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Automated Livestock Feeding System

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ABSTRACT: This project focuses on the development of an automated feeding and water dispensing system for applications such as pet care, poultry farming, and small-scale agriculture. The system integrates a conveyor belt mechanism driven by DC motors for precise feed dispensing, coupled with a servo powered discharge system to prevent clogs. The water dispensing function utilizes a submersible or diaphragm pump, controlled by a relay module, alongside a water level sensor to ensure efficient water filling and monitoring. The system also includes a waste collection mechanism, which is activated at scheduled intervals to dispose of excess feed. The prototype is compact (100 cm x 80 cm) and features real-time monitoring through an OLED display, which shows feed and water levels along with system status. Additionally, an HC-05 Bluetooth module enables remote communication with a mobile app, allowing users to receive SMS notifications for low feed or water levels, enhancing user convenience. The design is energy efficient, ensuring minimal power consumption while maintaining system reliability. This automated system aims to reduce manual labour, improve operational efficiency, and provide users with remote management capabilities, making it scalable for various agricultural and pet care applications.

KEYWORDS: Automated feeding System, Conveyor belt, Storage tanks, Level measuring sensor, Bluetooth module, Waste Management.

I. INTRODUCTION

The need for automation in agricultural and pet care systems has been increasing as industries and individuals seek more efficient, reliable, and scalable solutions. Traditional feeding and water dispensing methods often require significant manual effort, making them time consuming and prone to human error. This project aims to address these challenges by developing an automated system that ensures precise and scheduled feeding and watering, reducing the need for constant human intervention while improving operational efficiency

The proposed system integrates multiple components, including a conveyor belt feeding mechanism, a water dispensing system, a waste collection system, and real-time monitoring tools. The conveyor belt, powered by DC motors, automatically dispenses feed at set intervals, ensuring a consistent and controlled ow of feed. To manage water dispensing, the system uses a submersible or diaphragm pump, which is monitored by a water level sensor to maintain the required water levels without overflow or shortages. The system's waste collection feature further enhances its efficiency by automatically removing excess feed at scheduled times

. A key feature of this system is its real-time monitoring and notification capabilities. An OLED display provides users with vital system information, such as feed and water levels, while an HC-05 Bluetooth module enables communication with a mobile app for remote notifications regarding low feed or water levels. This enhances convenience by alerting users to system status changes even when they are not physically present. The compact design and low energy consumption of the system make it suitable for a range of applications, including small-scale agriculture, poultry farming, and pet care. By automating critical tasks like feeding and watering, the system not only reduces labour costs but also optimizes resource usage, ensuring that animals and plants always receive the correct amount of feed and water. This project provides a reliable and scalable solution that contributes to the advancement of automation in agricultural and care-related industries.

II. MOTIVATIONS

The motivation behind this project stems from the increasing need for automation in various industries, particularly in agriculture and animal care, where manual feeding and watering systems are often inefficient, time-consuming, and





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prone to human error. As the demand for optimized agricultural practices, improved animal welfare, and resource efficiency grows, traditional methods are no longer sufficient to meet these needs. In many small-scale farms, poultry operations, and pet care facilities, workers often struggle to manage feeding and watering tasks manually, leading to inconsistent feed distribution, water shortages, or wastage. These issues can not only impact on the health and well-being of animals but also hinder overall operational productivity. Additionally, manual monitoring and intervention are often required, creating inefficiencies in terms of time, labour, and energy. This project is motivated by the desire to solve these challenges by introducing an automated, reliable, and scalable solution. The system aims to reduce the human labour required for feeding and watering while ensuring that animals receive the right amount of feed and water at regular intervals. By automating these tasks, the system also improves efficiency, reduces waste, and ensures a more consistent and controlled environment for animal care or agricultural needs.

III. OBJECTIVES

- 1. To automate the dispensing of chopped grass and supplements by timely delivery without the need for manual intervention using Arduino and to optimal resource management.
- 2. Installation of sensors for Continuous monitor of feed levels and sending notifications via GSM.
- 3. The adoption of a mechanized water filling system ensures that livestock maintains optimal hydration levels.

IV. METHODOLOGY

3.1 Block diagram

The system uses several key components to provide efficient monitoring and control of the Livestock feeding system. The Ultra sonic sensor is a very important device that continuously checks the feed in the supply tank. It is important in the detection of feed level and send the message indication with the help of Bluetooth module if the feed level are high or low levels, thus supplying the feeding system and automated water filling system. The microcontroller acts as the central unit of the monitoring system. It is programmed to take care of numerous actions at the same time following real-time inputs and events. This enables efficient coordination and execution of operations, which makes it a crucial element in the system's functionality. The Display system and Bluetooth Module is done for displaying the operation and sending alerts to the concerned staff, including feed level and water level, in the event of a feeding or Water supply. Such timely notification prevents low level feed and Feeling Alerts.



Fig 3.1: Block diagram of the Feeding system





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1. Feeding Mechanism

A small-scale conveyor system is designed using materials such as plastic or metal. The conveyor system is fitted with DC motors (60 RPM, 5-12V) to facilitate feed transportation. The motor is powered via a relay module to enable start/stop control. An SG90 servo motor is used to power the discharge mechanism. It is designed to open or close a gate to control the release of feed from the hopper into the feeding area.

2. Water Dispensing System

A submersible or diaphragm water pump (3-6V, ow rate ~80-100 L/hour) is chosen to dispense water into a designated drinking container. The pump is powered by a 5V relay module to switch it on/off as needed. A plastic or metal container is used to store water, with a water level sensor installed to monitor the water levels. The sensor is either a float or capacitive type to accurately measure the water level.

3. Sensors and Actuators

A 0.96-inch OLED display is mounted on the system to display real-time information, including feed levels, water levels, and system status. The Arduino Uno is the central processing unit that coordinates the operation of the system. It interfaces with all sensors and actuators, manages logic, and communicates with the Bluetooth module. The HC-05 Bluetooth module enables communication between the system and a mobile app, which is used to send SMS notifications about low feed or water levels.

4. Data Logging System

The data logging system is the forensic backbone of the livestock feeding system, utilizing a multi-tiered structure to acquire, process, and store operational data with industrial-grade dependability. At its essence, a custom Py-thon stack on a Raspberry Pi 4 gathers 15+ parameters at 100Hz sampling rates (such as current waveforms through ADS1115 16-bit ADC, obstacle sensor telemetry, GPS coordinates, and signal states) and stores raw data in compressed binary form (lossless FLAC for analogue signals) with microsecond-precision timestamps.

V. IMPLEMENTATION DETAIL

The implementation of the Automated Feeding and Water Dispensing System involves both hardware and software components, each designed and integrated to work in unison.

5.1 Process of Implementation

The system includes several key components that help in effective monitoring the feed level and supplying system for the livestock. The ultra sonic sensor is an important one that continuously measures the levels of feed in the supply tank. It is vital for identifying anomalies and alert is sent to the staff of levels, helping to refill the tanks at proper instant of time.

The alert system is tasked with the generation and transmission of alerts to respective individuals, including feed level and water level in tank. The water pump is activated based on a set schedule or when the water level sensor detects that the water has dropped below a specific threshold. The water level sensor provides continuous input to the Arduino to check the water level, and if the water is low, the pump is activated to refill the water reservoir.

The OLED display is programmed to show real-time status updates, including feed and water levels, and system status. The Arduino continuously updates the display based on sensor input. Bluetooth Notifications: The Arduino is programmed to send real-time data to the HC-05 Bluetooth module. If the feed or water level drops below a specified threshold, the module sends an SMS notification to the mobile app connected via Bluetooth. A simple mobile app is created that connects to the HC-05 Bluetooth module via Bluetooth.

The app receives data from the Arduino and shows real-time information about feed and water levels. The app is programmed to alert the user with an SMS notification when the feed or water level is low. The Arduino communicates with the HC-05 module, which transmits information to the mobile app. When low feed or water levels are detected, the app sends an SMS to the user's mobile phone, notifying them to refill the feed or water.





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5.2 Demonstrative Unit



Fig 5.2: Operational model

The microcontroller, which is commonly called the system's brain, has been engineered to handle inputs from multiple sensors and perform instructions in real-time. It manages processes like detecting obstacles, transmitting data, and raising an alarm. With its capacity to handle several components at a time, the microcontroller ensures that the system runs smoothly under dynamic conditions, thus being a critical application for real-time monitoring.

5.3 Workflow Sequence



Fig 5.3: Flowchart of feeding system

5.4 Hardware details

5.4.1 Arduino uno: Arduino Uno is a universal, easy-to-use microcontroller board, popular among electronics and embedded systems projects. Based on the Atmel ATmega328P microcontroller, Arduino Uno offers an easy platform for development and prototyping and is everyone's Favorite, from hobbyists to educators and professionals.



Fig 5.4.1: Arduiuno.





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5.4.2 Ultrasonic Sensor: The Ultrasonic sensor is an electronic component that is intended to detect the level of ultraviolet (UV) radiation in the surroundings. Ultrasonic sensors are widely applied in systems that need to monitor UV exposure, including weather stations, health devices, industrial systems, and scientific research.



Fig 5.4.2: Ultra Sonic sensor

5.4.3 HG 05 Bluetooth module: The HG05 Bluetooth module is a compact and universal Bluetooth communication module suitable for seamless incorporation into wireless projects. It complies with the Bluetooth 2.0 standard for effective and efficient data transmission of several applications, including IoT, robotics, and industrial automation. in automatic lighting circuits, light meters, and alarm circuits.



Fig 5.4.3: HG 05 Bluetooth module

5.4.4 Relay module: A relay module is an electronic device that assists in controlling high-power devices with a low-power control signal. It acts as an automatic switch, enabling devices to be switched on or off depending on sensor inputs. This automation improves efficiency, safety, and convenience in systems.



Fig 5.4.4: Channel Relay modules

5.4.5 Display module: OLEDs are energy efficient, have a long lifespan, and are versatile and thus a perfect solution for numerous application lighting is a contemporary and energy-saving lighting technology that has completely transformed the lighting sector. LEDs are semiconductor elements that produce light as an electric current flows through them using a phenomenon called electroluminescence. In contrast to conventional incandescent or fluorescent bulbs.



Fig 5.4.5: OLED display





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An OLED (Organic Light Emitting Diode) display is a display technology that utilizes organic materials to emit light when electric current flows through them. As opposed to regular LCD displays, which need a backlight to make the pixels glow, OLED displays are self-emissive and have each pixel glow by itself. This means that the contrast ratios are higher, refresh rates are quicker, and colours are more saturated compared to standard displays.

IV. FINAL MODEL

The feeding and water dispensing mechanisms are integrated into the prototype. The system is set to operate based on pre-programmed intervals or triggered by sensor inputs. The complete system is tested under real-world conditions to ensure that it operates reliably and efficiently. Adjustments are made if there are any issues with the feeding or water dispensing. The prototype (65 cm x 45 cm) is deployed and tested in a controlled environment.

Initial trials are conducted for pets, poultry, or small-scale agriculture applications. If the system works as intended, the design can be scaled up or down for different applications by adjusting the size, capacity, and power requirements of the system. The system is designed to be energy-efficient by using low-power components and optimizing power usage for each task. The components are chosen for their durability, ensuring that the system operates reliably over long periods with minimal maintenance.

Machine learning algorithms could be implemented to predict the optimal feeding and watering schedules based on animal type, environmental conditions, and consumption patterns. This would make the system smarter by learning and adjusting feed/water distribution over time for better efficiency. AI could be used to detect abnormal patterns or potential system failures (such as pump failure, feeding blockages, or sensor malfunctions) and send alerts to users, ensuring proactive maintenance and minimizing downtime.

The project could be scaled up for industrial use, with larger feed storage units, pumps, and conveyor systems designed for large-scale farms, livestock facilities, or poultry farms. This would involve the use of high-capacity motors, pumps, and reservoirs to handle higher volumes of feed and water. A multi-zone system could be developed for facilities that require feeding and watering in different sections. Each zone would have its own control unit to independently manage the dispensing of feed and water based on local needs. The system could be adapted to run on solar power, reducing the reliance on the main electricity grid and making it more eco-friendly. Solar panels could be used to charge batteries that power the entire feeding and watering mechanism, ensuring sustainable operation. Advanced energy harvesting techniques, such as using small wind turbines or piezoelectric materials, could be explored to power the system in remote or off-grid locations.



Fig 6: FINAL MODEL





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VII. CONCLUSION

The implementation of the Automated Feeding and Water Dispensing System successfully met the project's goals of creating an efficient, automated system for feeding and watering in small- scale applications. The system showed reliable performance in dispensing feed and water, as well as effective real-time monitoring and remote notification capabilities. With further optimization and testing, the system can be scaled and deployed for a wide range of applications, offering a cost-effective solution for small-scale farming, pet care, and more. The results also highlight the potential of automation in improving operational efficiency and minimizing manual labor in everyday tasks. The Automated Feeding and Water Dispensing System offers several advantages, including automation, precise resource dispensing, energy efficiency, and remote monitoring. These features make it a reliable, cost-effective, and scalable solution for various small-scale applications, improving operational efficiency and enhancing the well-being of animals while reducing manual labor and resource waste.

REFERENCES

[1] A. S. Belal, H. A. M. Abdel-Salam, and M. T. A. El-Kady, Energy-Efficient Systems for smart farm, Science Direct journal, Energy Efficiency (2022)

[2] J. K. S. Dhanalakshmi, S. R. S. Raghavan, and S. M. K. Reddy, Smart Animal Feeding Systems Using Wireless Sensors and Automation, Journal of Agricultural Engineering (2021).

[3] S. N. Abdel-Gawad, S. F. Ahmed, and A. M. F. Ismail, Design and Control of Automated Water Systems for Poultry Farming, Agricultural Engineering International: CIGR Journal (2020).

[4] M. A. G. Abed, M. T. Mahmoud, and M. H. Hossain, Internet of Things (IoT) for Smart Agriculture: Technologies, Applications, and Challenges, IEEE Access (2020).

[5] D. P. Richardson and S. A. Harris, Automation in Pet Care: Feeder and Water Dispenser Designs, Journal of Pet Technology (2019).









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