**A Minor Project Report on**

**Smart diary management system based on RFID**

# Submitted by

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# DECEMBER 2024

# i

**M.KUMARASAMY COLLEGE OF ENGINEERING**

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**BONAFIDE CERTIFICATE**

Certified that this Report titled **“SMART DIARY MANAGEMENT SYSTEM BASED ON RFID”** is the Bonafide work of **NALIN S (927622BEE074), SUGANTHI B (927622BEE118), YOGESHWARAN L (927622BEE310)** who carried out the work during the academic year (2024-2025) under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report.

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Submitted for Minor Project III (18EEP301L) viva-voce Examination held at M Kumarasamy College of Engineering, Karur-639113 on ………………...

ii

# DECLARATION

We affirm that the Minor Project III report titled “ **SMART DIARY MANAGEMENT SYSTEM BASED ON RFID ”** being submitted in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering** is the original work carried out by us.

|  |  |  |
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iii

## VISION AND MISSION OF THE INSTITUTION VISION

* To emerge as a leader among the top institutions in the field of technical education

## MISSION

* Produce smart technocrats with empirical knowledge who can surmount theglobal Challenges.
* Create a diverse, fully engaged, learner - centric campus environment toprovide Quality education to the students.
* Maintain mutually beneficial partnerships with our alumni, industry andProfessional associations.

## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING VISION

To produce smart and dynamic professionals with profound theoretical and practical

knowledge comparable with the best in the field.

## MISSION

* Produce hi-tech professionals in the field of Electrical and ElectronicsEngineering by inculcating core knowledge.
* Produce highly competent professionals with thrust on research.
* Provide personalized training to the students for enriching their skills.

## PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

* **PEO1:** Graduates will have flourishing career in the core areas of Electrical Engineering and allied disciplines.
* **PEO2:** Graduates will pursue higher studies and succeed in academic/research careers.
* **PEO3:** Graduates will be a successful entrepreneur in creating jobs related toElectrical and Electronics Engineering /allied disciplines.
* **PEO4:** Graduates will practice ethics and have habit of continuous learning fortheir success in the chosen career.

iv

**PROGRAMME OUTCOMES(POs)**

After the successful completion of the B.E. Electrical and Electronics Engineering degree program, the students will be able to:

**PO1: Engineering Knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

**PO2: Problem Analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

**PO3: Design/Development of solutions:**

Design solutions for Complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

**PO4: Conduct Investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

**PO5: Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

**PO6: The Engineer and Society:** Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

**PO7: Environment and Sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

**PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

v

**PO9: Individual and Teamwork:** Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

**PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO11: Project Management and Finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

**PO12: Life-long learning:** Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## PROGRAM SPECIFIC OUTCOMES(PSOs)

The following are the Program Specific Outcomes of Engineering Students:

* **PSO1:** Apply the basic concepts of mathematics and science to analyses and design circuits,controls, Electrical machines and drives to solve complex problems.
* **PSO2:** Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.
* **PSO3:** Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real-world problems.

|  |  |
| --- | --- |
| **Abstract (Key Words)** | **Mapping of POs and PSOs** |
| Arduino Nano, Rfid reader, Rfid tags,  Liquid crystal display | PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO11, PSO1, PSO2, PSO3. |

vi

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vii

**TABLE OF CONTENTS**

**CHAPTER CONTENTS PAGE NO**

**NO**

**ABSTRACT x**

**1 INTRODUCTION 1**

**1.1 BACKGROUND OF THE PROJECT 1**

**1.2 PROBLEM STATEMENT 1**

**1.3 OBJECTIVES 1**

**2 LITERATURE REVIEW 3**

**3 PROPOSED METHODOLOGY 5**

**3.1 BLOCK DIAGRAM 5**

**3.2 BLOCK DIAGRAM DESCRIPTION 5**

**3.3 CIRCUIT DIAGRAM 6**

**4 HARDWARE DESCRIPTION 7**

**4.1 RFID TAGS 7**

**4.2 RFID READERS 7**

**4.3 ARDUINO NANO 8**

**4.4 LIQUID CRYSTAL DISPLAY 9**

**5 HARDWARE IMPLEMENTATION 10**

**5.1 IMPLEMENTATION OF HARDWARE 10**

**6 FUTURE SCOPES 11**

**CONCLUSION 12**

**REFERENCES 13**

viii

**LIST OF FIGURES**

**FIGURE NO TITLE PAGE NO**

**3.1 BLOCK DIAGRAM 5**

**3.2 CIRCUIT DIAGRAM 6**

**4.1 RFID CARDS 7**

**4.2 RFID READERS 8**

**4.3 ARDUINO NANO 8**

**4.4 LIQUID CRYSTAL DISPLAY 9**

**5.1 IMPLEMENTATION OF 10**

**HARDWARE**

ix

# ABSTRACT

The RFID-Based Automated Milk Billing System is an innovative solution for farmer to

designed the streamline the process of milk collection, monitoring, and billing in dairy farms. This system utilizes Radio Frequency Identification (RFID) technology automatically identify and record the quantity of milk collected from individual farmers. Each farmer is provided with a unique RFID tag, which is scanned when they deliver milk. The system then measures the volume of milk and records the data along with the farmer’s information in a centralized database.The objective of the RFID-Based Automated Milk Billing System project is to streamline the milk collection and billing process at dairy farms and cooperatives by implementing an efficient, automated solution This system utilizes RFID (Radio Frequency Identification) technology to identify milk cans or containers associated with different farmers. As each can is scanned at the collection point, the system automatically records the quantity of milk delivered, calculates the total cost based on predefined rates, and generates a bill for the farmer

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# CHAPTER 1

# INTRODUCTION

## BACKGROUND OF THE PROJECT

#### Dairy farming requires precise management of livestock health, productivity, and breeding cycles. Traditional methods of managing dairy farms can be labor-intensive, time-consuming, and prone to human error. This is particularly true in large-scale farms, where tracking each animal manually can become challenging. A Smart Dairy Management System based on RFID addresses these challenges by leveraging technology for improved productivity, animal welfare, and operational efficiency.

**1.2 PROBLEM STATEMENT**

Traditional dairy farm management relies heavily on manual processes to track and manage livestock, which is labor-intensive, prone to human error, and often inefficient, especially on large-scale farms. Farmers face significant challenges in accurately monitoring animal health, tracking production levels, managing feeding schedules, and keeping up with breeding cycles. The absence of a centralized, automated system can lead to issues such as Inefficient Tracking and Monitoring, Inaccurate Data Collection and Analysis, Challenges in Record-Keeping for Compliance

**1.3 OBJECTIVES**

**Efficient Tracking:** Use RFID tags attached to each animal to automatically track their movements, feeding habits, and other essential data without manual intervention.

1

**Data Collection and Management:** Develop a centralized system to collect and storedata

related to animal health, milk production, feeding schedules, and breeding cycles. This data can then be analyzed to make informed decisions**.**

**Enhanced Record-keeping and Productivity:** Reduce manual labor and errors by automating the record-keeping process, thus allowing farm operators to focus on high-level management tasks.

2

# CHAPTER 2

# LITERATURE REVIEW

# Paper 1: The Development of Smart Dairy Farm System and Its Application

# Nutritional Grouping

# Inference: This study combined IoT technology with dairy farm management to set up SDFS. All kinds of data in the dairy farm will be intelligently captured by various sensors and transmitted to the SDFS in time for corresponding integration analysis. The applications of the SDFS were demonstrated in two aspects.

**Paper 2: Data Management system**

**Inference:** RFID-based Data Management System for dairy farms involves drawing valuable insights from the data collected via RFID technology to support decision-making and operational improvements. This system goes beyond just collecting data; it processes and analyzes it to provide actionable information to enhance the efficiency, productivity, and health monitoring of the farm.

**Paper 3: RFID Based Library Management System**

**Inference:** This project helps to identify the large number of tagged books using radio waves. The database shows the availability of the book in the library so that the student can search in the database and if available, they can collect book from the library. It helps to handle the issue, renewal and return process via RFID tags easily.

**Paper 4: RFID attendance system using Nicodemus**

**Inference:** This is an RFID card based attendance system which sends the attendance and user data to server using wifi.This attendance system is based on RFID technology for

3

identification. It sends the attendance data to the server using wifi. For reading RFID card and sending data to server RFID module RC522 and NodeMCU is used. The server sidecode is written using jango and frontend is made using Bootstrap 4. It also do not requires the wifi credentials to be hard coded inside it.

4

# CHAPTER 3

# PROPOSED METHODOLOGY

# 3.1 BLOCK DIAGRAM

# 

# Figure.No.3.1 Block diagram

# 3.2 BLOCK DIAGRAM DESCRIPTION

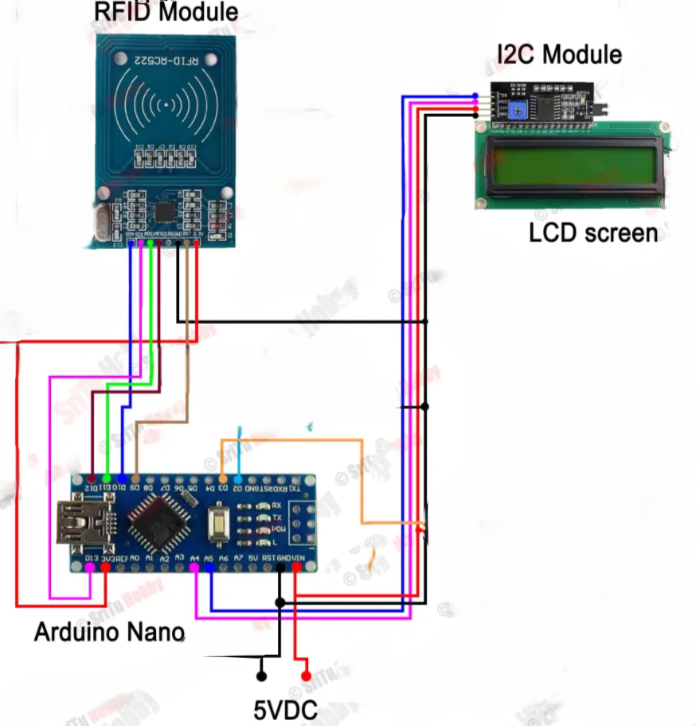
# The provided block diagram outlines the working of Smart dairy management system based on RFID

1. **Power Supply:** This supplies electricity to the appliance and other system components, ensuring continuous operation.
2. **RFID tags:** Each milk supplier (usually farmers) is given an RFID tag/card.The RFID tag contains a unique identification code that links the supplier to a database, where their profile and milk supply history are stored

**5**

1. **RFID readers:** An RFID reader in a smart dairy management system identifies and tracks the user by reading RFID tags, automating data collection and monitoring.
2. **Arduino nano:** The Arduino Nano controls RFID readers, processes tag data, and sends it to a central system for tracking and managing information.
3. **Liquid crystal display:** An LCD displays real-time data for quick, on-site monitoring.

**3.3 CIRCUIT DIAGRAM**

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**Figure.No.3.2 Circuit diagram**

6

**CHAPTER 4**

**HARDWARE DESCRIPTION**

**4.1 RFID TAGS:**

RFID cards are used to streamline customer identification and transactions. Each customer is issued an RFID cardembedded with a unique ID, which is linked to their account. When the customer visits the milk dispensing station, they simply scan the card at the RFID reader. The systemautomatically identifies the customer, records the amount of milk dispensed, and calculates the bill accordingly. This eliminates manual data entry, reduces errors, and speeds up the transaction process, making the system efficient, secure, and user-friendly. Each milk supplier (usually farmers) is given an RFID tag/card.The RFID tag contains a unique identification code that links the supplier to a database, where their profile and milk supply history are stored



# 

# Figure.No.4.1 RFID cards

# 4.2 RFID READERS:

# RFID Reader MFRC522 Module Full form of RFID is Radio Frequency Identification. RFID tags and RFID reader use wireless communication between them. In this kind of communication RFID Reader does not need any line of sight with the tags. The reader can find the RFID tag even if there is an obstacle between them.

# 7

# 

# Figure.No.4.2 RFID readers

# 4.3 ARDUINO NANO:

# In a *Smart Dairy Management System based on RFID*, the Arduino Nano plays a crucial role as the main microcontroller for reading, processing, and transmitting data collected from RFID tags. The Arduino Nano is a compact, lightweight, and cost-effective microcontroller that’s ideal for small, embedded systems in IoT applications. It features an Atmega328 microprocessor and a variety of digital and analog I/O pins, making it suitable for controlling sensors, modules, and other connected devices.

# Arduino Nano V3

# 

# Figure.No.4.3 Arduino nano

# 8

# 4.4 LIQUID CRYSTAL DISPLAY:

# Liquid Crystal Display (LCD) plays a crucial role in providing real-time information to both the customer and the system operator. When the RFID tag, assigned to a customer, is scanned, the system automatically identifies the user and retrieves relevant data such as the quantity of milk and the associated cost. The LCD then displays this information, allowing the user to view transaction details instantly. This is the improve transparency,enhances user experience, and streamlines the billing process by reducing human error and ensuring quick, accurate transactions.

# 

# Figure.No.4.4 Liquid crystal display

# 9

# CHAPTER 5

# HARDWARE IMPLEMENTATION

# 5.1 IMPLEMENTATION OF HARDWARE

# 

# Figure.No.5.1 Implementation of hardware

# 10

# CHAPTER 6

# FUTURE SCOPES

# The future scope of an automated milk billing system based on RFID (Radio Frequency Identification) technology is promising, particularly in streamlining the dairy industry.

# With RFID tags, farmers can efficiently track milk quantities, automate billing, and ensure transparency in transactions.

# Future advancements may integrate IoT (Internet of Things) for real-time monitoring of milk quality and supply chain management, providing instant updates to farmers and consumers.

# 11

# CONCLUSION

# 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.

# 12

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# 13