IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, April 2026
Impact Factor: 8.2

Smart Shade: Automated Livestock Care and Environment Motoring System

Ms. Priyanka Dilip Devkate, Ms. Swapnali Brahmadev Survase, Ms. Rohini Dipak kamble
Ms. Gitanjali Shivaji Pawar, Prof. H. R. Dhananjaya
Department of Electrical Engineering
Brahmadevdada Mane Institute of Technology, Belati, Solapur

Abstract: *Smart Shade is an Arduino Uno-based automated livestock care and environment monitoring system designed to enhance cow well-being and productivity. It integrates temperature control, intelligent watering and feeding systems, stress-reducing fragrance release, and real-time clock control. Results show effective temperature control, automated systems, reduced stress levels, and improved cow well- being and productivity. Smart Shade offers a comprehensive, efficient, and cost- effective solution for smart farming applications. The health and productivity of livestock significantly depend on timely feeding, comfortable environmental conditions, and proper hydration. Manual management of these tasks can be time-consuming, inconsistent, and labor-intensive. To address these challenges, this project, "Smart Shade: Automatic Livestock Care and Environmental Monitoring System," introduces a fully automated solution for livestock care. Keywords: Smart shade system, Arduino Uno, Temperature control, Watering System, Feeding system, Fragrance system, Real-time clock, Cattle welfare, Productivity*

Keywords: *Smart Shade*

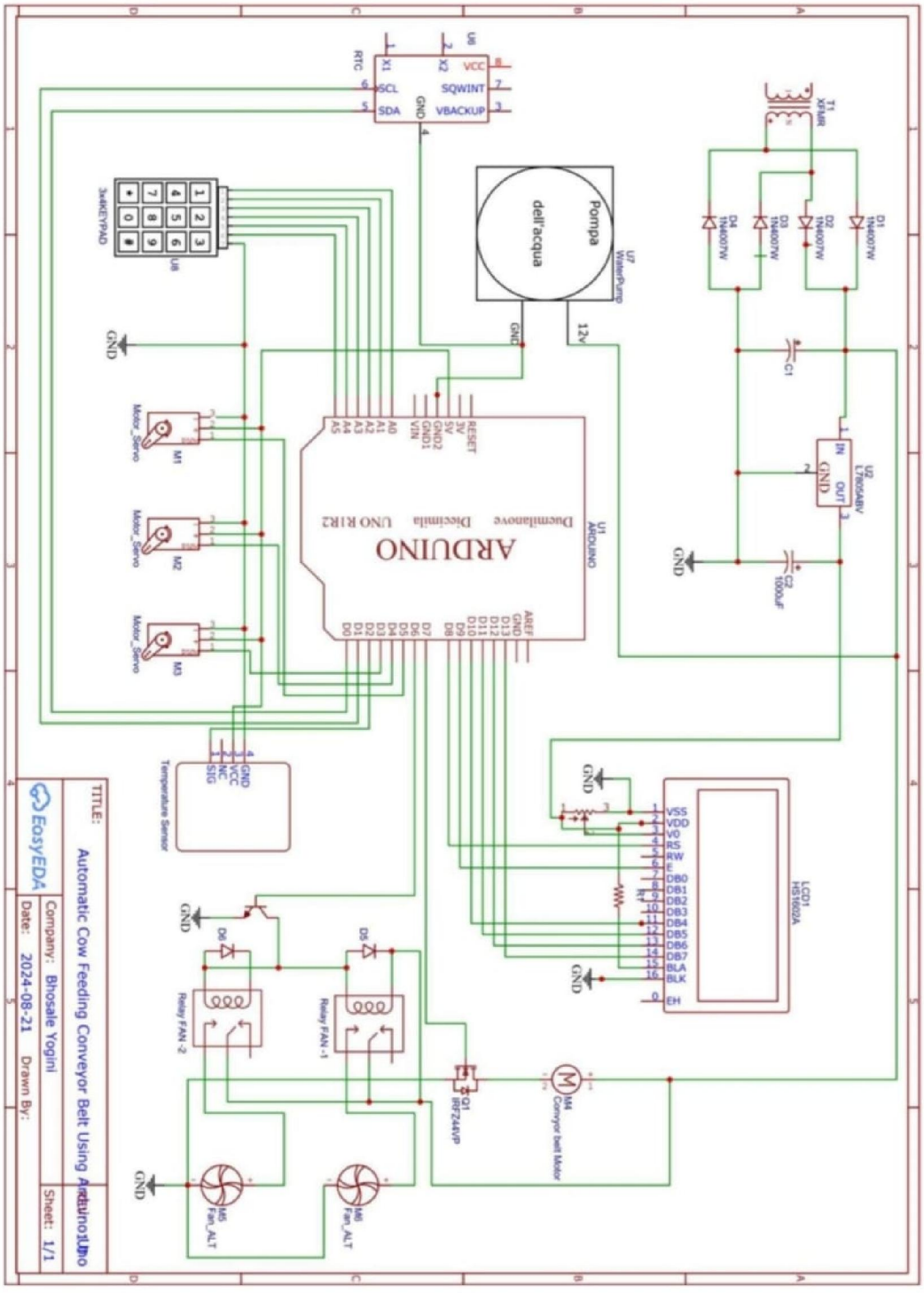
I. INTRODUCTION

Automatic Cow Feeding System is a technological solution for feeding cattle without human interference. Design and develop an automated system providing shade and water for cows, by using Sarvo Motor enhancing their comfort and productivity. An Automatic Temperature-Based Fan in a Cow Shed is a system that regulates temperature and maintains a comfortable environment for cows. The main problem farmers facing now is feeding the cow with conventional and time consuming method.

By considering those factors The main problem farmers facing now is feeding the cow, we decided to develop this project. Design an automated cow feeding system using Arduino Uno and sensors to dispense the right amount of feed at scheduled intervals based on the cow's weight and nutritional needs. The system should be able to monitor the feed levels, dispense feed accurately, and provide real-time clock on feeding patterns to ensure the cow's health and well-being.

Design, Development, and Evaluation of an Smart Shade System with Real-Time Clock, Temperature Control, Watering, Feeding using Arduino Uno: A Sustainable Solution for Enhanced Cattle Welfare and Productivity". Cattle farming plays a vital role in global food security, with the livestock industry contributing significantly to agricultural economies. However, cattle are susceptible to environmental stressors, such as extreme temperatures, humidity, and inadequate lighting, which can compromisetheir health and productivity. Heat stress, for instance, can lead to reduced milk production, decreased fertility, and increased mortality rates.

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, April 2026
Impact Factor: 8.2



CIRCUIT DIAGRAM

Copyright to IJARSCT
www.ijarsct.co.in
DOI: 10.48175/IJARSCT-32506

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, April 2026
Impact Factor: 8.2

BLOCK DIAGRAM

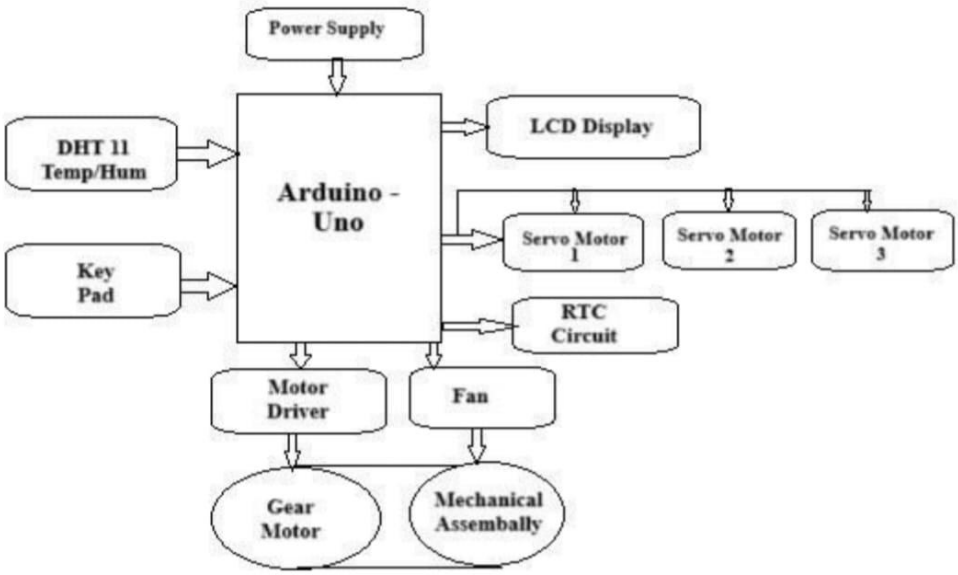


Fig. 3.1 Block Diagram

1. Power Supply: Provides power to the entire system.
2. Arduino Uno: Microcontroller board that controls the system.
3. Real-Time Clock (RTC): Keeps track of time and schedules system events.
4. Temperature Control System: DHT11 sensor monitors temperature and humidity.
5. Lighting Control: Servo Motor 1 adjusts lighting levels.
6. Watering System: Servo Motor 2 controls watering.
7. Feeding System: Servo Motor 3 dispenses food.
8. Fragrance System: Servo Motor 4 releases fragrance.
9. LCD Display: Shows system status, temperature, and user input
10. Keypad: Allows user input (e.g., setting temperature, lighting levels).

Key Components in the Circuit

1. Microcontroller (Arduino Uno)
o Function: Central control unit managing inputs, outputs, and real-time logic.
o Pins Used:
▪ Digital I/O: For servo, DC gear motor, fan, and keypad.
▪ PWM Pins: For controlling speed and position (e.g., servo motor).
▪ I2C Pins: For LCD and RTC communication (SDA - A4, SCL - A5).
2. DC Servo Motor
o Function: Performs precise movements (e.g., actuator or gate control).
o Connection: Connected to a PWM-enabled pin (D9 or D10).
3. DC Gear Motor
o Function: Drives the conveyor belt for material transport.
o Connection: Controlled via transistor/relay (visible in circuit) or through a motor driver

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429 Volume 6, Issue 3, April 2026 Impact Factor: 8.2

4. RTC Module (Real Time Clock – DS3231)
o Function: Maintains real-time for scheduling motor or fan operations.
o Connection: Connected via I2C (SDA to A4, SCL to A5).
5. LCD Display (16x2 with I2C Adapter)
o Function: Displays time, system status, or messages.
o Connection: I2C interface shared with RTC.
6. DC Fan
o Function: Operates for temperature management.
o Connection: Controlled by Arduino through a transistor (as seen in schematic).
7. Keypad
o Function: User input device for manual control or setting time/schedule.
o Connection: Digital pins of Arduino connected to rows/columns.
8. Conveyor Belt
o Function: Mechanical system driven by DC gear motor to move items.
o Drive Mechanism: Controlled through servo motor driver circuit.
9. Power Supply
o Components:
▪ 12V Battery/Adapter: For motors and fan.
▪ 5V Regulator (LM7805): Supplies 5V to Arduino and logic components.

Advantages

1. Automation of Daily Tasks

The system automates essential cattle care tasks like feeding, watering, and climate control, reducing the need for constant manual supervision and ensuring timely action every day.

2. Improved Animal Health and Productivity

Regular feeding and hydration routines contribute to better digestion, metabolism, and overall health of the cows. A controlled environment also minimizes stress, enhancing milk production and quality.

3. Efficient Use of Resources

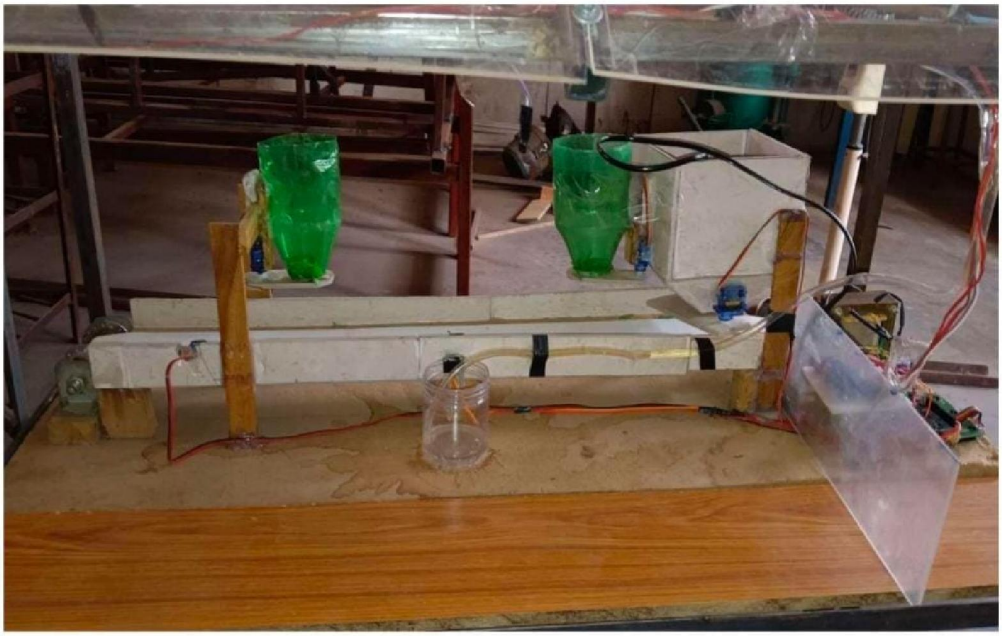
The system optimizes feed and water usage through timed or sensor-based control, reducing wastage and saving resources, especially in large-scale or resource-limited farms.

4. Labor Cost Reduction

With automated operations, farmers can reduce dependency on labor, leading to significant cost savings over time and improved efficiency during labor shortages.

II. CONCLUSION & FUTURE SCOPE

Smart shade with real-time clocks using Arduino Uno offer a promising solution for improving cow health and productivity. Further research and development can enhance the system's efficiency, accuracy, and scalability This research contributes to the development of innovative and sustainable solutions for cattle farming, addressing critical challenges in environmental management and animal welfare. The results indicate that the automated cow shade system can provide a comfortable and stress-free environment for cows, enhancing their welfare and productivity. The system's real-time clock and automation capabilities enable efficient management and reduced labor costs.

Copyright to IJARSCT
www.ijarsct.co.in
DOI: 10.48175/IJARSCT-32506

IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 3, April 2026
Impact Factor: 8.2