

PLC based automatic feeding machine for poultry farm

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Abstract: The PLC-based automatic feed machine stands out as a beacon of efficiency and precision in the realm of poultry feed management. This abstract explores the design, implementation, and functionality of such a system tailored specifically for poultry farms. At its core, the PLC-based automatic feed machine integrates a network of sensors, programmable logic controllers (PLCs), actuators, and user interfaces to automate the process of feed distribution to poultry

Safety measures are paramount in the design of the system, with the PLC enforcing safeguards to prevent overfeeding and mitigate potential hazards. Through the seamless integration of technology and intelligent automation, the PLC-based automatic feed machine optimizes feed management practices, enhances poultry welfare, and improves overall farm productivity

1. Introduction

A PLC-based automatic feed machine for poultry farms is a sophisticated system designed to automate the feeding process for poultry. It utilizes a Programmable Logic Controller (PLC) as the central control unit to monitor and control various aspects of feeding operations. The system includes sensors to detect parameters such as feed levels and bird activity, actuators to dispense feed, and conveyors or augers to transport feed from storage bins to feeding areas. The PLC processes input signals from sensors and executes pre-programmed logic to determine feeding schedules and optimize feed distribution based on factors like bird population, nutritional requirements, and environmental conditions. By automating the feeding process, the system ensures precise feed distribution, reduces labor requirements, and enhances overall efficiency and productivity in poultry farming operations..

2. Existing Methodology

[1] Shoba.K, Sushmitha.V, Umashree N, Yashaswini D.M, Priyanka K. An Effective Automated Monitoring and Controlling of Poultry Farm using IoT. Poultry is one

of the most important growing economic segments of agricultural and commercial sector in India today. Nowadays automation plays very importance in our life, where the combination of wireless and mobile network is saved to remotely monitor and maintain poultry farm. The project focuses on automation of poultry farm using 7 technology to perform various management things like maintaining room temperature, feeding chicken. These parameters are maintained, the production and quality of chicken increases. In addition to that the chicken's health can be observe through motion sensors by setting threshold temperature of the chicken also bad cell sensor is implemented using a controller to monitor the weight of the chicken. And disposal of chicken's waste by using servo motor.

[2] Lata S. Handigolkar, M.L. Kavya and P.D. Veena. IOT Based Smart Poultry Farming using Commodity Hardware and Software. This work aims to provide details on how to build an automated Environment Controlled Poultry Management System (ECPMS) using low cost commodity hardware and open source software. A comprehensive system was built using

Raspberry Pi, used as a Linux embedded system board and Arduino-Uno board for interfacing with different sensors. The system has been thoroughly investigated for various physical parameters associated with effective poultry management which includes temperature, humidity, moisture content in the air and air quality. It was found that the system not only monitors these parameters, but also regulates these parameters effectively. The framework was observed to be very useful for farmers as they could easily access and control the system remotely using their handheld mobile devices.

[3] M.Mohana Priya, K.Pavithraa, B.Pavithra Devi, Dr.V.Sureshkumar. Smart Poultry Farm Incorporating Gsm And IOT .The Chicken poultry industry is an important industry for sustainable food supply in our country. The development of an automatic chicken feeding machine can be very useful to the growth of the poultry industry. In existing system contains temperature and humidity detection and the chickens need a presence of manpower to manually give the food to the chickens. The use of proposed system can replace the worker for feeding the chicken thus overcome the labor problems in the industry and introduce a semi-automatic process in the poultry industry. The Proposed system can be applicable in Poultry Farm, in addition prevention against theft of chickens is equally important as it safeguards revenue losses. Considering the health of chickens gas sensor is placed to indicate the presence of harmful gasses like Ammonium. Fire accidents can be prevented with the help of fire sensor and alerts the user. Temperature and humidity is monitored and maintained in the poultry farm with the help of temperature sensor. The data obtained from sensor are updated in IoT cloud.

[4] Peter Olalekan Idowu', Oluwole Abiodun Adegbola, Ifeoluwa David Solomon, Monsuru Abolade Adeagbo, John Adedapo Ojo Design and Implementation of Smart-Controlled Poultry Farm Management System. Bird mortality at a young age can be reduced by monitoring parameters like temperature and relative humidity in a poultry chick house. As the thermal environment becomes more stressful, the animal body perceives a risk to life and stops prioritizing production for survival. The health of the chicks can be ensured by using an efficient temperature and humidity control system that conserves energy by only using the heater or fan when absolutely necessary. Using a computer simulation, the work designs and simulates an automated poultry house weather control system with week selection switches that let the user select the age of the chicks. The selection informs the microprocessor of the control instruction to be used automatically. Proteus is used to simulate the system, and it performs according to the design specifications, with precise temperature and humidity values used for control and results displayed on a 16^o2 LCD.

[5] Mohammad R. Ahmadi, Naseer Ali Hussien, Ghassan F. Smaisim Naser M Fala. A Survey of Smart Control System for Poultry Farm Techniques. Faculty of Science, University of Kashan, Iran Faculty of Education, Wasit University, Iraq. Mechanical Engineering Department, Faculty of Engineering. Agriculture and poultry are the backbones of any country's economy indeed, there is a strong correlation between agricultural growth and economic prosperity. In fact, from last few years, the chicken production had increased as standardized farming maraging and best industrial practices. Backing to agricultural produce survey, chicken is the best favorite food, as it provides low cholesterol, low fat, rich protein, and low energy compared with another type of poultries. This paper highlighted the smart control system (intelligent farm) with their types such as Zigbee, Raspberry Pi, and the integration of wireless sensors and GPRS. These types have been designed in order to control automatically monitor environment limitations in a poultry farm. Finally, the previous techniques and strategies for smart control system have been compared in a table with their drawbacks.

[6] Bilal Ghazal, Khaled Al-Khatib and Khaled Chahine Faculty of Sciences IV, Lebanese University (UL), Zahle, Lebanon Faculty of Engineering. Agriculture and poultry are the backbone of any country's economy. Indeed, there is a strong correlation between agricultural growth and economic prosperity. While poultry are raised for egg and meat production, farmers experience a huge financial loss because of inaccurate weather forecasts and ineffective methods employed in conventional farming. Therefore, new effective technological approaches are required to continuously improve the productivity, profitability, and sustainability of our major farming systems. A wireless sensor network (WSN) is proposed to monitor and measure many poultry environmental parameters such as temperature, humidity, air quality, and amount of light. The different sensors are disposed in particular positions in the farm in order to better reveal the realistic information. The collected farming data are sent by means of WSN via ZigBee transceivers to the main controller based on PIC microcontroller or PLC module. The main controller analyzes the various readings, compares them with the standard levels, evaluates the presented situations, considers the portfolio of foreseen cases, and finally gives the right instructions. In fact, the main microcontroller controls the corresponding equipment such as heater, cooler, fan and others according to theprocessed data. The proposed system design offers convenient directives for differentfacing scenarios and therefore enables all-weather real time control of the farming parameters and achieves a comfortable environment for the fowls.

3. Proposed Methodology

A PLC-based automatic feed machine for poultry farms is a sophisticated system designed to automate the feeding process for poultry. It utilizes a Programmable Logic Controller (PLC) as the central control unit to monitor and control various aspects of feeding operations. The system includes sensors to detect parameters such as feed levels and bird activity, actuators to dispense feed, and conveyors or augers to transport feed from storage bins to feeding areas. The PLC processes input signals from sensors and executes pre-programmed logic to determine feeding schedules and optimize feed distribution based on factors like bird population, nutritional requirements, and environmental conditions. By automating the feeding process, the system ensures precise feed distribution, reduces labor requirements, and enhances overall efficiency and productivity in poultry farming operations.

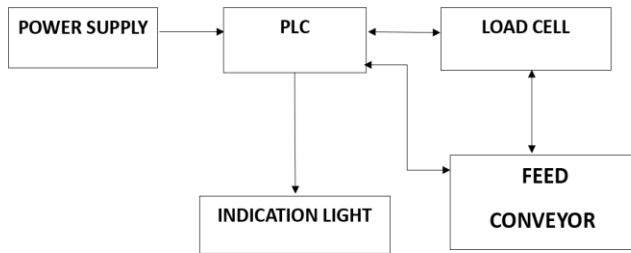


Figure 1: Block diagram

In the bustling world of poultry farming, where every minute detail can impact the health and productivity of the flock, the PLC-based automatic feed machine stands as a beacon of innovation and efficiency. Embedded within its intricate design lies a symphony of technology, seamlessly integrated to streamline the feeding process and enhance farm operations.

As dawn breaks over the poultry farm, the sensors embedded within the feed storage silos awaken, their keen eyes scanning the horizon for signs of dwindling reserves. Whether utilizing ultrasonic waves or harnessing the power of load cells, these sensors serve as the vigilant guardians of the flock's sustenance, relaying vital information to the PLC with unwavering precision.

4. Schematic structure of smart EV charging system

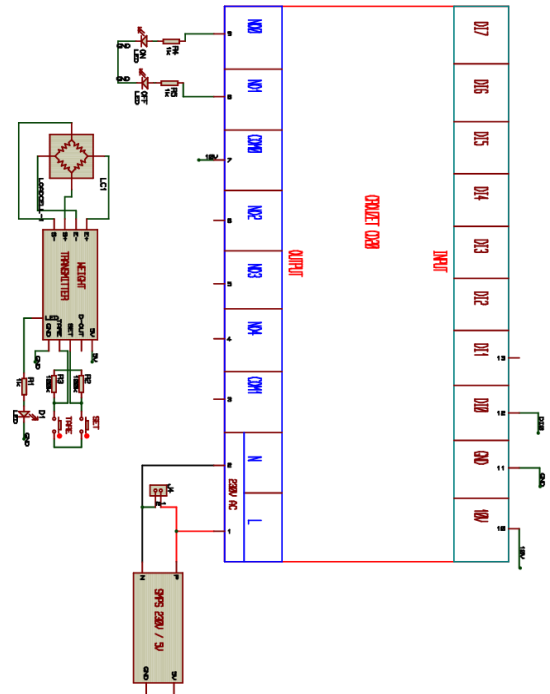


Figure 2: Circuit diagram

With the swiftness of a seasoned maestro, the PLC springs into action, its programmed logic meticulously analyzing the incoming data to determine the optimal course of action. Like clockwork, commands are dispatched to the array of actuators awaiting their cue. With a gentle hum, motors whir to life, and solenoid valves click into place, heralding the arrival of nourishment to the feeding troughs. Yet, amidst the rhythmic cadence of automation, the farmer remains the silent conductor, wielding the power of the HMI interface to guide the symphony. With a few deft keystrokes, feeding schedules are fine-tuned, portion sizes adjusted, and alarms set to alert of any unforeseen deviations. But even in the realm of technological prowess, safety remains paramount. The PLC, ever vigilant, enforces a fortress of safeguards to protect against overfeeding and mitigate potential risks. Limits are imposed, thresholds monitored, ensuring that the welfare of the flock is never compromised. In the tapestry of modern poultry farming, the PLC-based automatic feed machine stands as a testament to the marriage of ingenuity and efficiency.

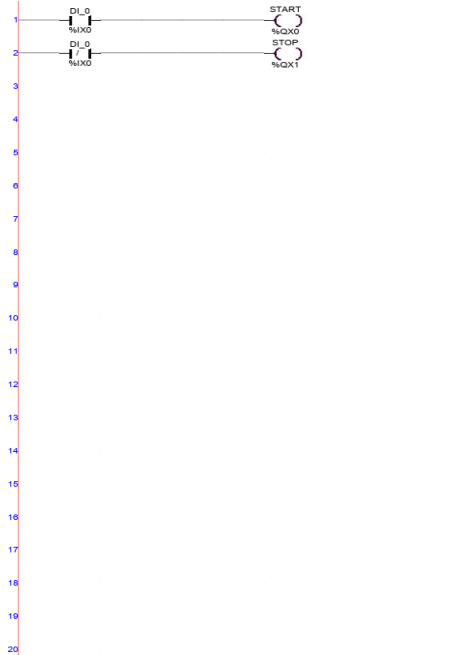


Figure 3:ladder circuit connections

The above figure shows that is PLC ladder circuit connection for this project.

5. CONCLUSION

Designing a PLC-based automatic feed machine for poultry farms offers numerous advantages, including improved efficiency, reduced labor costs, and precise feed management. By automating the feeding process, poultry farmers can ensure consistent feed distribution, leading to healthier and more productive birds. Additionally, the ability to monitor and adjust feed levels remotely enhances overall farm management and reduces the risk of feed wastage. Overall, implementing such a system can significantly contribute to the profitability and sustainability of poultry operations. The PLC-based automatic feed machine for poultry farms revolutionizes the way feed is managed and distributed, offering a host of benefits ranging from increased efficiency and cost savings to improved animal welfare and farm management. Its ability to automate tasks, monitor feed levels, and adjust feeding schedules in real-time ensures optimal nutrition for the birds while minimizing waste and labor requirements. By leveraging modern technology, poultry farmers can enhance their operations, boost productivity, and stay competitive in the ever-evolving agricultural industry. In essence, adopting PLC-based automation represents a smart investment for poultry farms looking to optimize their operations and achieve long-term success.

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