ISSN No:-2456-2165

Interfacing Blynk IOT Platform for Monitoring Temperature and Humidity in Poultry Farm

JOY G. BEA
Ilocos Sur Polytechnic State College
Sta. Maria Campus
Sta. Maria, Ilocos Sur Philippines

CARLBEN DOMINIQUE A. BEA
Ilocos Sur Polytechnic State College
Tagudin Campus
Tagudin, Ilocos Sur, Philippines

Abstract:- This paper aimed to interfaced Blynk IOT platform for monitoring temperature and humidity in poultry farm. The materials used to build the prototype is arduino microcontroller, sensors, and blynk platform. Rapid Application Development Model was used as guide to develop the prototype. ISO 9126 was adopted to evaluate the functionality of the developed prototype. The respondents agreed that the developed prototype is indeed functional.

Keywords:- *Blynk;IOT; Humidity; Temperature; Poultry Farm.*

I. INTRODUCTION

With the evolution of technology, Internet of things has been very helpful to poultry farming. Using internet of things it is now very easy to monitor the temperature and humidity in the poultry farms to be sure that broiler chickens are safe from heat stress and other cause of mortality. Heat stress is the condition in chickens caused by high temperatures, especially when combined with low airspeed and high relative humidity (Andrews, 2016). Heat stress is the most dangerous stressor that challenges broiler production worldwide, affecting the quality of broiler products (SONG & KING, 2015). Heat stress affects the feed intake in broiler chicken, which decreases gain weight (Estefan et al., 2018).

Proper humidity level should be monitored daily. The proper humidity level should be maintained to avoid dampness which causes the growth of infectious microorganisms and the accumulation of toxic gasses. Relative humidity in the poultry house should be monitored daily. The suggested humidity level for the first week should not be below 50%. If it reaches below 50%, the condition in the chicken coop is dry and dusty. It could affect the chicks because they will start to dehydrate and have respiratory problems. If this happens, the farmer should increase the humidity level so that the chicks can survive. Meanwhile, the suggested humidity level from 18 days onwards should be lower than 50% (Pillainc, 2016).

In monitoring the poultry farm, Blynk IoT Platform which is designed for the internet of things has an app, server, and libraries (Media et al., 2019). Blynk Framework was tested in a smart home, interfaced with Raspberry Pi. It monitored and controlled electrical devices via smartphone. With this reason the researcher motivated to use blynk platform to test if it is suited for monitoring poultry farm.

II. OBJECTIVE OF THE STUDY

The goal of this study is to develop a prototype with Blynk IoT platform to monitor the temperature and humidity in the poultry farm with broiler chicken. Specifically, to determine the materials and sensors to be used, and to evaluate the acceptability of the developed prototype.

III. METHODOLOGY

This study utilized the descriptive developmental research design and has adopted Rapid Application Model to develop the prototype.

Along objective number 1, the researchers conducted interview to the IoT experts and conducted a literature survey regarding the suitable sensors to be used in the development of the prototype.

Along objective number 2, the researchers adopted the ISO 9126 to evaluate the functionality and efficiency of the developed prototype. Frequency count and mean were use to analyze the data. Respondents were identified based on purposive sampling which is the available poultry farmers and owners in the Ilocos Sur, Philippines. There were 60 respondents in this study. To compute the result of the evaluation tool used in the study, the researchers used the mean, frequency count, and Likert Scale was utilized to interpret the results with the following description. The scale shows that all responses within the range of 2.60 to 5.00 and this implies that the proposed system is acceptable while the responses in the range of 1.00 to 2.59 means that the system is not acceptable in terms of functionality, reliability, usability, efficiency, maintainability, and portability. When the results of the acceptability come up with the descriptive interpretation of “Acceptable”, the developed prototype functions correctly, otherwise, the system must add more functions and features to reach the neutral descriptive equivalent rating.

ISSN No:-2456-2165

IV. FINDINGS

Based on the result of the literature survey, the parts of the developed prototype were identified. Arduino Microcontroller low cost, with pre-tested software widely used for DIY electronics and the Internet of Things ((Robinson, 2015: Silva et al., 2018: Khillar, 2019:So-in, et al.,2014). DHT11 and DHT22 are low-cost sensors used in monitoring temperature and humidity. Both are small and easy to pack. However, DHT22 was proven to be more efficient, precise, and accurate to use in detecting temperature and Humidity than DHT11 (Foxworth, 2017: Bogdan, 2016: Kunjumon et al.,2016: Hitimana et al.,2018:Dejan, 2022: Sipani et al.,2017: Sujeetha,2019). Further, the ESP8266 WiFi module is a low-cost chip that connects a device to the Internet. This chip is used in home automation to control the light of a room. It was proven effective, connecting to existing WIFI Infrastructures (Mesquita, J. et al., 2018: Oh, T., 2017: Gupta, V., 2021).

For monitoring purposes, Figure 1 shows the full screen of the Blynk Dashboard using a browser at the computer. The dashboard contains the latest detected temperature, humidity. Fig 2 shows the blynk dashboard using mobile phone. Fig 3 shows the developed prototype in a casing.

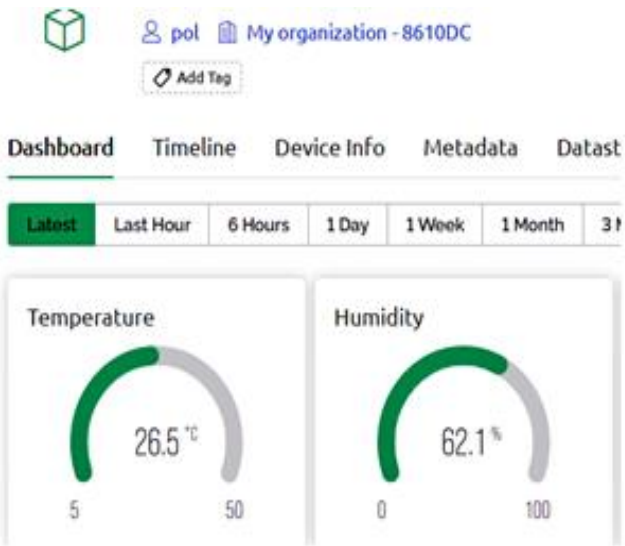

Fig 1 Full Screen of the Blynk Dashboard

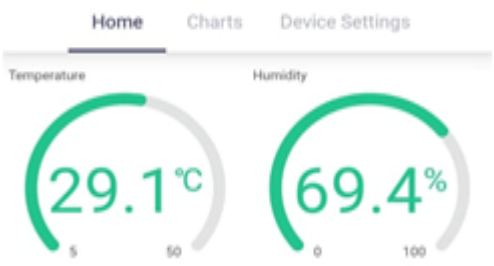

Fig 2 Blynk Dashboard using Mobile Phone

Fig 3 The developed prototype with casing

The developed prototype is evaluated by adopting the characteristics of ISO 9126, namely: functionality, reliability, usability, efficiency, maintainability, and portability. The poultry owners and caretakers were present to validate the test result of the developed prototype. The developed prototype was connected to a WIFI internet connection and mobile data in the other poultry farms. The Blynk Framework was used to monitor the detected values. The developed prototype is tested for the different age groups of chicken at the various poultry farms. It ensures that the developed prototype is functional based on the specific assigned threshold value adopted in the study of Based on the findings, the respondents perceived that the developed prototype was very highly acceptable in terms of functionality, reliability, usability, efficiency, maintainability, and portability, with a grand mean of 4.84. It is described as strongly agree and interpreted as very highly acceptable. The developed prototype's usability is the highest mean rating which interpreted as very highly acceptable. The lowest mean rating is portability but still interpreted as very highly acceptable. This implies that the quality of the developed prototype recognized the quality characteristics of the ISO/IEC 9126 namely the functionality, reliability, usability, efficiency, maintainability, and portability.

V. CONCLUSIONS

Based on the result from the findings, the following are the conclusions: there were identified materials suited as part of the prototype and determined based on its capabilities and specifications; therefore, it is expected to function at its total capacity; based on the evaluation of the level of acceptability of the developed prototype, the respondents perceived that the developed prototype was very highly acceptable in terms of functionality, reliability, usability, efficiency, maintainability, and portability with a grand mean of 4.84. Thus, this implies that the developed prototype recognizes the quality characteristics of the ISO/IEC 9126 namely the functionality, reliability, usability, efficiency, maintainability, and portability.

RECOMMENDATIONS

The poultry farmers can use the developed prototype to monitor temperature and humidity that could add protection to the broiler chickens and can use this as an aid or assistance to lessen the workforce needed in the poultry farm. Future researchers could also conduct more studies on broiler chicken health and survival.

ACKNOWLEDGMENT

Special thanks to the love ones of the researchers for supporting them.

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