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SMART IOT AROWANA AQUARIUM

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ABSTRACT

IoT system has been provided or used in many sectors that makes human able to do work although they are miles apart. IoT can also be applied to monitor the condition of aquarium for Arowana fish. There are a few factors that need to be taken seriously in keeping Arowana fish such as the pH level and the water temperature. In this project, the pH sensor and temperature sensor were used to detect its current condition. At unwanted condition which is related to the pH level and water temperature, dosing pump and heat pump will turn ON while LED will lights up at current condition. At this moment, users will receive notification through their smartphone (SMS and e-mail) when these conditions occur. The notifications show the current condition of water temperature, the pH level and the pump that turn ON at certain time. Tinkercad has been used to construct the circuit while Thingspeak being used to store data. IFTT being used to connect the device with smartphone to receive notification.

Keywords: internet of things (IoT), smart aquarium, pH sensor, temperature sensor, tinkercad, thingspeak and if this then that (IFTT)

1. INTRODUCTION

The preservation of Arowana fish required pH level between 6.0-7.0 and the temperature in range 24-28 °C [1]. At unwanted condition, user will receive notification via email and SMS. Dosing pump and heat pump will turn ON at certain condition to stabilize the pH level and the water temperature in the aquarium. IoT technology can makes human can monitor their aquarium although they are not physically at that place.

2. METHOD

IoT technology can be used to monitor the pH level and temperature which also can reduce human supervision to keep on checking it regularly. The sensors will be the most important indicator in the aquarium in order to make sure that there are no changes in pH quality and the temperature [2]. Tinkercad has been used to construct the circuit while Thingspeak is being used to store data. At unwanted condition, the user will receive notification via text message and email as it being the event being created by If This Then That, IFTT application to show the user the current condition of the pH and temperature value of the water in the aquarium and it enables user being notified by the smartphone [3]. When the pH value is be in the range of 6-7 and the temperature of water is not in the range of 24 – 28 °C, the dosing and heat pump will start to work to stabilize the pH and temperature value of the water in the aquarium.

3. RESULTS

3.1 Temperature Sensor

The DC motor will turn ON if the temperature is higher than 28 °C and lower than 24 °C. When the temperature sensor detect the temperature is higher than 28 °C or lower 24 °C, the heat pump will turn ON automatically to stabilize the temperature back to the range of 24 °C to 28 °C. After the temperature is back into normal condition, the heat pump will turn OFF. The condition of temperature will be displayed by the colour of LED as shown in Table 1.

Table 1. Colour of LED for Temperature condition

Temperature condition	Colour of LED
Lower Temperature (Temp < 24)	Red
Normal Temperature (24 < Temp < 28)	Green
Higher Temperature (Temp > 28)	Yellow

3.2 pH Sensor

If the pH sensor detect the pH is lower than 6 or higher than 7, the dosing pump will turn ON automatic to stabilize the pH value within the ranges of 6 to 7. When the pH sensor detects the pH value has returned to the range between in 6 to 7, the dosing pump will turn OFF. The pH conditions are displayed by colour of LED in the system as shown in Table 2.

Table 2. Colour of LED for pH condition

pH condition	Colour of LED
Lower pH (pH < 6)	White
Normal pH (6 < pH < 7)	Blue
Higher pH (pH >7)	Orange

4. CONCLUSION

In conclusion, this project Iot is one of the alternative and easy way to monitor the pH quality and temperature of water in the aquarium. Having the cloud database, the owner can monitor and keep update the growth of Arowana fish to keep it healthy. Nowadays, everyone has a smart phone so that it will make it easier to use and easy to get notification.

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Kelulusan daripada pihak YBhg. Profesor dalam perkara ini amat dihargai.

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