SMART WATER TAP AND NOTIFICATION VIA MOBILE APPS OF INTERNET-OF-THINGS FOR ECOLOGICAL SUSTAINABILITY

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Abstract

Water plays an important role in our lives. Though, water wastage is a topmost serious issue in Malaysia. One of the most common waste of water incident is forgetting to turn off the water tap after turning it on. To overcome the problem, we have developed a smart water tap which will notify user via mobile app if the water tap is leaking or has not turned off. In addition, user can through our developed mobile app to control the water tap. Our developed Internet-of-Things (IoT) not only can save the water for ecological sustainability, it has the potential to track the usage of the water.

Introduction

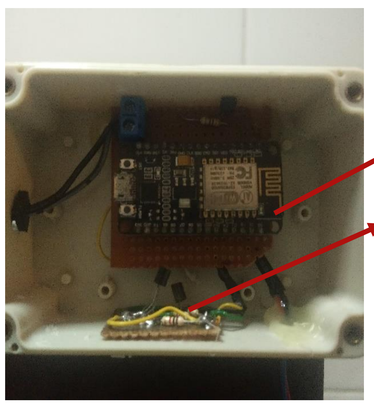
Online Straits Times dated on 23rd February 2019 [1] stated that Malaysia has started drafting the law to promote water conservation. This is because Malaysia consumed 10.786 million liters a day of water in 2017, with 60% were used in domestic households. Malaysia's per capita household consumption was 201 liters. In comparison, its neighbor (Singapore) consumed 143 liters. Many resources pointed out that the water wastage in household is the first priority to be solved [2]. Forgotten to turn off the water tap is the major issue of water wastage.

Materials & Development Methodology

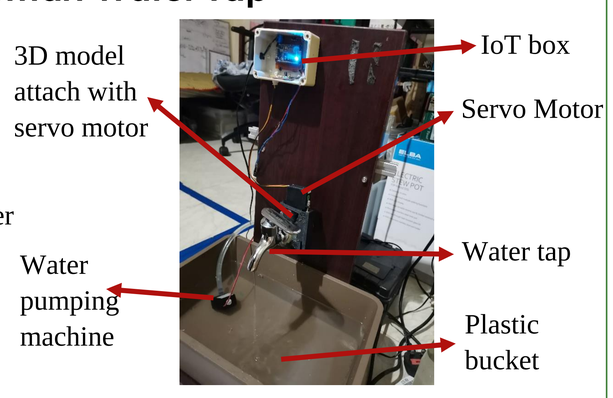
We develop our mobile app using Android Studio. The ESP 8266 is a Wi-Fi microchip with a full TCP/IP stack and microcontroller capability. The small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections.

The motor driver circuit is used to control the water tap motor. It is attached at the water tap to control the ON/OFF switch. The servo motor is to close the tap tightly. The water pumping machine is used to suck the water up from the plastic bucket to the water tap.

Prototype Smart Water Tap



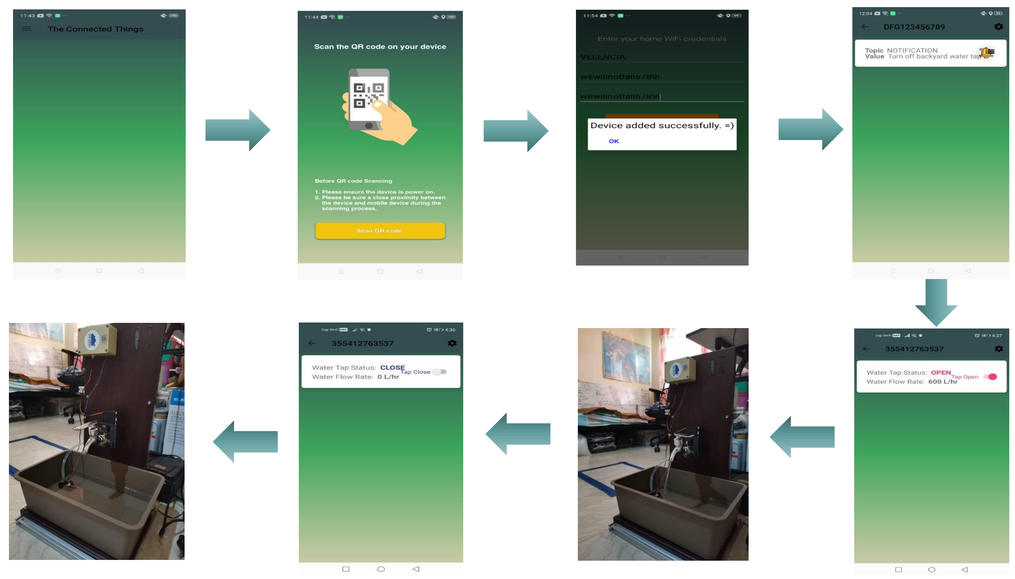
IoT box



Front view of Smart Water Tap

Experiment, Results & Discussion

Below shows the process taken to connect our mobile app to the water tap machine, and to manipulate the water tap. The blank page is our dashboard. We first scan the QR code pre-generated at the water tap. Once the device is successfully connected, it shows the notification and the current status of the water tap, which is "Open" (means turn-on) and with water flow rate as 600 L/hr. User clicks to turn off the water tap. No more water flows out from the tap.



Connect mobile apps to the water tap and manipulate the water tap

Conclusion

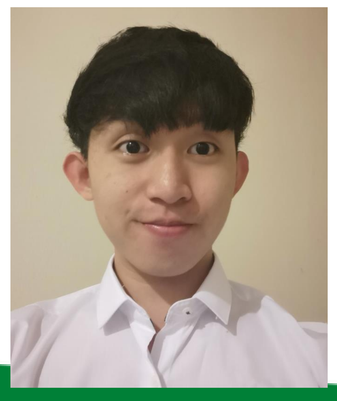
We have successfully developed a smart water tap which would automatically send notification to the user if the water tap is not turned off. User can through our developed mobile apps to check the status of the water tap and turn on/off the water tap via our apps.

We have surveyed and received a number of positive feedbacks that our IoT is interesting and potential for environment sustainability and commercialization. We hope that this could solve the water waste and indirectly save million of lives on the earth.

References

[1] Malaysia drafts law to promote water conservation, The Straits Times (Retrieve on 26th September 2020). https://www.straitstimes.com/asia/se-asia/malaysia-drafts-law-to-promote-water-conservation

[2] WasteWater Report 2018, The International water association. The Reuse Opportunity. (Retrieve on 27th September 2020) https://www.iwa-network.org/wp-content/uploads/2018/02/OFID-Wastewater-report-2018.pdf



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