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Design and Development of an IoT Based Smart Poultry Farm

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***Abstract*— On the majority of poultry farms in India, especially in broiler farms, manual monitoring and control is done. The primary parameters in chicken farming include temperature, humidity, ammonia, air quality, light intensity, and litter moisture. Broiler production is strongly influenced by these factors.This paper proposes an IoT based monitoring of poultry farm environment and incorporating necessary features to control those parameters. In India, the majority of chicken farms, particularly broiler farms, are manually watched and regulated. The primary parameters in chicken farming include temperature, humidity, ammonia, air quality, light intensity, and litter moisture. These factors are directly linked to the broiler production. This paper proposes an IoT based monitoring of poultry farm environment and incorporating necessary features to control those parameters.**

Keywords*— Broiler farms, chicken farming, temperature, Humidity, ammonia, monitoring, control.

I. INTRODUCTION

India is regarded as a prosperous agricultural nation. In terms of food and natural resources, the nation is in good shape. Nonetheless, such wealth was steadily eroded. Low agricultural productivity and farmer profitability are two factors contributing to this[1]. Monetary benefits In addition, the farmers lacked knowledge in this field. Marketing strategies for agriculture and high-quality production preparing. The circumstances under which poultry are raised is heavily influenced by flock size as well as profitability. Because of its low energy, high protein, and low cholesterol content, poultry meat is becoming increasingly popular in most countries.

In most situations, adequate manpower is needed to actively oversee and manage the farm; however, this raises the production cost considerably[2]. For the farm to be more productive, while at the same time decreasing the cost, a control mechanism is required. Although most poultry farms are found in the suburbs, not within city limits, suburban areas contain an abundance of them[3].

There has been a significant increase in profits for the poultry industry in Tamil Nadu due to the growing demand for chicken in restaurants, weddings, and regular meals. Human health, livestock, and birds have also been concerned by rising global temperatures, and in particular in the southern state of Tamil Nadu, where temperatures regularly exceed 51 degrees Celsius in the daytime. Preventive steps against the scorching sun could include drinking lots of water, avoiding excessive travel, and taking precautions. Feed, illumination, air (temperature, humidity and ammonia), water, and litter consistency make up the essential climate. The body temperature of birds is homoeothermic[4]. The internal body temperature of adult hens is between 105°F and 107°F (40.6° and 41.7°C). The body temperature of a freshly hatched chick is roughly 103.5°F (39.7°C), and it grows steadily until it reaches a steady stage at three weeks of age. It is considered IoT if there are various objects throughout the environment capable of sensing anything, connected to a WAN network for the purposes of exchanging, collecting, and transferring data for analysis.

Using these small network-linked sensors or objects, we can easily monitor anything that is connected to the network. Useful examples of IoT applications include hospitals, home automation, and smart traffic. An effective IoT system can be created by setting up a smart poultry farm.[5].The Internet of Things (IoT) will assist poultry farmers in increasing productivity while significantly lowering costs [6]. The Internet of Things (IoT) is an ecosystem in which a wide range of things/objects are interconnected and capable of interacting with one another through new applications. Water scarcity, harsh weather conditions, and a shortage of sanitation and transportation services are all problems that some developed countries face. IoT-based intelligent poultry may help to address a few of these issues in these countries [7].

The thermal comfort zone, or thermos neutrality, of poultry varies by species and age, with younger birds preferring warmer temperatures[8-10]. When temperatures are below the recommended comfort zone, poultry feed conversion suffers. To sustain stable body temperatures, birds emit heat that must be lost to the atmosphere. The welfare of chickens is determined by the poultry farm and its surroundings.

The nature of a poultry farm is primarily determined by the availability of appropriate environmental conditions[11-13]. Proper ventilation, cooling, and lighting are needed for certain conditions to be suitable. This paper introduces a new paradigm for making conventional chicken farming smarter by using advanced digital technologies. Via sophisticated sensors and a microcontroller, the smart farm sends environmental parameter statistics to a desktop computer, such as temperature, humidity, ammonia gas, and weather conditions. The farm is connected to the internet.

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II. GENERAL DESIGN OF THE PROPOSED MODEL

This paper proposes a concept that combines various hardware and software platforms in order to create a device that can remotely track and manage aviaries. The functional block diagram is shown in Figure 1.

Environmental parameters are monitored by sensors connected to the controller, and those parameters are controlled by the control system connected to the relay. The experimental setup is shown in Figure 2.

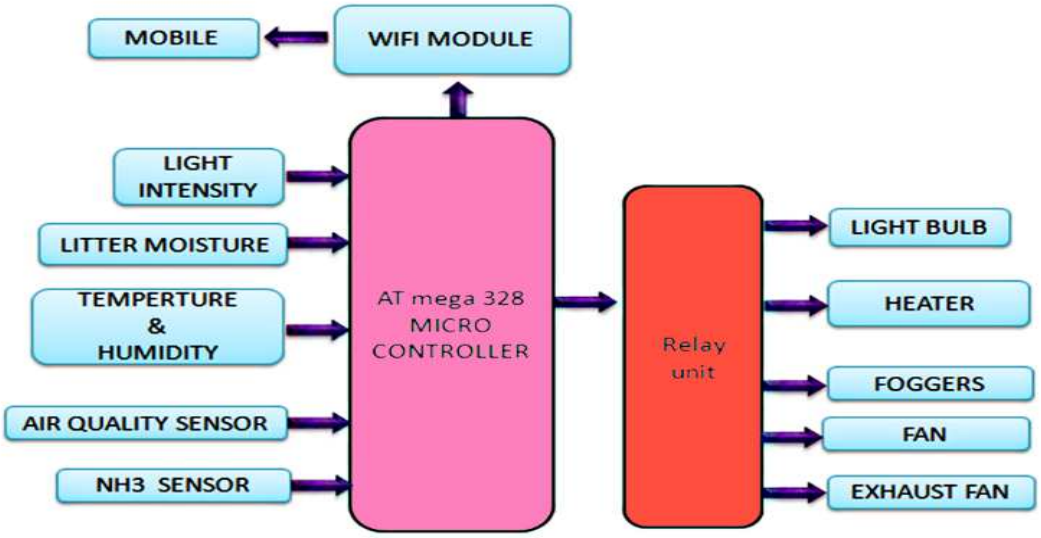

Figure 1 Block diagram

Figure 2: Experimental Setup

III. RESULT AND DISCUSSION

The above mentioned parameters are monitored and controlled. Those values are sent to the user mobile through an blynk app by IoT platform. The wifi module helps the controller to upload the data in the server. The relay unit turns on the respective control mechanism based on the controller output. Figure 3 shows that the temperature changes in the form that is sent to user mobile.

Figures 4 and 5 shows that change in litter moisture, Light intensity and air quality in the user mobile phone and the respective control mechanism will turn on to control those values.

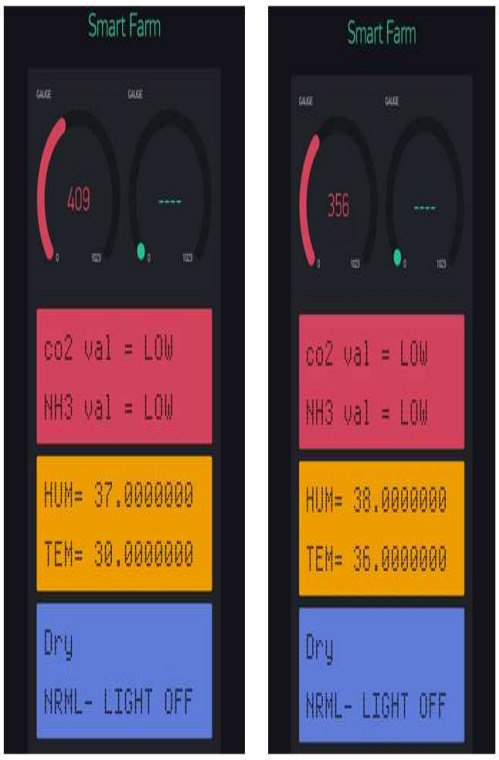

Figure 3 Output of temperature changes

Figure 4 Output of Litter moisture and LDR

Figure 5 Output of Change in air quality

The entire experimental setup can be accurately monitored and control all environmental parameters required for the healthy growth of chicken in the farm. The whole poultry farm can be monitored from anywhere and anytime remotely with the help of respected sensors and technologies. Thus no need for skilled workers. It Reduce the mortality rate by controlling those parameters in the correct proportion. Thus it increase the production and produce better yield by following this cost effective process method.

IV. CONCLUSION

As a results, the mortality rate can be reduced by monitoring these parameters along with good hygiene and thus increase the productivity. It can be opted for various environmental conditions by modifying the threshold values in accordance with the climatic condition of the area in which the poultry farm is established. Despite environmental fluctuation, it can provide an effective outcome. It is critical that an effective, stable, and robust fully automated poultry farm system is established. One of the unique features of this automated poultry farm is its computerized functions like light intensity, litter humidity, air quality, temperature control and humidity monitoring is the introducer system. This instrument protects the entire farm and mitigates the effects of changes to the environment. It keeps the chickens healthy by monitoring physiological parameters such as temperature, humidity, and moisture. The farm's light intensity is carefully measured

and managed with minimal human interference. As a result, farmers can benefit greatly from this automated device because they can easily access and manage it. According to the latest research, combining these specific features into a single electronic device would provide greater reliability The obsolete manual system would be unable to meet the challenges and demands needed in the context of the impending crisis in the poultry industry. In the field of poultry production, these problems must be solved efficiently, which means a major involvement to the budget of a nation.

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