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GSM-Module based Dairy Parameter Monitoring

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Abstract: ***As we know India is agriculture based economy whose 70% population depends on agriculture and cattle farming. India ranks 2nd worldwide in the production of milk which is 18% of total milk produced worldwide. It contributes around 60.6 billion Kg of milk .In India majority of milk is produced by small scale farms(15- 20 cows at each farm).but day by day the purity of milk decreases for earning more money by mixing of low quality material to the milk.The proposed project aimed to present some aspects regarding milk quality and estimation. The parameters regarding dairy is pH, specific gravity and storage (tank level).these parameter can be measured and displayed on site as well as gives the notification to the owner via sms using GSM module (Abstract)***

Keywords: GSM, pH, Specific gravity, Dairy

I. INTRODUCTION

As we know India is agriculture based economy whose 70% population depends on agriculture and cattle farming. India ranks 2nd worldwide in the production of milk which is 18% of total milk produced worldwide. It contributes around 60.6 billion Kg of milk .In India majority of milk is produced by small scale farms(15- 20 cows at each farm).but day by day the purity of milk decreases for earning more money by mixing of low quality material to the milk.

The dairy products monitoring is very much essential in the day to day life since any contamination many to the full product. In the dairy industry the monitoring of the status of the milk manually will take long time and the manual labour has to be present in order to periodically monitor the status.

In this system we are going to monitor the parameter of the milk such as the pH value of the milk is determined in order to find whether the milk is contaminated or not. If any of the monitored values is abnormal, notification is sent through GSM to the farmer to the work aimed to present some aspects regarding milk quality and quantity estimation. To develop an automated corruption free milk parameter monitoring & collection system that can check the fat contents of a milk and also measure weight or quantity of milk And sending message to farmer for receipt purpose that can be reduced by making the system automation using sensors which indirectly increases the productivity by reducing processing time and gives better accuracy. The LCD display is used to the milk level in terms on liters and percentage of the milk.

The measured output is sent via the global system for mobile communication (GSM) technology to the user mobile so that verifiable record can be created. This would help the owners of transportation.

II. EXISTING SYSTEM

Lucas de Souza Ribeiro et. al. [2] states that utilizing a cryoscope, identification of water defilement in milk can be performed. The GaAsSb sensors, which show speedy response and incredible affectability to the NIR go, were used to recognize diffusely reflected light. The proposed instrument was taken a stab at milk tests ruined with water. The results showed high coefficients of confirmation, higher than 0.99.

As such, the made system may be used for distinguishing proof of milk degradation. Carla Margarida Duarte et. al.[9] built up an appealing counter that identifies the proximity of Streptococcus agalactiae (a Group B Streptococci) in rough milk. This contraption allows the examination of unrefined milk without traverse the microfluidic channels, making this joined stage astoundingly engaging for fast bacteriological contamination screening. Wesley Becari et.al. [7] Built up a technique for the discovery of ox-like milk debasement by applying electrical impedance estimations. The classification of the outcomes is proposed through ak-closest neighbor's calculation that permits to quantitatively qualify the examples of unadulterated and debased milk. Pallavi Gupta et. al [5] showed another system, which is used for the area and estimation of debasement of clarified butterfat, a classification of anhydrous milk fat. Distinguishing proof of debasement by at any rate 20% of animal muscle versus fat's in clarified margarine is successfully and financially done. Dari de O. Toginho Filho and Vanerli Beloti [3] proposed a model of a modernized photometer, micro controlled, adaptable contraption, which uses three LEDs with release in the NIR territory and was made without the usage of central focuses, filters or moving parts. The results show that the model response takes after the one of a business cryoscope, yet snappier

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III. PROPOSE SYSTEM

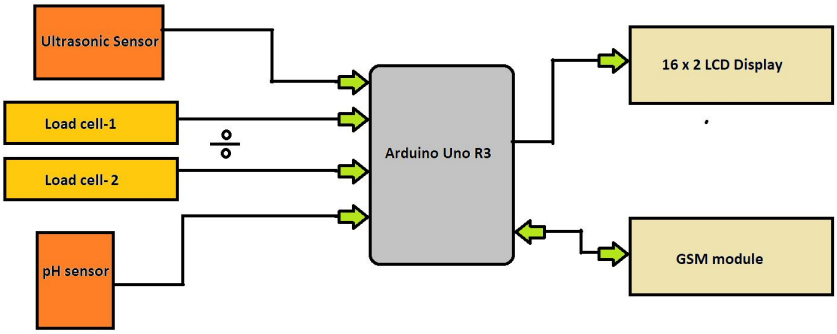


Figure: Proposed System

The proposed project aimed to present some aspects regarding milk quality and estimation. The parameters regarding dairy is pH, specific gravity and storage(tank level).these parameter can be measured and displayed on site as well as gives the notification to the owner via sms using GSM module

How the sensors will work

A. pH

Basically pH is concentration of H+ ion in liquid.

B. Specific Gravity

It is ratio of density of sample to the density of water.

Specific gravity =W1/W2

Specific gravity =M1g1/M2g2

(g1=g2=g)

Specific gravity =M1/M2

(Mass=Volume*Density)

(V=Volume) (D=Density)

Specific gravity =V1D1/V2D2 (as V1=V2=V)

Specific gravity=D1/D2

C. Ultrasonic Sensor

Ultrasonic sensor is used for level measurement

As we know

Velocity= Distance/Time

Distance =Velocity*Time (Velocity of sound =340 m/s)

D. System Architecture

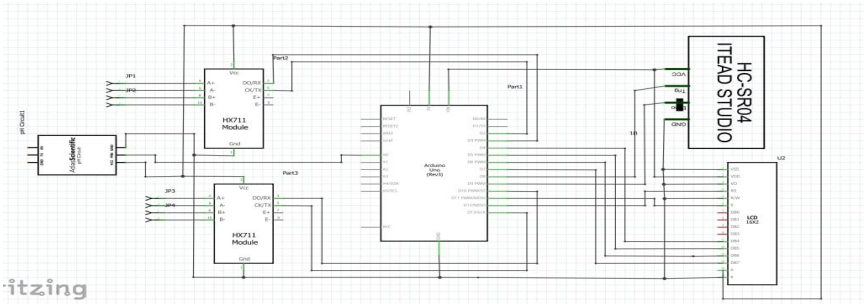


Figure: System Architecture

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In proposed system firstly when we on the system then micro-controller collects the data from sensors and display on the LCD screen and these readings send(or transmits) to the mobile via SMS using GSM -module .basically in these system we measure the specific gravity using in-direct method by taking a ratio of weight of sample to the weight of reference(water) keeping volume of container identical so we get ratio of their density and for measurement of pH of liquid we used digital sensor and level measurement by using ultrasonic sensor. Our system consists of GSM module, Arduino, pH sensor, Load cell (HX711), Ultrasonic sensor and 16x2 LCD display to achieve our goal.

E. Hardware Required

1) Arduino
2) GSM-module
3) Load-cell
4) Ultrasonic sensor
5) pH sensor
6) Arduino Uno



Figure: Arduino uno

F. Key features

1) Microcontroller ATmega328.
2) Operating Voltage: 5V
3) Input Voltage (recommended): 7-12V.
4) Input Voltage (limits): 6-20V.
5) Digital I/O Pins: fourteen (of that six give PWM output)
6) Analog Input Pins: 6
7) DC Current per I/O Pin: 40 mA.
8) DC Current for 3.3V Pin: 50 mA.
9) Flash Memory: 32 KB of which 0.5 KB used by boot loader
10) SRAM: 2 KB (ATmega328)
11) EEPROM: 1 KB (ATmega328)
12) Clock Speed: 16 MHz

G. GSM-Module

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). GSM digitizes and compresses data, then sends it down a channel with two other streams of user data, each in its own time slot. It operates at either the 900 MHz or 1800 MHz frequency band. Mobile services based on GSM technology were first launched in Finland in 1991. Today, more than 690 mobile networks provide GSM

H. Load-Cell

1) Package include; 1x weight 10KG 1 X HX711 24BT precision ADC Module
2) Connection: red to E+ Black to E- Green to A+ to A-
3) on-chip active low noise PGA with selectable gain of 3264 and 128.
4) On-chip power supply regulator for load cell and ADC analog power supply.
5) . On chip oscillator requiring no external component with optional external crystal.

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I. Ultrasonic Sensor

The ultrasonic sensor is also known as a transceiver device. The ultrasonic sensor generates high-frequency sound waves and it works by transmitting an ultrasonic burst and providing an output pulse that corresponds to the time required for the burst echo to return to the sensor.

J. pH Sensor

pH sensing element measures the pH of binary compound solution in industrial and municipal method application. It is designed to perform within the harshest of envoirment as well as applications that poison typical pH sensor. A high volume, twin junction salt bridge is employed to maximize the in-service period of the sensing element. The ringed junction provides an oversized expanse to reduce the prospect of fouling.

IV. CONCLUSION

We have designed the Dairy parameters monitoring system using GSM module. The designed system works on the level sensor, the level sensor which measures milk level, pH sensor measures the milk nature and load cell which measures the specific gravity of milk. The parameters are displayed on the LCD display. Being an intelligent system it also sends the message using the GSM module.

A. Advantages

1) This kind of system is helpful for small scale farms to monitor their milk parameter from anywhere and also to the customer to buy a quality product. Many more parameters can be added to monitor and control
2) This system is cost effective system
3) This system is accessible from anywhere without installing any new application

B. Applications

1) To monitor the different dairy parameter on-site without using any special application through mobile.
2) Access to the system from anywhere.
3) To build a cost-effective system.

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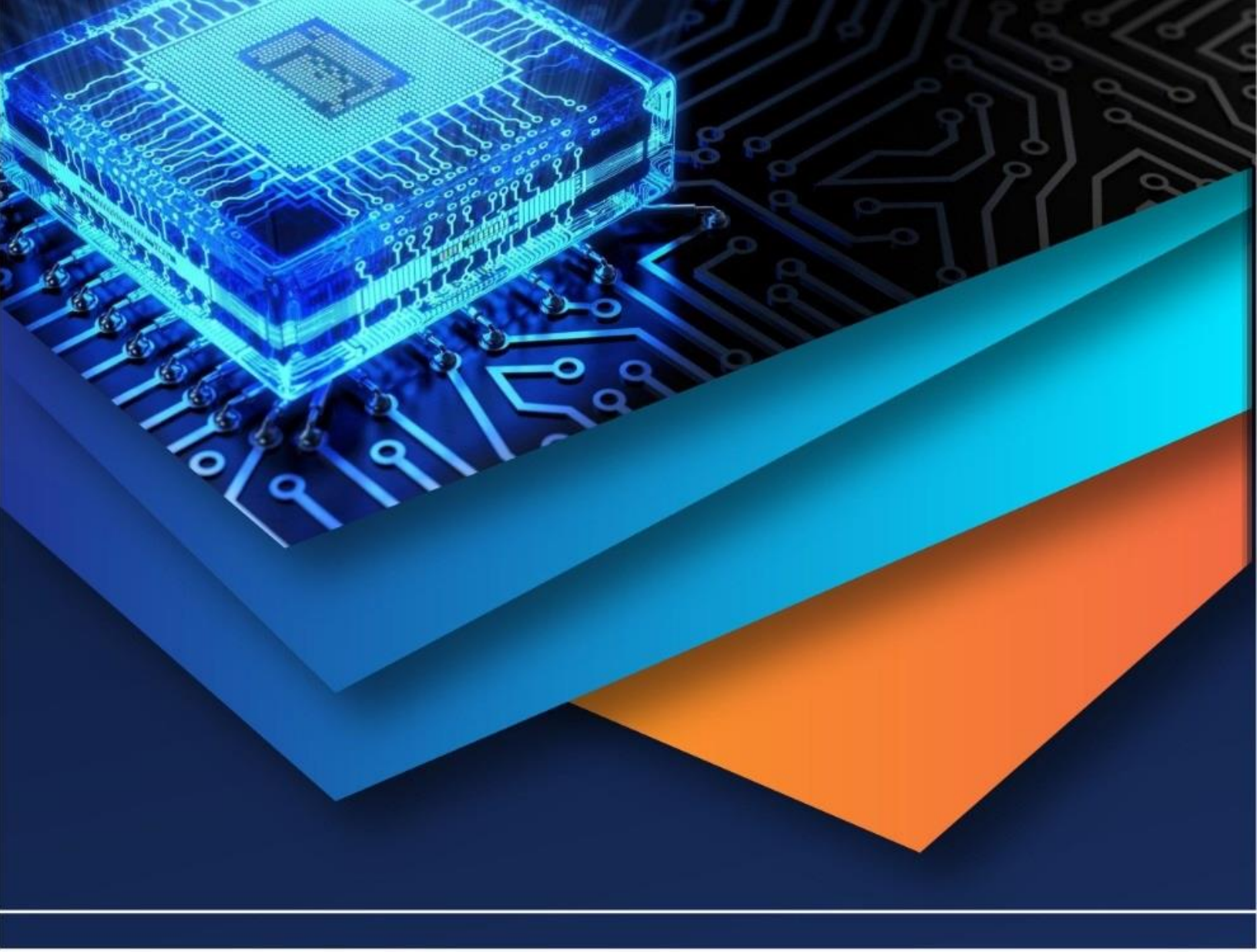
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