

## SUMATO Awning

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### ABSTRACT

Automated awning has been created and introduced to facilitate daily human activities. Various advantages such as the area will be maintained without the control of humans as well as save time. The main theme of this project is to prevent the clothesline or more focused on protecting the tables and chairs outside of a restaurant and the house's patio area. However, there is a shortage of existing inventions. Not all existing automated awning systems use raindrop and temperature sensors. Most can only be controlled manually. Thus, 'Sumato Awning' was introduced to address the problem. It is built from 2560 Arduino Mega, using the YL38 raindrop sensor and LM35 temperature, the awning can function itself. Then, the 16\*2 LCD is used to display the motion and status of the awning operation. Among the other components used are buzzer to generate alarm sound, after the awning is fully flat, the LED will be lit to provide adequate lighting and water-mist fan for the consumer's comfort.

KEYWORDS: Arduino, Temperature sensor, Motor, Automatic fan

## 1 INTRODUCTION

'Sumato Awning' project was created and important to address the daily problems of the community especially the restaurant and home environment. Typically, to protect the dining area outside the restaurant from the rain or sunny weather. This is to ensure the convenience of customers. Next, the design idea is to use a layer of waterproof and non-absorbent based material. This is to ensure rainwater only flows on the roof other than as a UV stabilizer. It could block between 93% to 99.9% of UV radiation [1]. In addition, the design improvements made are based on existing products. Most of the existing automated awning come by itself, which is no importance or lack of comfort features especially for restaurant and residential use. Therefore, 'Sumato Awning' is designed with space saving which the ability to compress to the walls. It will supply enough light by the LED installed under the protected area. Not only that, for the comfort value, the water-mist fan will be install to supply enough air. Finally, nano-finished as the external surface can keep the maintenance free with dirt as it will unable to ad-hold to the surface [2].

## 2 OBJECTIVES

The weather in Malaysia is uncertain. It cannot be expected exactly even by weather forecasts. The common approach is by using awning that was operated manually. Awning is used for certain restaurants to protect their restaurants from raining or sunny. There are a lot of great and advance designs such as Crystalia Glass retractable skylights and roofs in Brooklyn, New York which provided an automatic glass roof [3]. However, those automatic glass roof is not suitable to be applied in Malaysia due to the equatorial climate. On the other hand, there are also lightweight, inexpensive and suitable roof types for use in certain restaurants in Malaysia. However, it does not work automatically. Therefore, this awning project proposed is lightweight, affordable, large and automatic controlled by a motor and detected by two sensors for two different conditions. The main objectives of this project are to design an automatic awning system, 'Sumato Awning' that functions after detect the presence of rain or high temperature by using Arduino Mega as micro-controller. Next is to implement awning system that can be monitored by IFTTT apps.

## 3 SIGNIFICANCE(S)

This project will help saving the time and energy of restaurant workers and residents to control the awning manually. Since it is a system that works independently, people can concentrate and focus more on restaurant operations and daily chores. This awning system will continue to open automatically when detecting the presence of rain by using raindrop sensor. Even so, when the rain stops, it will again compress the layers of the roof to the wall. It will persist and repeat the same steps whenever it detects the presence of water or high weather temperatures. Other than saving time, in terms of restaurant income, it will increase their business income because there will be no operational disturbance that can affect the number of customers who are visiting especially during rainy days. This is because of the lack of seating that normally added by putting chairs and tables outside the restaurant. Lastly, it will contribute to the convenience of consumers as the awning is equipped with LEDs to provide lighting and water-mist fans that will provide adequate ventilation under the protected area. So, restaurant customers and residents will always feel comfortable with the features of comfort that are included in the 'Sumato Awning' project.

## 4 METHODOLOGY

### a. Flowchart of the project

Fig. 1 shows the flowchart for this project. This project uses two sensors. Firstly, the rain drop sensor will sense the rain drop on it in certain quantity. Then, LCD will display "Raining, Awning Active" and the servo motor will move the awning to be opened. Secondly, the temperature sensor is functioned when the temperature limit is reached. The LCD will display, "Sunny Day, Awning Active". Automatically, the awning opened. Buzzer will then beeping to notify users. Since the awning has opened, the LED which indicate lamp will be turned on to provide sufficient lighting. Then, fan (water mist fan) will be turned on to provide adequate ventilation. Finally, WiFi Module installed to control the awning to be closed or opened through mobile applications and to see the status of the awning itself. Thus, the awning can be opened and closed in a very short time.

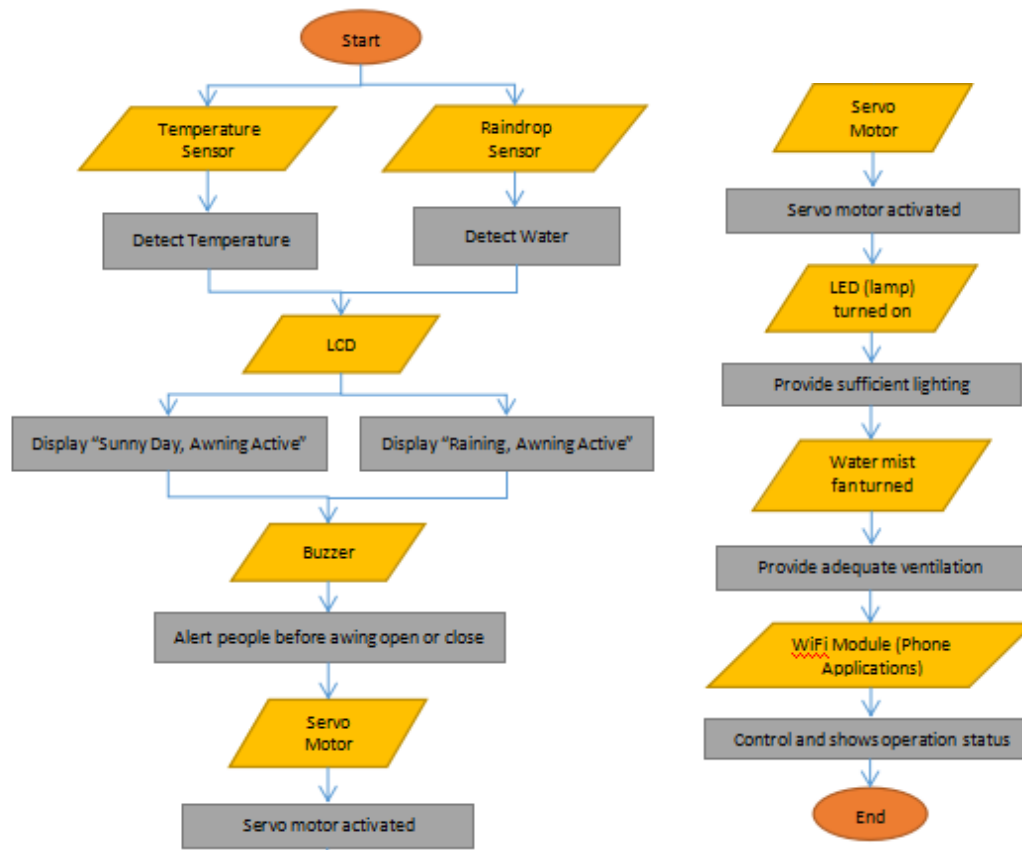


Fig. 1: Flowchart of Sumato Awning

## b. Block diagram of the project

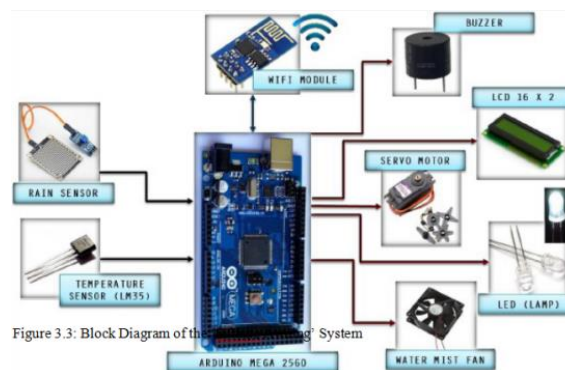


Fig. 2: Block diagram of Sumato Awning

Fig. 2 shows the block diagram for this project. There are two parts which are input and output. This project is developed by using Micro-controller board ATmega2560-16AU. This awning will operate based on two input sensors, raindrop sensor (YL 38) and temperature sensor (LM35). The outputs are Liquid Crystal Display (LCD) 16 x 2, servo motor (MG996R), buzzer, 9V fan and Light Emitting Diode (LED). Rain drop sensor will sense the rain drop on it in certain quantity. Then, LCD will display the operation mode of the awning. LED and fan which indicate lamp and water mist fan will be turned on automatically. Hence, WiFi Module used to control the awning to be closed or opened through mobile applications and to see the status of the awning itself.

## 5 RESULT



Fig. 3: Result of Sunny; temperature > 35°C

Fig. 3 shows the result during the sunny day. Temperature sensor sensed surrounding temperature higher than the limit set. Then, LCD will display, “Sunny Day, Awning Active”. Buzzer will beep to notify user and the the awning opened automatically. Since the awning has opened, the LED and fan which indicate lamp and water mist fan will be turned on automatically.



Fig. 4: Result of Raining

Fig. 4 shows the result during the raining day. The rain drop sensor will sense the rain drop on it in certain quantity. Then, LCD will display “Raining, Awning Active”. Buzzer will beep to notify user. Servo motor will then move the awning to be opened. Since the awning has opened, the LED and fan which indicate lamp and water mist fan will be turned on automatically.

## 6 CONCLUSIONS

‘Sumato Awning’ has more advanced system and technology than the existing awning system. In this regard, the problem in restaurants and clothesline that are exposed to rain and heat can be overcome. In fact, it can be monitored through applications on mobile phones. In the future, it can be expected that the use of automated intelligent smart systems will be widespread not only with smart awning systems. It will contribute significantly in the business industry such as restaurants and housing areas due to its characteristic features. Furthermore, this project could be continued by future researchers by adding various features of the privilege.

## REFERENCES

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