

Smart Portable White Revolution System for Dairy Farmers

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Abstract: Dairy industry is of crucial importance to India. The country is the world's largest milk producer, accounting for more than 13% of world's total milk production. It is the world's largest consumer of dairy products, consuming almost 100% of its own milk production. The proposed system will make the collection, billing procedure from farmer to dairy faster, more reliable, more accurate, more efficient. This system contains a system module installed at the local milk collection centre which includes a farmer verification unit, fat content detection unit, quantity measurement unit. Depending upon the fat content and the quantity of the billing amount will be calculated. This collected data will be shown at the centre to the farmer as well as it will be transmitted to the main dairy using wireless module.

Keywords: RFID module, LCD, RF module, LDR, RTC.

I. INTRODUCTION

India has tremendous milk production in last 40 years and has become the world's largest milk producing nation with a gross output of 84.6 million tons in 2001. The dairy industry has achieved this strength of producer-owned and professionally-managed cooperative system, despite the facts that a majority of dairy farmers are illiterate and run a small, marginal operations and for many farmers, selling milk is their sole source of income. More than 10 million dairy farmers belong to 96000 local dairy cooperatives, who sell their products to one of 170 milk producers' cooperative unions who in turn are supported by 15 state cooperative milk marketing federations.

The primary source for milk providing to dairy is farmers. Dairy industries is a joint business of farmer who daily provides collected raw milk to dairy, dairy will provide the money according to milk collected. This process of raw milk collection happens twice a day. This collection process is very big and requires use of IT for easier, convenient and faster operation. This system proposes the concept to replace manual work in Milk dairy system by automated system which will be installed at the Local village dairies. In this automated system we will replace the conventional Milk collection system with an automated. Milk collection process happens as farmer pours milk from animals like cow or buffalo and brings pour milk in variety of containers and cans. Each farmer will have his own memory card which is actually memory chip. Each memory card will have its unique id which is allotted by the dairy automation system at the beginning. So when Farmer will insert his memory card into the memory card slot, system will check its ID and then display whether card is valid or not. If card is valid system will display user ID otherwise display invalid user. Then

user has to pour small quantity of milk into a test tube for fat detection process. Milk will be allowed to pass through a flow sensing circuit for quantity measurement. This data is fed as an input to an embedded system.

System will calculate the rate for brought milk according fat content. Billing will be done according quality and quantity of the brought milk. This collected data will be displayed on a LCD. This system will store parameters which are displayed on the LCD into the memory. This complete system requires an embedded system to do the collection and billing process. The collected data is stored at local dairy and can be transmitted to main dairy by using wireless RF module.

II. CURRENT SYSTEM

PC based Automatic Milk Collection Unit (AMCU) at Milk Collection Centre (MCC): It comprise of following components:

1. Computer
2. Software
3. Milk Analyser
4. Electronic Weighing Scale
5. Digital Display
6. Printer
7. UPS
8. Battery

In this scenario milk collection done at milk collection centre located in each village. Farmer has to bring raw milk to milk collection centre. At milk collection centre following process as below

1. Farmer has to collect raw milk from cow OR buffalo

- Brings raw milk to collection centre. The farmer has given unique id that it has to be entered into software.



Figure 1. PC based Automatic Milk Collection Unit

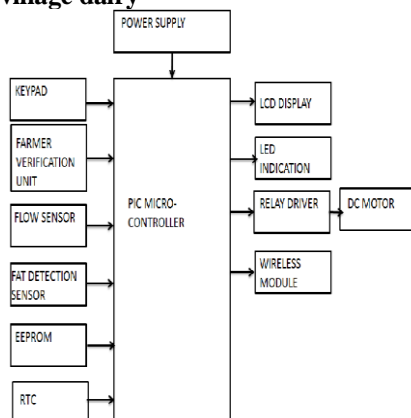
- The milk is weighed on electronic weighing scale and the weight of milk will be captured.
- Then the fat analyser analyses the Fat, SNF, Water parameters from collected milk by taking small sample of milk.
- According to the parameters the price of milk is calculated.
- The billing amount will be calculated and added to the database.

The system requires physical place to keep the system modules as all are large in size. System is not as such portable to move. Operation handler requires knowledge of computer for running system operation. System utilizes more power. This system is costly.

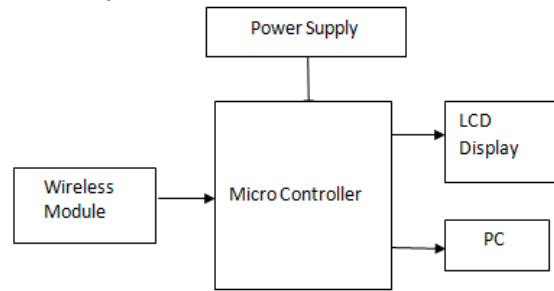
III. PROPOSED SYSTEM

Milk collection systems currently being used are not portable and are costlier. The proposed system will incorporate small electronic device with all necessary module. So that it will be a portable and less costly. The module contains a farmer verification unit, a fat sensing circuit, a quantity measurement device and a RF wireless module for transmission of data

A. Local village dairy



B. Main dairy



IV. BLOCK DIAGRAM EXPLANATION

A. FARMER VERIFICATION UNIT:

Farmer verification unit consists of RFID system and a 4*3 keypad.

RFID system consists of three components: an RFID tag or smart label, AN RFID reader and an antenna, RFID tag contains an integrated circuit and an antenna which are used to transmit data to RFID reader. The reader converts radio waves to more usable form of data. Then information collected from the tags is then transferred through a communication interface to the host computer system where data can be stored in the database and analysed at a later time.

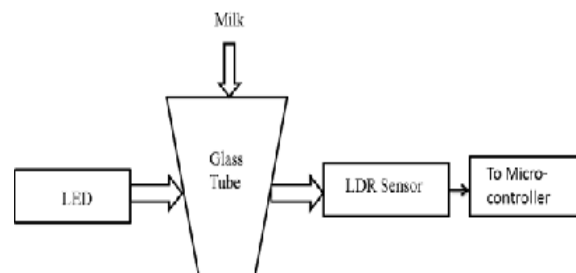
Farmer will be entering the password using a 4*3 keypad.

B. FAT SENSING CIRCUIT:

We have designed an instrument that will be useful to an animal farmer in India. Fat sensing circuit is a power electronic based device. This is low weight and easily accessible to farmers

Key Features of fat sensing circuit

- Simple and light weight design.
- Low cost.
- Low power consumption.
- Easy to operate.
- Very small quantity of milk requirement.
- No acid or other chemicals are used.



Principle of working fat sensing circuit:

The scattering of a beam of light by the fat globules present in the homogenized milk is the principle in the fat sensing circuit. The amount of light scattered by the milk sample is a measure of the fat content in the milk.

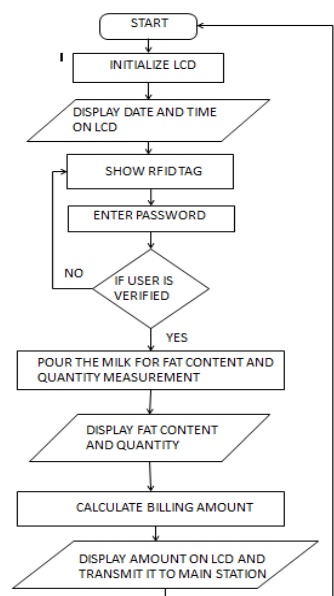
Construction:

A high intensity LED is used as a light source. The light beam is made to pass through the sample solution contained in the test tube. A LDR is placed exactly on the opposite side of the test tube to detect the amount of light passing through the test tube un scattered. To obtain maximum sensitivity the test tube is covered in wooden shield which has opening only for LED and LDR to pass through. Voltage across is given as an input to the microcontroller.

C. QUANTITY MEASUREMENT UNIT:

For quantity measurement purpose we are using a Flow Sensor. Flow sensor can be used to create a flow meter or calculating amount of liquid passing. This sensor sits in line with your liquid line, and uses a pinwheel sensor to measure how much liquid has moved through it. The pinwheel has a little magnet attached and there's a Hall Effect magnetic sensor on the other side of the plastic tube that can measure how many spins the pinwheel has made through the plastic wall. This method allows the sensor to stay safe and dry. Water flow sensor consists of a plastic valve body, a water rotor, and a hall-effect sensor. When water flows through the rotor, rotor rolls. Its speed changes with different rate of flow. The hall-effect sensor outputs the corresponding pulse Signal. This pulse is given as input to the microcontroller. Microcontroller will count the no of pulses and depending upon the previously calibrated value it will give the value of quantity in litres and display that quantity on the LCD display. This all data collected i.e. farmer ID, fat content of the milk brought by that farmer, and the quantity of milk will be displayed on the 16*4 LCD along with billing amount. Billing amount will be calculated by the system using the equation $Price = amount\ of\ milk * Rate\ of\ milk\ as\ per\ fat\ milk\ (In\ litres)\ content\ (In\ Rs)$. This all data will be stored at the local dairy as well as the data will be transmitted to the main dairy using a RF trans-receiver pair. With the proposed System monthly or weekly payments can be easily done.

IV. FLOWCHART



V. RESULT



Fig 1.LCD Displaying Show Card Message



Fig 2.LCD Displaying User Logged In



Fig 3.LCD Displaying Quantity And Fat Content Of Milk

VI. ADVANTAGES

- Accurate information about the fat content, quantity of milk and the payment due to the farmer is displayed;
- Immediate testing of the quality of milk as against testing after 2 to 3 hours of collection;
- The card reader unit ensures speed of operation and an error-free entry of identification number of the farmer;
- The elimination of manual registers for all kinds of information and data storage. The reading of milk sample displayed on LCD. Each farmer is provided with a unique ID number. The daily transduction for each farmer is to be stored on the internal memory as well as on a smart card of the farmer.

VII. CONCLUSION

In this paper, we have presented a cost effective, highly portable milk collection system using transceiver pair connectivity for sending data to remote dairy station. In future this system can also be modified and used for

various collection processes. The prototype of system has been developed and tested successfully. Use of smart cards to enter the daily billing for a farmer makes it convenient for the dairy management and farmer to keep account of the entries made for a month and beneficial to Indian farmer.

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LINKS

For current system being used <http://www.akashganga.in/amcscomputer.htm>