

## Smart Dairy using Raspberry Pi and Cloud Application

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**Abstract**— The milk is the dietary fluid secreted by the mammary gland of mammals. The high quality milk should have better density and is free from the adulterants. Milk is most commercially sold commodity both by local vendor's as well super markets. However in local areas to increase the yield certain adulterants are added which may affect the nutritional quality of milk. Milk adulteration is a social problem. It exists both in the backward and advanced countries. Consumption of adulterated milk causes serious health problems and a great concern to the food industry. The Country milk producers and consumers facing problem to find the quality of milk, accept the fair of price and consumption. So it is necessary to ensure the quality of milk by measuring type and amount of adulterants that are added to the milk. This is performed by using combined electronic sensory instrumental system such as Temperature sensor (DS18B20), LDR Module. Complex data sets from these sensor signals are combined with multivariate statics represents rapid and efficient tools for classification, discrimination, recognition and identification of adulterants as well as the concentration of different compound leads to analyze and ensure the quality of milk. This project is implemented using Raspberry PI Microprocessor. All the sensors are combined to form compact and flexible system which

analyze and classify the quality of milk into different grades and finally output displayed on LCD screen and data of the sensors will be sent to the cloud and stored. From the cloud it will be sent to the farmers mobile number that temperature, quantity of milk, cost of the milk based on fat and quantity.

**keywords:** Raspberry pi, FAT, Temperature, Python

### INTRODUCTION

In India Dairy farming is a joint business of Indian farmers is backbone of our country. Milk and its by products are valuable nutritious food to human beings adulteration milk that effects to the human health so quality of milk will be maintained. Indian dairy sector contributes 1, 15,970 crores to Indian economy. The quality of milk is measured using milkotester concept and other sensor. The milk with average 3.5 to 4% is an good milk. The adulterated milk is harmful to human health. There is a need of adaption of new technology into this. Here we are using Raspberry pi based automated system. This system reduces the corruption improper maintenance of data and so on. Here we measure the quality of milk like (

FAT, Temperature, SNF) and quantity is measured using weighing machine and the details is send to farmers mobile then the data is stored in cloud. This system produces the transparency between farmer and dairy management.

**LITERATURE REVIEW**

Rupak Chakravarty[1] this paper states advantages of automatic milk collection station and use of instruments such as electronic milkotestometer for accurate fat measurement.

Abhishek M. Aware.et.al.[2] this paper states construction of simple milkotetser with paired IR LED and a phototransistor as a module. The system would be set up with the receiver and transmitter separated by a small distance inside the given sample. Fat molecules tend to specifically absorb certain bands of IR module.

Yadav S.N.et.al. [3] this paper states an applications of embedded system MILKOTESTER. It is Small compact embedded in a single unit, requires less power and measure milk parameters like SNF(Solid but Not FAT), FAT, CLR, WEIGHT, PH, with less cost.

D.Shekar Goud.et.al.[4] this paper states Implementation of Micro Banking System using RASPBERRY PI and Raspbian Operating System.

Dr. G. Rajakumar.et.al.[5] this paper states implementation of IoT based adulteration detection in milk using arduino microcontroller.

Dr. D. R. Shende.et.al.[7] this paper states implementation of the system for detecting the quality of milk based on fat and temperature. Diplaying these parameters on LCD display and sending it to the farmers through GSM.

**DRAWBACKS OF EXISTING SYSTEM**

1. Daily records about the amount of milk which farmers bring to the

- dairy are not maintained properly.
2. Instead of the milk being brought to the dairy directly, it is brought through the middlemen, who take most of the profit.
3. Delay in payments to farmers.
4. Lack of knowledge to farmers about the quality (fat content) and the cost in the market.
5. Loss of records is likely to occur, if it is paper work.

**PROPOSED SYSTEM ARCHITECTURE**

The main objective of milk collection system is corruption free milk parameter monitoring and collection. System checks the fat contents of a milk and quantity of milk with the help of Fat tester and weight sensor. For customer identification RFID Tags and RFID Reader are used.LCD display is used for displaying the value. Raspberry Pi microprocessor is used for controlling and processing data.

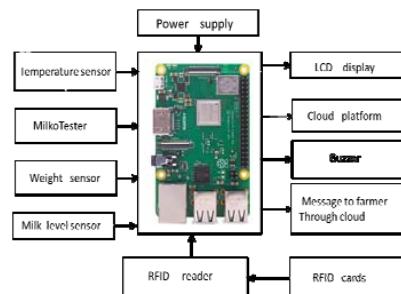


Fig1: Block diagram of system



Fig2: Overview of the system

## METHODOLOGY

1. When the RFID card is swipped card is read through RFID reader, the ID and name of farmer will be displayed on LCD display. After displaying the information of farmer, the sample amount of milk is taken in the test tube.
2. Variation in temperature of milk sample is measured by using Temperature sensor which is measured in terms of degree Celsius.
3. The scattering of a beam of light by the fat globules present in homogenized milk is the principle in the MilkoTester. The amount light scattered by the milk sample is measure of fat content in the milk.
4. For cow's milk fat value will be in the range of 3.5-4.5 percent & for buffalo milk fat value will be in the range of 6-7 percent. If milk fat does not fall in this acceptable range then amount will be given based on fat value.
5. The temperature value and fat percent of milk will be displayed on LCD including fat range. In turn it displays the ID of the farmer.
6. After testing the quality of milk using various sensors (MikoTester, Temperature) the milk will be poured into container and then quantity of milk is measured by using weight sensor in terms of liters.
7. After measuring the quantity of milk billing is done based on Fat content in milk .
8. After billing all details like (Date, Time, Fat, Temperature, quantity, present amount, Total amount) is send to farmer mobile through offline message and the same data is stored in cloud.
9. The customer details and payment details will be maintained in the Cloud platform.
10. The above steps is repeated for other farmers after pressing the reset button in the board.

## Results obtained:

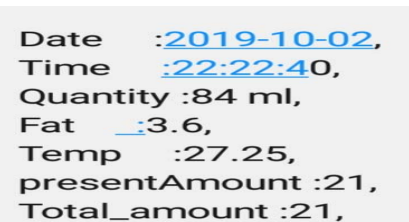
- 1) After swiping the RFID cards the details of farmer displayed on LCD screen.



- 2) After measuring quality of milk values are displayed on LCD screen.



- 3) After billing the data send to farmer mobile through Offline message



## SYSTEM EVALUATION

### Advantages

1. Software & Accounting.
2. Reduction Empowering Farmers.
3. Transparency and access to own data.
4. Improve Productivity & Profitability.
5. Common in Maintenance cost.
6. Direct interaction with Farmers.
7. Data Integrity & Security.
8. On time payment to farmers.

### Disadvantages

1. It takes internet connection.

## REQUIREMENT ANALYSIS

### HARDWARE REQUIREMENTS

1. Raspberry Pi
2. RFID Reader
3. RFID cards
4. Temperature sensor version DS18B20.
5. Milkotester (LDR module and LED strip)
6. Weight sensor Hx711
7. LCD display
8. Buzzer

### SOFTWARE REQUIREMENTS

1. Raspbian Operating System
2. Python
3. Cloud platform: UBIDOTS

## CONCLUSION

Here we developed an automated corruption free milk collection system in the dairy to measure the milk parameter by the quality analysis of milk. It provides quality assurance for farmers and consumers. This system also calculates the payment using various sensors. This device is used in small dairies for that should based an fat content in the milk and automated billing will be done in cloud so that manual errors can be reduced.

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