

IOT Based Detection of Microbial Activities in Raw Milk

*Shinde Kajal P.¹, Yadav Shivashkti K.², Gholap Arati B.³, Bajaniya Shivangi R.⁴
Prof. Kadam P.R.⁵*

S.B.Patil College of Engineering, Indapur., Assistant Professor.S.B.Patil College of Engineering,
Indapur.

{shindekajal01¹, yadavshivashkti1², arati123gholap³, shivangibajaniya.9⁴ poojakadam.sbpcoe⁵}
@gmail.com

Department of Computer Engineering

Abstract

Day-by-day purity of food decreases for earning more money, by blending or mixing low quality material in original material. That creates human health problem, That is become a rural as well as urban areas people food safety issue. Result of different studies shows that stored raw milk contains some amount of bacteria. Thus there is necessity to develop a real time milk monitoring and controlling system. In the proposed system we are dealing with set of sensor unit which is connected to the arduino board and all this data then transmitted to the app with the help of Bluetooth device. On the bases of FAT and Liters amount is calculated. According to that result quality, acceptance of milk and rate of milk decided. The designed GUI of Android Application gives real time updated milk result to the User. Users are milk collector or supplier, Dairy Manager and Farmer. User can check date wise previous records, analysis of data is also done by the manager.

Index Terms - Arduino, SD I.2.9 Sensors, SD C.2.1 Network, SD J.7 Real Time.

INTRODUCTION

Dairy farming is joint business of Indian farmer as agriculture is backbone of our country. Farmers are primary milk provider to dairy by without any processing with their milk i.e. raw milk. Raw form milk is collected from collection points daily. At the collection point there is no any test has been taken so some time thousand liters milk slot can be spoiled because of some small amount of spoiled milk. That affects to quality, cost and mainly human health. Raw milk is analysis is very necessary because an earlier study shows that raw milk having pathogenic organisms that will results increase in diseases and degrade the quality of life. The basic necessity of human being is milk which will provide strength to human body. When fresh milk obtained from healthy cow then it contains fewer amounts of bacteria. We are design such system that reduce wastage of milk, human effort as well as time. System effectively

checks quality of raw milk at the collection point and provide real time result on android apps to user as well as manager.

LITERATURE REVIEW

In this section we are discussing the different milk spoilage detection techniques that are implemented before and also the technologies, features, future work of those systems.

In the Paper [1], The RTOS based electronic nose monitoring system uses array of sensors that detects bacterial activities in the headspace of milk container. The sensors which are used for expressed and adjusted to a several concentration of VOC's which is responsible for milk flavors. That monitoring system provides toxic bacterial count in the raw milk. This E-nose system tested various fields as scents and gases from different beverages. It is a classification of cold drink as blackcurrant

juice, orange juice and mango juice. E-nose System provides good classification result by using two methods: PCA (Principal Component Analysis) and MLP (Multi-Layer Perception) [8]

In the paper [2], The e-nose system consist of metal oxide gas sensor and temperature sensor which is used for correct measurement and classification of beverages. System consist of Five main component-sampling chamber, data acquisition system, power supply, control unit. Good classification result evaluated with the help of Principle Component Analysis and Multi Layer Perception Neural Network.

In the paper [3], The skilled persons developed an embedded portable biosensor system that provide result in minimum time as compare to Standard Plate Count method which requires 24-72 hours. In that they uses algorithm for transformation of biosensor resultant data that easy to prove and implement. Result shows good correlation between biosensors result and standard technique results.[8]

In the paper [4], They established such a system which will identify the blends like shampoo, urea, sugar, NH₃ etc. from milk with the help of various sensors. Result of present parameter in raw milk was displayed in percentage form. For the acceptance of the milk there is necessity of PH value which gives the acidity of milk[8]

In paper [5], In dairy industries watching and controlling of milk hotness is necessary. They implement the embedded system which will monitor and control the temperature of milk with the help of valve. If the temperature exceeds the predefined limit the valve gets closed automatically. Temperature sensor provide result to the signal conditioning unit that contain amplifying and filtering process that check

limit and decide whether valve get close or not. Pasteurization process is nothing that heating milk at high temperature and then sweep to cooling state. Basically pasteurization process is used in drinks and food industries. That foils milk from spoilage for minimum time span[8].

In paper [6], They uses uSense Technology for real time milk monitoring system with the TGS gas sensors. In that technique milk spoilage result is provided within a fraction of second. As the raw milk is collected from cow it contains some amount of bacteria but it does not have any ill effect. As it stores for longer time the amount of bacteria gets multiplied.

LIMITATIONS OF EXISTING SYSTEM.

As per our literature review we comes to know that previous system used highly analytical instruments[1][8].

Our review shows that these instruments provide less accuracy, so that it does not provide portability1][2].

PROPOSED SYSTEM

The proposed system contains different unit like sensors, Controller, Android Phones, Bluetooth device etc.Our system takes milk as a input and then it will check different parameters like FAT value of milk, pH of milk, and if any gases are present TGS 822 gas sensor detect that value and these value will be given into App with Bluetooth device and these data is then maintain in database.

We have created two android app one is for depositor and other is for manager. In depositor app it will be check all values or parameters of milk and put data into database. Similarly manager app will be check all data of depositor and make the payment of depositor as well as it having authority to add depositor.



Fig. 1: System Architecture

EXPERIMENTAL RESULTS

The proposed system is defined to detect the microbes from the raw milk as well as the measurement of FAT and pH value.

For this collection we have created an Android app for depositor also for the manager of the dairy farm.



Fig. 2: Experimental Setup

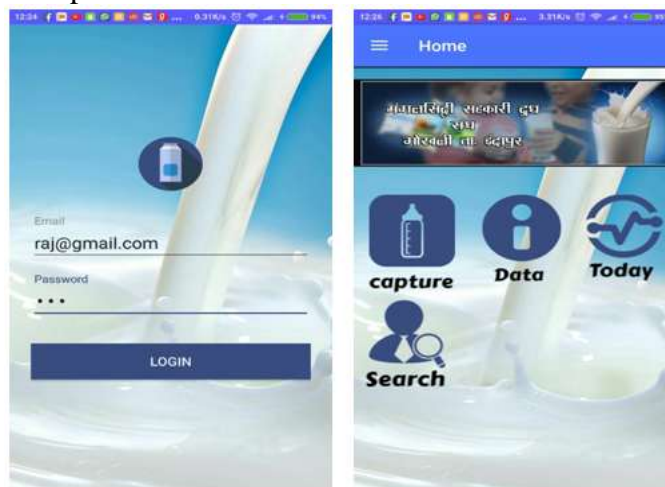


Fig. 3: Depositors App

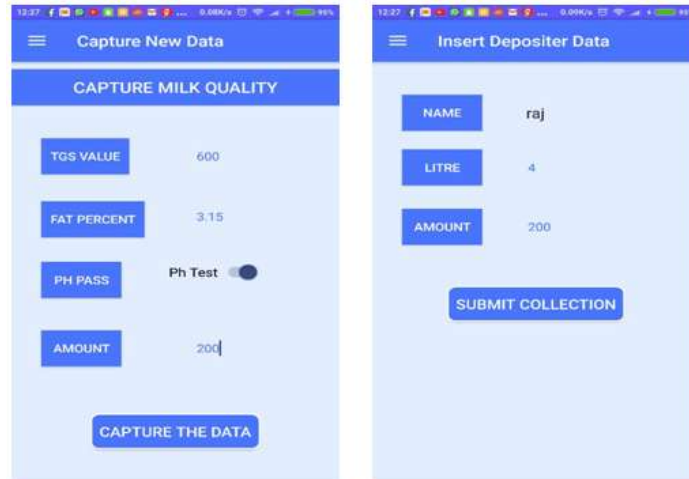


Fig. 4: Result Collection

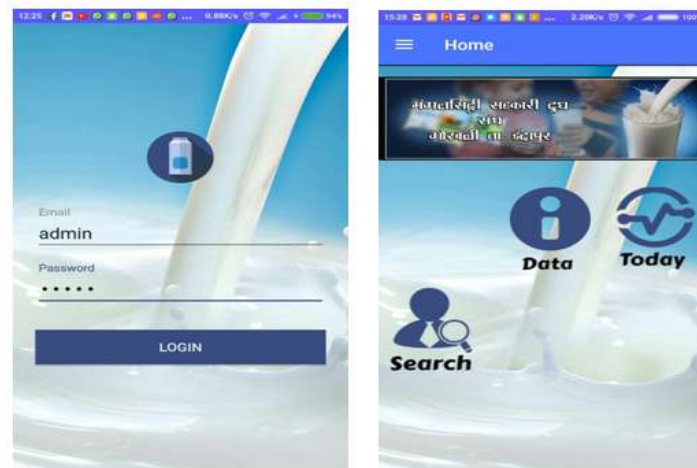


Fig. 5: Manager App

APPLICATIONS

In the milk dairies this system is useful for testing of raw milk collected from milk different sources. If in raw milk any objectionable microorganism found then that milk would be rejected.

At our home this system is useful for early detection of microbes from milk which is purchased from milk providers.

CONCLUSION

After this survey we come to know that lot of work has been done related to the detection of bacteria in raw milk. They were used the sensor array in E- nose system [1]. For SPC test it requires 24-72 hours for the detection so they design a biosensor system with the algorithm [3]. As know that the people add the some blends for increase of fat so they

developed blend detection system[4].So we have we have developing real time monitoring tool with the help of different sensor and processing unit Intel Galileo Gen II

REFERENCES

- 1.The electronic nose applied to dairy products: a review S. Ampuero, J.O. Bosset Swiss Federal Dairy Research Station, FAM, Schwarzen burgstrasse 161, Liebefeld, CH-3003 Bern, Switzerland Received 20 December 2002; received in revised form 22 February 2003; accepted 3 March 2003.
- 2.An Electronic Nose for Reliable Measurement and Correct Classification of Beverages Mazlina Mamat Salina Abdul Samad and Mahammad A. Hannan 2011

3. Journal of Electrical Engineering Electronic Technology Data Transformation Algorithm for Reliable Bacterial Concentration Detection Using the Impedance Method Marco Grossi, Massimo Lanzoni, Diego Matteuzzi and Bruno Ricc 2014
4. The Detection Of Urea, Sugar, Sodium Chloride, And Measurement Of Ph Parameter In The Milk By Using Arm Processor. Prof S.G.Galande Jhadav Dnyaneshwar B.Mhase Mayur D.Manakar Rahul J.2015.
5. International Journal of Engineering Trends and Technology (IJETT) Volume 16 Number 5 Oct 2014 ARM Based Temperature Monitoring and Control for Milk Pasteurization S.Boopathi ,F.Parvez Ahmed , S.Thulasi Ram , T.Devika , Dr.N.SuthanthiraVanitha
6. Milk products monitoring system with ARM processor for early detection of microbial activity Dr.S.Asif Hussain, Dr.M.N.Giri Prasad, Chandra Shekar Ramaiah, S. Mazhar Hussain 2016 3rd MEC International Conference on Big Data and Smart City
<http://www.figarosensor.com/products/822pdf>.
7. IoT based detection of microbial activity in raw milk by using Intel Galileo Gen II. 2017 Volume 4, Issue 1, International Research Journal of Engineering and Technology (IRJET)