

ABSTRACT

IMPLEMENTATION OF TURTLE TUB MONITORING SYSTEM FOR IoT-BASED BRAZIL TURTLE MAINTENANCE

The care of Brazilian turtles requires a turtle tub or aquarium equipped with a basking spot and a pool with UVA/UVB heat emitter lamps to maintain body temperature and prevent disease or death. Proper temperature and humidity are crucial, as poor conditions can cause heat stress, growth disorders, and a general decline in health. The ideal water temperature ranges from 24.5°C to 27.1°C, with a pH level between 7.68 and 7.9. This study aims to facilitate the monitoring of key parameters, test the performance of the DS18B20 temperature sensor, SKU SEN0161 pH sensor, and SKU SEN0189 turbidity sensor, and determine the appropriate time to replace the water and activate the UV lamp. The monitoring system was developed using the prototyping method, which includes requirement identification, prototyping, testing, and evaluation. The platform used is the ESP32 microcontroller integrated with Arduino IoT Cloud, equipped with key sensors and a relay module for UV lamp control. The final results show that the system can display real-time data for temperature, pH, and water clarity through the Arduino IoT Cloud dashboard, and allow remote UV lamp control. Sensor accuracy was verified with an average error rate of 2.72% for the DS18B20 temperature sensor, 2.94% for the pH sensor SKU SEN0161, and turbidity readings ranged from 0–10 NTU for clean water, 30–55 NTU for water mixed with powder, and 75–100 NTU for water mixed with black ink. Therefore, the system is considered effective in supporting the efficient and responsive care of Brazilian turtles using *Internet of things* (IoT) technology.

Keywords: Brazilian turtles, IoT, Turtle Tub, Arduino, Arduino IoT cloud, Monitoring System