Milk Quality and Quantity Checker.

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Abstract : Milk Quality and Quantity checker.In this paper we have discussed about Internet of Things (IoT) based system which allows users to checks the quality and quantity of milk . As the milk is kept for several days, the expansion of bacterium will get increased which ends up in undesirable smell in the milk.This contaminated milk producing bacteria is very dangerous for human health. So milk monitoring is an urgent need of the society to prevent the diseases causing in the future . The prime intention of this research has been to develop electronic sensor based system to monitor the milk with the behavior of the vairious chemicals mixed with it,which can change the properties of pure milk. Hence there is a necessity for monitoring system to discover and determine the spoilage of milk. This work presents an innovative approach of milk quality testing by implementing various sensors to monitor the milk parametrs.

***IndexTerms* - IoT, Milk Detection, Milk Quality checking, Aurdino , Sensors, Adulteration.**

I. INTRODUCTION

Now-a-days the milk adulteration is mostly detected using various chemical tests. These methods are tedious, time consuming and costly. Also the knowledge of the tests is necessary. The nutritional value of milk to human health needs no introduction; it also has traditional impact on Indian society. At the same time it is alarming that many vendors adulterating it with water, detergents, caustic soda, starch, formalin, urea, ammonium sulphate, sodium carbonate which have harmful effect on the human health. The greed for money has pushed them to the extent of producing synthetic milk which has no nutritional content. "Adulteration" is a legal term meaning that a milk product fails to meet federal or state standards. Adulteration is an addition of another substance to milk in order to increase the quantity of the milk in raw form or prepared form, which may result in the loss of actual quality of milk. Milk adulterated is mainly done for financial gain but it can also be adulterated due to unhygienic conditions such as processing, packaging, transportation, distribution etc. Water is the most common adulterant used which decreases nutritional value of milk and lowers the quality of milk. Many analytical techniques have been developed to measure the adulterations quantitatively and qualitatively. Milk adulteration is a global concern and developing countries are at higher risk associated with it due to lack of monitoring and policies. However, this is one of the most common phenomena that has been overlooked in many countries. Unfortunately, in contrast to common belief, milk adulterants can pose serious health hazards leading to fatal diseases.

The system we propose as a project proposal is Milk Quality and Quantity checker (Milk analysis embedded system / Milkotester) in which can be used to find the quality of the milk samples by measuring more than one parameters at once. The targeted beneficiaries of this project proposal would be both the milk farmers and the industries in whole. The farmers would be benefiting in the sense that they would get a just pricing and they cannot get cheated by the system, since manipulating it would be harder than manipulating a physical measuring scale. The industry would benefit because this can be used as a cheap alternative to the cost prohibitive and non-user friendly meters available abroad. This project proposal would allow for an indigenous developed tool that can be used as a complete solution for this.This project deals with categorising the quality and estimating the quantity of the milk using Ph sensor and ultrasonic sensor. Milk is very important due to its special nutritive value and important role for human health. This project aimed to present some aspects regarding milk quality and quantity estimation The existing milk analysers categorises the milk based on the quantity level only .So High quality milk does not contain its value, because treated as quantity based.. High quality milk should have good density, so density of the milk is measured by using an intensity sensor and also level of the milk will be measured by using a ultrasonic sensor.

II. PROPOSED SYSTEM

The proposed system is based on IoT based Arduino ESP32 Microcontroller is used which can drive by 5V DC supply; the quality of the milk is maintained by using the smart sensors the temperature sensor helps in monitoring the temperature of the milk. The viscosity sensor measures the viscosity of the milk, the gas sensor used to detect the odour of the milk, the ultrasonic sensor is used to check the level of milk it is calibrated according to the size of container used to measure quantity of milk, and the salinity sensor detects the salinity of the milk.

The maintenance and repairing of mechanical and electronic parts of the digital milk analyzer requires extra man power and of course extra investment. Once the sensors stop functioning, the detection of sensors damages is difficult. Since the display used in this project is the calibrated information couldn't be used for future references.The project proposed is beneficial to the society by giving measure to reduce the adulteration practice in milk.This device is used in small diaries for the quality analysis of milk.It provides quality assurance for farmers and consumers.It can also be used by the normal people, where an individual should know about the quality of milk that he consumes in his daily life.It can be used by milk traders for computerized milk analysis. In future this project can be made more accurate by using pH sensor that is highly sensitive for small variation in pH and by using conductivity sensor that have high precision. The project can also be improved by using odor sensor that is sensitive to particular gases.

III. METHODOLOGY

3.1 Hardware Requirments.

3.1.1 ESP-32 Microcontroller

It is a 18 Analog to digital converter channels. It contains 3 SPI interfaces, 3 UART interfaces, 2 I2C interfaces, 16 PWM output channels.

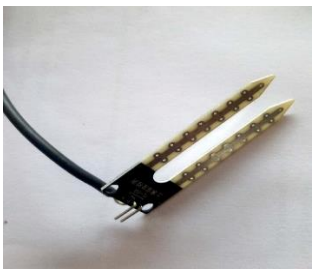
3.1.2 Ultrasonic Sensor (HC-SR05)

Its Vcc is connected to 5V of positive voltage for power. Trigger pulse is send here for the sensor to go into ranging more for object detection. Echo sends a signal that if an object has been detected or not. If a signal is returned an object has been detected.

3.1.3 Ph Sensor

The detection concentration range Ph-0 to Ph-14 the detection range of temperature is 0-80 centigrade. High quality PCB FR-4 grade with FPT certified. Ph sensor mainly used to check milk quality.It used for checking acidity of solutions.

3.1.4 Salinity Sensor



The Salinity sensor is designed to measure the salinity of liquids and solutions and is capable of measuring the entire range of 24-52,000 ppm (parts per million). Salinity is one of the most basic tests conducted in solutions. It determines the total concentration of salts in a sample.

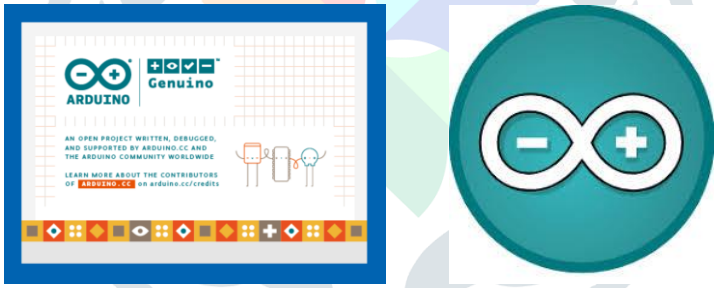
3.1.5 Temprature Sensor

The LM35 device is rated to operate over a −55°C to 150°C temperature range, while the LM35C device is rated for a −40°C to 110°C range (−10° with improved accuracy). The LM35-series devices are available packaged in hermetic tos transistor packages.

3.1.6 MQ-6 Gas sensor.

The MQ6 Gas Sensor module is useful for gas leakage detection. They are used in gas leakage detecting equipments in home and industry, are suitable for detecting of LPG, iso-butane, propane, LNG, avoid the noise of alcohol , cooking fumes and cigarette smoke. Due to its high sensitivity and response time, measurements can be taken as soon as possible.

3.2 Software Requirment.



The Arduino integrated development environment is a cross-platform application that is written in the programming language Java. It is used to write and upload programs to Arduino compatible boards, but also, with the help of 3rd party cores, other vendor development boards. The Arduino integrated development environment (IDE) is a cross-platform application (for Windows, macOS, Linux) that is written in the programming language Java. The Arduino IDE supports the languages C and C++ using special rules of code structuring. he source code for the IDE is released under the GNU General Public License, version 2.3 the Arduino IDE supports the languages C and C++ using special rules of code structuring. The Arduino IDE supplies a software library from the Wiring project, which provides many common input and output procedures. User-written code only requires two basic functions, for starting the sketch and the main program loop, that are compiled and linked with a program stub main() into an executable cyclic executive program with the GNU toolchain, also included with the IDE distribution. The Arduino IDE employs the program avrdude to convert the executable code into a text file in hexadecimal encoding that is loaded into the Arduino board by a loader program in the board's firmware.

IV. IMPLIMENTATION AND RESULTS

Fig 1. Welcome message on LCD Display.

Fig 2. Circuit Diagram inside board.

Fig 3. Implementation of sensors on board.

Fig 4. Result Displayed Ph-6.6 Milk is Normal.

V. LITERATURE REVIEW

Recent studies and surveys have revealed an emerging need to continuously collect, monitor, analyze, summarize, and visualize relevant information from huge amount of data.

[1] Lucas de Souza Ribeiro states that using a cryoscope, detection of water adulteration in milk can be performed. The GaAsSb sensors, which show quick reaction and great affectability to the NIR range, were utilized to distinguish diffusely reflected light. The proposed instrument was tried on milk tests corrupted with water. The outcomes displayed high coefficients of assurance, higher than 0.99. In this manner, the created framework might be utilized for identification of milk debasement.

[2] Carla Margarida Duarte. developed a attractive counter that identifies the nearness of Streptococcus agalactiae (a Group B Streptococci) in crude milk. This gadget permits the investigation of crude milk without crossing over the microfluidic channels, making this incorporated stage exceptionally appealing for quick bacteriological pollution screening.

[3] Wesley Becari. developed a methodology for the detection of bovine milk adulteration by applying electrical impedance measurements. The classification of the results is proposed through ak- nearest neighbors algorithm that allows to quantitatively qualify the samples of pure and adulterated milk.

[4] Pallavi Gupta displayed another framework, which is utilized for the location and estimation of corruption of clarified butterfat, a classification of anhydrous milk fat. Identification of defilement by at least 20% of creature muscle versus fat's in clarified margarine is effectively and monetarily done.

[5] Dari de O. Toginho Filho and Vanerli Beloti proposed a model of a computerized photometer, microcontrolled, versatile gadget, which utilizes three LEDs with discharge in the NIR area and was created without the utilization of focal points, filters or moving parts. The outcomes demonstrate that the model reaction resembles the one of a business cryoscope, yet quicker. erated content

VI. APPLICATIONS

- This devices are used in small and medium scale industries for analysis of quality of milk.
- Such devices can also be used in remote places, where an individual should be knowing about the quality of milk that he consumes in his daily life.
- Devices can be used in the Dairies to analyze Milk Quality. Used by Milk Traders for Computerized Milk Analysis.

VII. CONCLUSION

The development and application of low cost and efficient milk parameter detection and analysing system using Arduino controller has been presented in this paper. The developed system is smaller in size and weight; it works with low power consumption and has a fast response. Thus it can be implemented for portable applications. Future work will be focused on improving overall accuracy of the system. Also efforts could be made to make the system handier (design miniaturization) so that it could be freely implemented in field operations.

In this paper, we have been briefly reviewed the various application of IoT. The problem faced by humans due to milk Adulteration will be focused by reviewing this paper and would be helpful to researchers to determine the solution.

By using this project analysis approach,this paper proposed and tested design a handy device to test the Milk Quality and Quantity.

VIII. REFRENCES

[1]. Mohit Kamthania, Jyoti Saxena, Komal Saxena, D.K. Sharma; ”Milk Adultration: Methods of Detection &Remedial measures, National Conference on Synergetic Trends in engineering and Technology (STET-2014) International Journal of Engineering and Technical Research ISSN: 2321-0869, Special Issue, pp.15-20

[2]. Prof.A.S.Mali, Aruna A.Chougale “Low Budget System for Measurement of Milk Parameters and Billing for Dairy”, SSRG International Journal of Electronics and Communication Engineering (SSRG-IJECE).

[3]. A. Taniuguch, Y. Naito, Madea, Y Sato and H. Ikezaki, “Development of a monitoring system for milk quality using a taste sensor”, Sensors and Materials, vol 11 no7, 1999, p 437-446.

[4]. F :Winquist, P: Wide, and I : Lundstrom . “An electronic tongue based on voltammetry.” Analytical Chimica Acts 357”. pp 21-31, 1997.

[5]. “Milk Testing and Payment Systems Resource Book a practical guide to assist milk producer groups” by Jurjen Draaiyer, Brian Dugdill, Anthony Bennett, Jerome Mounsey, pp-21-25.