

A Model of Mobile Application for Automatic Fish Feeder Aquariums System

D. Prangchumpol

Abstract— Currently, ornamental fish in the office is popular among the fishers and fish farmers because this can create the good environment in an area. Thus, fishers have to pay attention in caring and control all kinds of factors such as feeding, air pumps, light, and pH value of water which may affect to the quality of water and fish maybe dead. With the advancement of IoT technology that is used to control wireless gadgets, this research developed an automatically fish feeding system that works through a mobile application. By writing device control commands onto the microcontroller device, users, through a mobile application, can control timing and amount of fish food according to the number of fish automatically, as well as warning when pH value of water is not proper. After testing from experts and users, the study found that an average value in the efficiency of this system was 4.16 which is considered that this application can control fish aquarium efficiently, and decreased spoiled water regarding to improper fish feeding.

Index Terms—Fish feeder, mobile application, aquariums system.

I. INTRODUCTION

Currently, fish aquariums in government offices, companies, tourist places, public parks, temples, schools, universities, and public areas is popular because this can improve the environment in the areas. Besides, fish aquarium can be used as a recreation place for students, teachers, and other people, and also support fish farmers. However, over feeding can spoil water, which is needed to be solved, and fish famers needed to spend most of the time in caring lighting system and water changing, otherwise the water is spoiled and fish are dead. With the advancement of Inter of Things (IoT) Technology that can be controlled through a mobile phone, a researcher developed an automatically aquarium system that can be controlled through a mobile phone. This can help fishers in checking pH value of water in an aquarium, an amount of food, timing, lighting, as well as spoiled water according to over feeding. Moreover, this application can support the environmental conservation.

The paper is structured as follows. Section II mentions related work. Section III is methodology of this paper. Section IV is Result and Discussion. Finally, Section V contains the Conclusion and Future work.

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II. RELATED WORK

Efficient operation and management of power network require many tools. Distribution network is transforming traditional radiation into large-scale smart grid, which is characteristic of greater number of power, multi-contact, and more power flow [1].

Some researcher design and production of automatic Fish feeding which is installed in the fish pond in front of the Engineering Rajamangola University of Lanna technology, Northern Campus, Chiang Mai. We solve the problem about the lack person for management water of the fish pond. It doesn't has problem about the water pollution in the pond [2]. Most of researcher try to monitoring and control the farm operation and environmental condition available. Sinduja presents a flexible answer in a trial of up the accuracy in observation the environmental conditions like temperature, water level, food feeding and reducing work force for industrial households poultry farm [3]-[9]. There is a lot of inventions had been made and been classified as "automatic fish feeder". From those previous designs, a few are chosen due to their criterions which are quite interesting and also useful. However, as stated by Mohapatra, Sarkar, Sharma and Majhi [10] and Noor, Hussian, Saaid, Ali and Zolkapli [11], for most automatic fish feeder, it is not easy to control the amount feed released. Too much will pollute the water in the pond or the tank. Furthermore, instead of feeder that are situated in pond, there are also automatic fish feeder feed feeder that are placed on the ocean by installing inside a buoy [12]. It is understandable that by placing the feeder inside a buoy on the ocean, by installing a camera, microphone or any other appropriate sensor, oceanic aquamarine life can be easily monitored. As long the ponds are large enough, such fish feeder can be used. P. Bartolome [13] in general fish farming the acidity and alkaline of the water should be maintained between 6 to 8. Too acidic or alkaline will cause adverse effects, acid erosion of the gill tissue, tissue coagulation necrosis, increased mucus secretion, abdominal congestion and inflammation. If the PH value is less than 4.5, the fish will die. D.Yusuf Mulge [14] temperature sensor are used to deliver the temperature information on a fire extinguishers to website, email-id, and mobile phone number. In this manner, response to fire emergencies is made with in fraction of seconds. Wen-Tsai Sung [15] found that the amount of dissolved oxygen in water increases/decreases based on seasons. When the amount of dissolved oxygen in water is reduced below certain limit then fish growth will be hindered. When amount of dissolved oxygen becomes lower than the fish survival conditions the fish will die. Paraguas M M [16] wireless networks have different security issues in the

wireless communication. Wi-Fi Protected Access 2 (WPA2) uses Advanced Encryption Standard (AES) encryption and has more security compared to Wi-Fi Protected Access (WPA). Jayavardhana G [17] the buzzwords in Information Technology are Internet of Things (IoT). Internet of Things will transform real world objects into intelligent virtual objects. Aim of IoT is to unify world under a common infrastructure, giving control of things around us. Gigli, M [18] the pH measurement is potentiometric that is, it explains the relationship between the electrode potential and the solution. The meter truthfully responds to the potential, it indirectly and mathematically converts the potential to the pH scale according to the questionable linear Nernst slope.

III. METHODOLOGY

The development of an automatic aquarium through a mobile application is combined in 4 steps as follows:

A. Study problems and possibility

This process is reviewing through research papers and related studies in order to gather data and system development.

B. Design and develop automatically fish aquarium

This step divided into two parts. First is Design system and second is designing of a mobile application. A model of mobile application for automatic fish feeder aquariums system was show in Fig. 1.

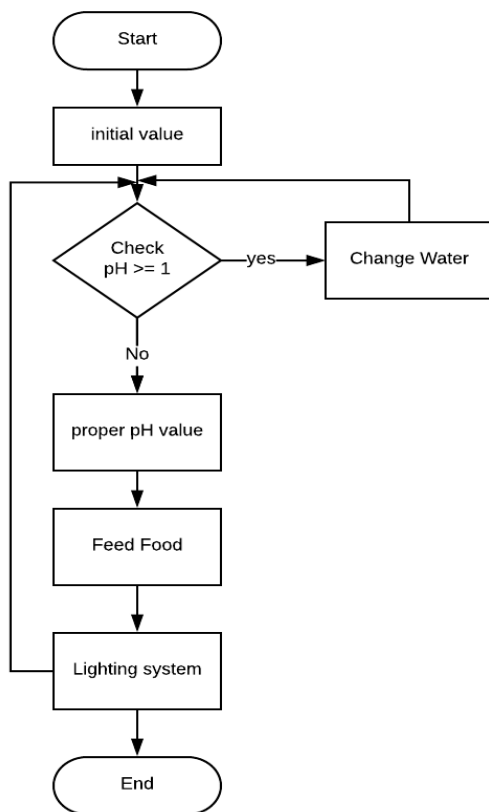


Fig. 1. A Model of mobile application for automatic fish feeder aquariums system.

- 1) Design system by writing down a procedure of pH value measurement, feeding system, and lighting. pH value of water can affect the quality of water in an aquarium. Fig. 2 show example of Raspberry pi board and Fig.3 show LCD circuit.

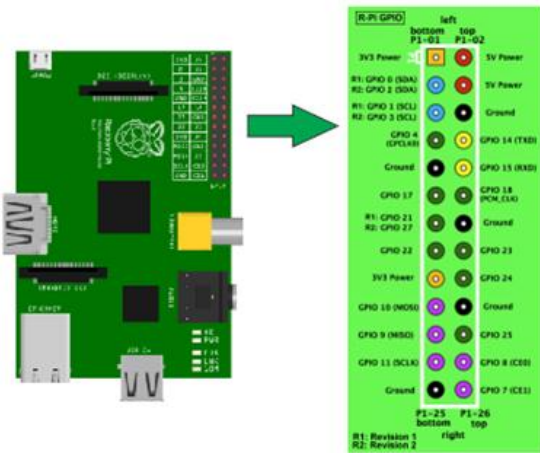


Fig. 2. Example of Raspberry pi board.

- 2) pH value measurement can be used in water changing, and a researcher used pH value in changing water. The proper pH value is 6.5 to 9.0.
- 3) Fish feeding was developed by using Raspberry pi to control automatically. Users can determine an amount of food and time.
- 4) Lighting system was developed by using Raspberry pi to control turn-on and turn-off the burbs in a fish aquarium based on the current time.

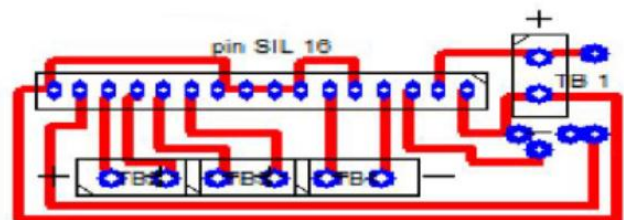


Fig. 3. Example of LCD circuit.

- 5) Designing of a mobile application This procedure was to design data base and visual image on a mobile phone monitor which is linked Raspberry pi with wireless gadgets.

C. An Automatically Fish Feeding System

Based on the design on a mobile application, a researcher writing an application by using C# which a program control sensor in fish feeding, pH value measurement, and lighting. The data from the Raspberry Pi can be retrieved in real time, allowing users to check the current information. An example of Fish Feeder application was show in Fig. 4.

D. An Automatically Fish Feeding System

This research divided system testing into two parts: accuracy and satisfaction toward an automatically aquarium system.

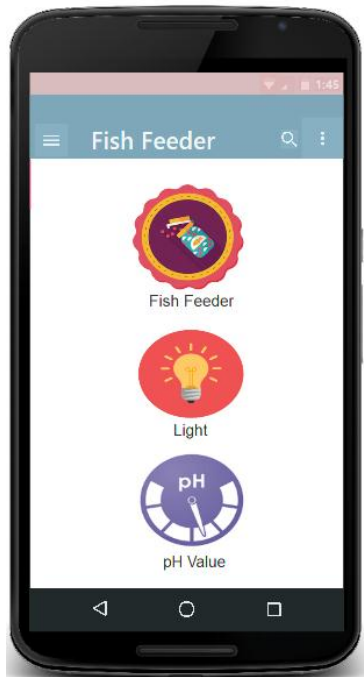


Fig. 4. Interface of Fish Feeder application.

IV. RESULTS AND DISCUSSION

The satisfaction was accessed by 35 experts through questionnaires and presented in a Table. 1. The subjects were asked to rate the relevancy of the search results on a five-point scale: Score 1 is the level of satisfaction improvement, Score 2 is minimum level of satisfaction, Score 3 is medium level of satisfaction, Score 4 is good and Score 5 is very good satisfaction. The result from the assessment in satisfaction of mobile application for automatic fish feeder aquariums system showed that system reliability and information was 4.16 and reliability was 0.57. The result showed that the satisfaction toward a system was good.

However, the results score can be increase by develop and improve some additional features such as in the case of infectious diseases in the aquarium, serious consequences can be expected. This is an interesting research topic for future work.

TABLE I: THE RESULT OF THE ASSESSMENT

Content	Mean	S.D.	Result
1. sturdy	3.82	0.63	good
2. proper in use	4.11	0.74	good
3. modern	3.90	0.88	good
4. safety in using	3.74	0.51	good
5. save time	4.32	0.73	good
6. works for the purpose.	4.28	0.21	good
7. improve quality of life	4.83	0.33	Very good
8. accuracy in an application	3.89	0.52	good
9. convenience in using	4.01	0.65	good
10 Be able to use in the real time	4.72	0.46	Very good
Average	4.16	0.57	good

V. CONCLUSION

This research is to develop a mobile application to control an automatically aquarium system. The result showed that this

developed system could save labors of fishers. From the testing the system accuracy, it revealed that this application could work according to users' command, and could set time without turning off or unplugged the system. The system could feed fish on time, and also could control pH value of water properly. The system could alert users when pH value of water was lower than determined value, including turn on and off the light automatically. This study showed that an automatically aquarium can be used, and adjusted according to the size of an aquarium. The satisfaction of users was good. Further study should be done on an automatically water changing system.

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