

# Smart Dairy Managements System

Sagar Shinde<sup>1</sup>, Arif Patel<sup>2</sup>, Rohit Waghmare<sup>3</sup>, Prof. P.J. Chorage<sup>4</sup>

*Student-Bachelor of Engineering, E&TC Engineering Department, DACOE, Karad, India <sup>1</sup>*

*Student-Bachelor of Engineering, E&TC Engineering Department, DACOE, Karad, India <sup>2</sup>*

*Student-Bachelor of Engineering, E&TC Engineering Department, DACOE, Karad, India <sup>3</sup>*

*Assistant Professor, E&TC Engineering Department, DACOE, Karad, India<sup>4</sup>*

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**Abstract:** In milk industry, milk collection is on of the first step needed to be taken before processing & supplying it to consumers. In order to enforce this, Milk Collection Center is setup which collects milk from farmers & transports it to processing center. Apart from just collecting milk dairy need to keep record of each farmer for processing payments based on its milk quantity and quality. Crowd management and safety becomes a serious issue when all this work is carried out manually. Whereas, manual recording and collection is not only time consuming but also leads to data manipulation which compromises milk quality and payment processing. An Internet of Things (IoT) based smart milk collection system addresses these issues by introducing automatic milk quantity & quality check along with record management with minimal human interference.

**Keywords:** Milk Collection, Raspberry Pi 3 B, Radio Frequency Identification (RFID), Farmer, Database.

## 1. INTRODUCTION

Traditional dairy's used milk measuring cans for determining quantity of milk and manual fat, SNF, density testing methods for determining milk quality. Also a paper based record was maintained for reference and payment processing. Nowadays dairies have upgraded to integrated units which consists of electronic weighing machines, milk analyzers and computer with printer for data processing and generating payment slips. The daily milk collection process includes manually feeding farmer details in computer followed by analyzing milk sample, weighing milk and storing data. Based on quantity and quality therate gets calculated and payment slip is printed. This collection process in recent milk collection is indeed more advanced than traditional milk collection system, but is still time consuming and needs both time and crowd management solutions. Eliminating physical contact and avoiding crowd is the need of the hour and demand of situation. This could be achieved by installingsmart milk collection system at dairy which will automatically perform all the task right from collecting milk from farmer, weighing and testing it and most important maintaining records within single shift without any human interference through a web application.

## 2. NECESSITY

- **Reduce man power:** most of the dairy have used man to perform some manual work to carry out. Most of the time
- **Clerical work:** Most of the dairies have carried out notebooks to carry forward farmer's day to day ledger. At the end of the month they calculate every day's ledger and pay the bill to the farmer according to farmer's data & this is tedious process to calculate bills at the end of month.
- **Adulteration:** There are many farmers which adulterates for their benefits by adding water, detergents, starch, urea, baking soda etc. which results to increase SNF in the milk. Due to it they get much value for their milk. But these adulterations in the milk are dangerous to human health.

## 3. OBJECTIVE

- Reduce the man power.
- Reduce clerical work.
- Reduce the time.
- Improve the quality of milk.
- Help dairy administration to maintain relation with farmers.
- Digitally access of daily transaction to farmers throw web application.

## 4. MOTIVATION

In this system our main goal is to eliminate the Traditional milk collection system and introduce advanced milk collection system which helps in reducing human efforts. Also it includes collection, billing and the testing of milk. Most of times the farmers who lives away from the dairy, they have to come early to submit the milk also further milk process more than two peoples are required. So must be a system which

will do the measurement lie fat, weight in few steps. Thus we develop a system that will automatically perform these operations.

### 5. BLOCK DIAGRAM

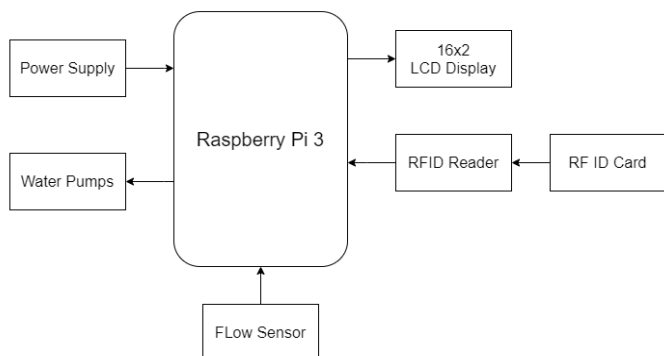


Fig 1. Block Diagram of Smart Dairy Management System

### 6. BLOCK DAIGARM DESCRIPTION

#### 6.1 Raspberry Pi 3B

Raspberry Pi 3B is a system on Chip (SoC) device based on BCM2837 ARM cortex family. Raspberry Pi is one of the best hardware for any IoT application Development platform. Here in the we have used as the heart of the system. Raspberry pi is doing maximum work like recognize farmer, measure milk quantity, send read to a server. This all work has carried out by Raspberry pi.

#### 6.2 RFID Reader

RC522 RFID Module has used in Smart Dairy Management system, it supports 13.56 MHz frequency. It required 3.3 volt input power supply. This RFID module has MFRC522 controller. It is passive type of RFID Module work on very low voltage. RFID reader has used to authentic the farmer in system. To each farmer we have assigns its own RFID card. Through that unique RFID number the system will get authenticate.

#### 6.3 Flow Sensor:

Here in the system S201 flow sensor has used to measure flow rate of milk. This flow sensor based on PWM signal this illustration gives detailed working method of hall effect sensor based water flow sensor, a turbine wheel embed with magnet is placed on a closed plastic envelope and a Hall effect sensor placed, When the water flows through the pipeline. It makes the turbine wheel to rotate and hence the magnet flux interferes the hall sensor. The rate of interference is depends on the speed of water flow, so the hall effect sensor produce pulse signal output, this pulse output can be calculated as water volume.

### 6.4 Water pumps

Here is the system 12 volt water pumps have used remove milk from one tank and pass milk to sub tank. To switch these water pump here in system relays have used.

### 6.5 Power Supply

Raspberry pi requires 5 volt 3 A DC power supply. So with power consumption raspberry is a low powered device system on chip device.

### 7. Flow Chart

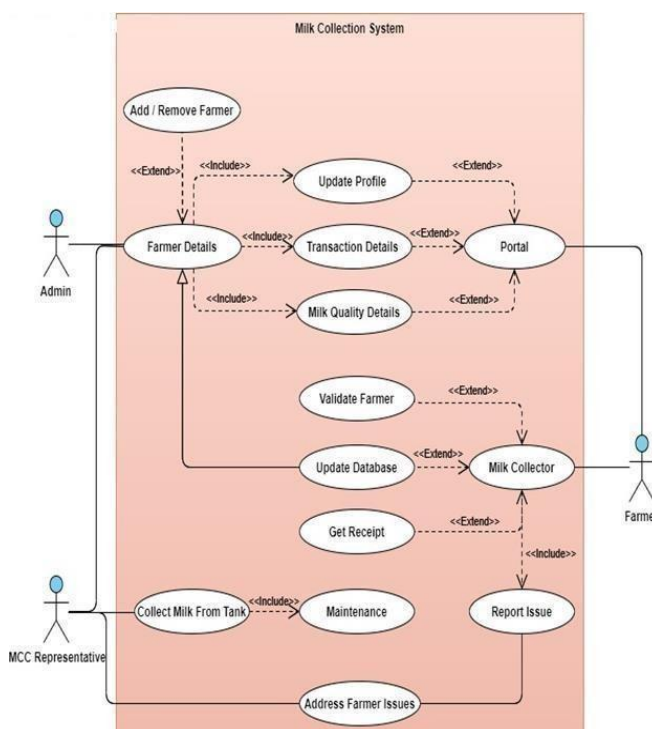


Fig 2. Flow Chart

### 8. WORING PRINCIPLE

The smart milk collection system is a single computerized machine performing all tasks included in collection process and does not require any operator to operate the machine. It automatically validates farmer for collecting milk and signals him to pour milk in the collector inlet then, it determines milk quantity and quality, updates records and finally generates a payment slip. The milk collection system needs to feed the farmer details only once for the first time and provide an authentication card to the farmer for accessing the milk collection system. Special features offered by the system are as follows:

**Farmer Authentication:** The smart milk collection system has a unique way of authenticating farmers via RFID technology which allows farmers to pour milk in milk collection tank once authenticated.

**Inbuilt Testing & Weighing Unit:** It has an inbuilt quantity and quality measuring unit which allows calculating rate for milk, since milk pricing depends on quantity and quality of milk.

**Billing Unit:** It generates a receipt which includes quantity, quality, pricing and shift details.

**Record Maintenance:** The data received from milk collector is stored in a database which keeps on updating after every single use. That updated can be analyzed and monitor by the dairy administration. So administration can maintain healthy relation with prior farmers, and serve them better service to improve their productivity of milk.

**Web Portal:** This online service allows farmers and dairy representatives to view recorded data anytime and also update authentication details. Farmer will have to face some trouble while submitting his milk.

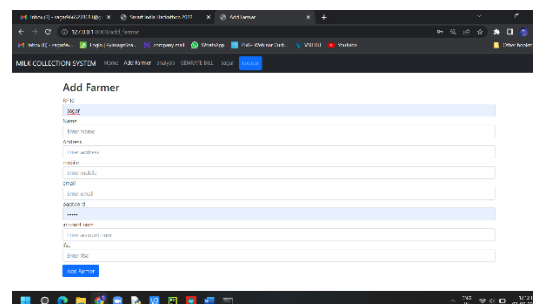


Fig 3. Website

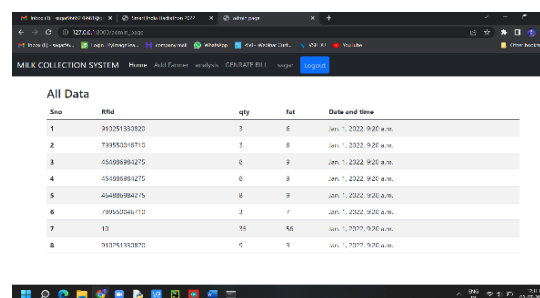


Fig 4. Database

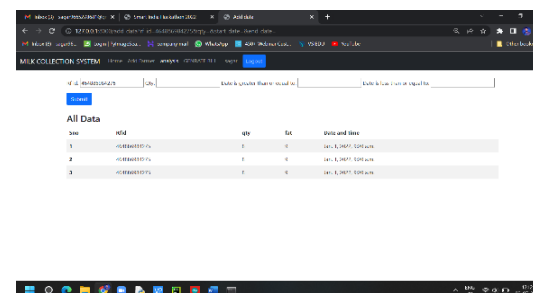


Fig 5. Result

## 9. RESULTS



Fig: Prototype

## 10. CONCLUSION

This paper shows that the smart dairy management system is going help society to transference in transection and dairy administration to build their business. And also it is going to reduce the man power. This is major factor which is going change dairy industries approach. Web application is gong help farmers to access their application.

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