

For farmers, this is the biggest loss. As a result, the outdated system needs to be changed out with a new one. which makes use of technology that can automatically and inexpensively measure milk samples in order to save labour and produce better results. Dairy products receive milk from many farms as a consequence. It is the responsibility of using dairy products to gauge the quality of each farmer's milk and to compensate the farmer. Utilizing moisture and gas sensors will allow users to understand more about milk. The Arduino controller was used to create this system, which uses it to sense several aspects of milk.

[2]. Gas sensor, humidity sensor, pH sensor, and LDR are examples of parameters. The Arduino controller is linked to the sensor. Using the software that has been developed, On the LCD display, parameters may be shown and read aloud. This is an inexpensive and dependable way of identifying adult milk. Furthermore, the dairy industry may use the IOT technique to send info about milk in real time for the govt in order to remedy illegal items like milk quality [1][2][5] during milk production.

2. OVERVIEW OF EXISTING SYSTEM

Generals' worry over the chemical mixture that degrades the advantages that pure milk provides has grown recently. Additionally, in today's world, it is extremely difficult for the ministry of food to ensure that producers of milk and items connected to it adhere to the national code. Additionally, two of nutrition science's main difficulties are cleanliness and nutrition. Therefore, milk quality control is the use of approved tests to ensure that approved criteria, standards, and controls on milk and milk products are applied. The tests are intended to confirm that milk products adhere to accepted standards for chemical composition and purity. Hence, ensuring that milk and milk products are of a high quality and checking that milk products, processors, and promoting organizations adhere to the accepted norms of conduct costs cash.

3. DESIGN OF PROPOSED SYSTEM

According to the light that the milk scatters, the milk tester method determines whether or not something is fat. a "photo resistor," which experiences a reduction in resistance as the intensity of incoming light rises. It is a highly resistant semiconductor material. The photo conductivity theory underlies its operation. When the light fades, more electrons are liberated, increasing the amount of charge carriers known as holes. Thus, the change in resistance brought on by the milk's fat content allows for an analysis of the findings. The PH module is used to assess if the supplied milk is safe,

Sample is PH-good or not. A gas sensor is used to measure milk parameters, while a humidity sensor provides data on humidity. The collected data are then updated on the Blynk

cloud IOT platform and shown on LCD monitors, allowing for internet-based data monitoring. numerous elements, such as FAT and the classification of cow milk or Buffalo milk, producing the necessary rate for the estimated quantity of fat in the milk. As a result, the system determines these parameters. Reading the data and delivering it to the Android phone is done by the microcontroller. The per-liter milk price may be calculated for payment using an IOT application that is loaded on a phone. The system provides a smart mobile application and LCD display in addition to helping to identify the milk's fat level, gas, humidity, and pH.

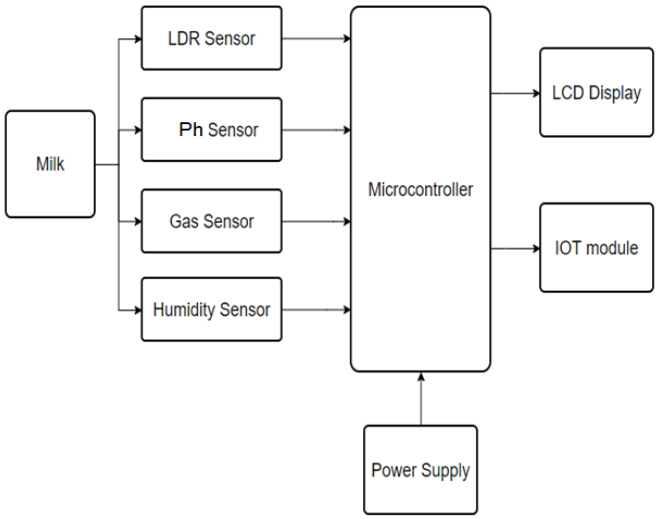

Fig-1. Block Diagram

3.1 PROBLEM IDENTIFICATION

- In existing method need to add many chemicals that is affecting on health.
- Man power is required for checking the milk quality
- Time consuming process for testing the milk.
- Possibility of error value in manual process.
- No record and no remote monitoring system in existing system

3.2. OBJECTIVES

Below mentioned is main objective of this project.

- Find the fat in milk.
- To measure any harmful gas content.
- To measure Ph level of milk.
- Using by Humidity sensor testing refrigerated level of milk.
- Implementation of IOT for remote monitoring.
- Develop an algorithm that can calculate price of the milk based on Fat content.

3.3 Working Principle of Sensor Module's.

(i) LDR Sensor:

The photo conductivity theory underlies how this resistor functions. It simply means that when light strikes the surface of the object, the material's conductivity decreases and electrons in the object's valence band are stimulated to the conduction band. The energy of these photons in the incoming light must be higher than the semiconductor material's band gap. The electron in the valence band is forced to go into the conduction band as a result.

Fig-2. LDR Sensor

These devices are light-dependent; when light strikes an LDR, the resistance changes; in the dark, it rises. A LDR has a high resistance when kept in a dark environment, and a lower resistance when stored in a bright environment.

(i) pH Sensor:

The pH scale, which measures the concentration of hydrogen ions in a liquid solution, is an extremely crucial, Measuring is used in several liquid chemical reactions (industrial, pharmaceutical, manufacturing, food processing, etc.). The terms "acid" and "caustic" are used to describe different types of solutions, depending on their pH. " The pH scale is a measurement of acidity that goes from 0 (strong acid) to 14 (strong caustic), with 7 (clean water) in the middle, signifying neutrality.

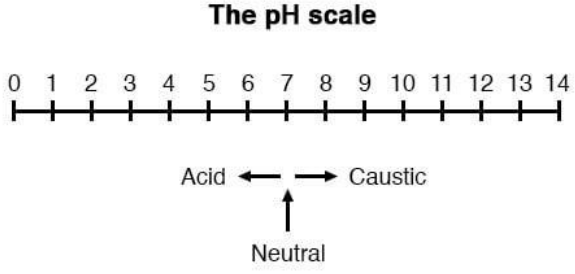

Fig-3. PH Value

The negative common (base 10) logarithm is represented by the lower-case "p" in pH, while the element hydrogen is represented by the upper-case "H" in pH. The amount of hydrogen ions (H+) present per litre of solution is therefore measured by pH using a logarithmic scale. Intriguingly, the "p" prefix is also utilized for other chemical measurements where a logarithmic scale is required; two examples include pCO2 (Carbon Dioxide) and pO2 (Oxygen).

4. Experimental Setup and Results.

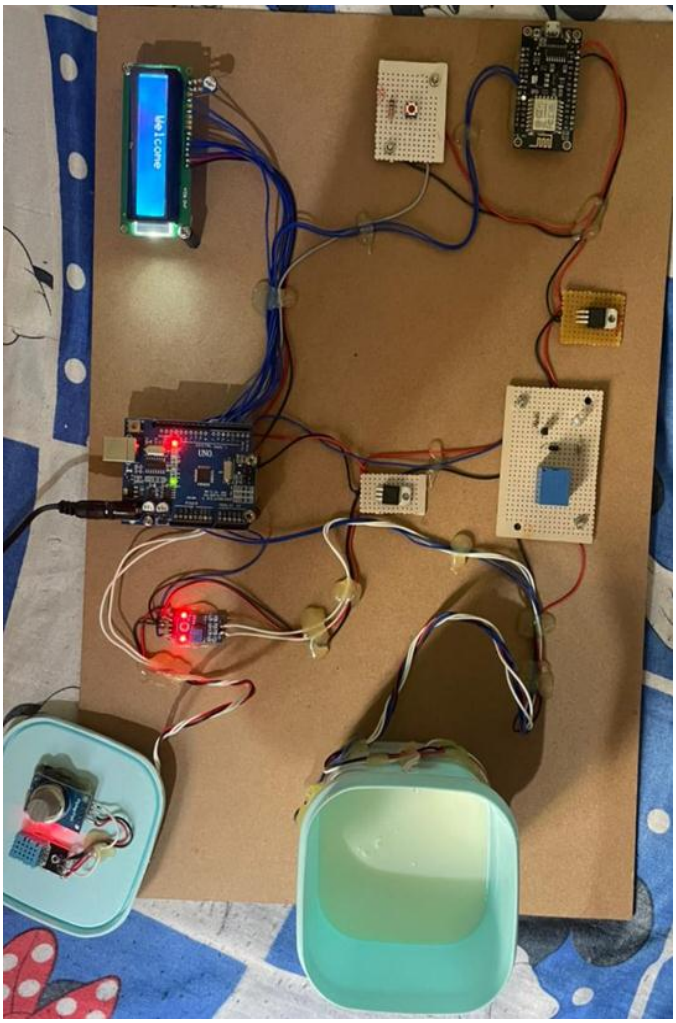

Fig-4. Experimental Setup.

The Above Diagram is Experimental Setup for milk quality analysis with Billing System. Now, it is completed 50% of project i.e, showing Fat Sensor and PH Value to the LCD Display. Liquid crystal display is what the word LCD refers to. It is a specific sort of electronic display module used in a wide array of devices and circuits, including TV sets, computers, calculators, mobile phones, and other electronic devices. Seven segments and multi-segment light-emitting diodes are the two major applications for these displays. The primary advantages of adopting this module are the low cost, easy programming, animations, and the lack of any restrictions on displaying customized characters, unique and even animations, etc. The data register and command register are two of the 16 by 2 LCD's registers. The main purpose of the RS (register select) is to switch between registers. The register set is referred to as a command register when it is set to "0". Similar to this, a register set of 1 is referred to as a data register.

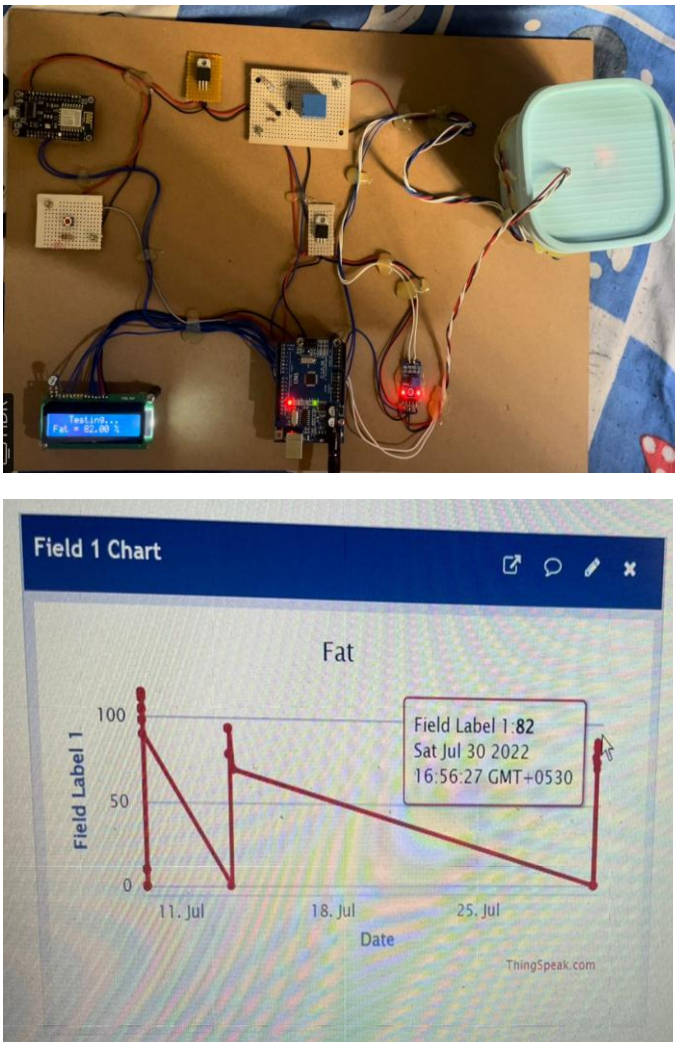

Fig-4.1 FAT Sensor Results.

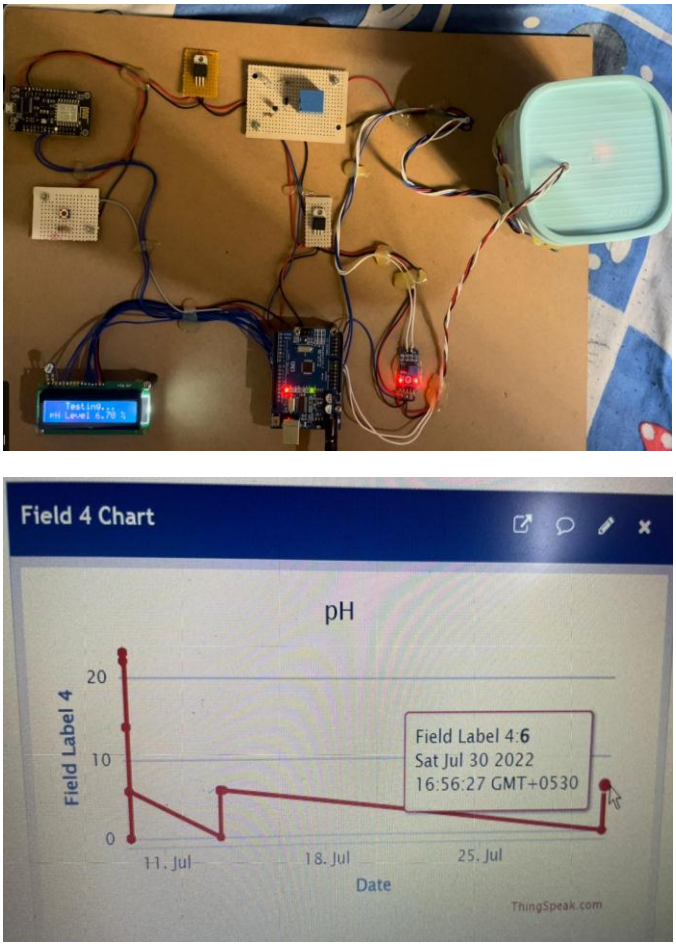

Fig-4.2 pH Sensor Results.

5. CONCLUSIONS

The major goal of the study is to identify the fat, which can be inferred by looking at all of the aforementioned systems. Hazardous gases such ammonia, hydrogen sulphide, benzene series steam, smoke, and others are accurately detected by the MQ135 gas sensor The quantity per litter calculation, IOT cloud for remote monitoring, and the level of milk humidity are also applied. Pure milk has a pH between 6.7 and 6.9 [1][6]. The nutrition, lactation season, and breed of the cow all have an impact on it. The range of certain animals' fat contents is 3.0 to 4.0 [1][5]. Cow milk has a 6 percent fat level, whereas buffalo milk has a 7-8 percent fat content. The most frequent ingredient in LDR is cadmium sulphide. It uses relatively little energy.

6. ACKNOWLEDGEMENT

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