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## AUTOMATIC MOTOR FOR ROOFING GARMENTS USING LIGHT SENSORS, WATER SENSORS AND ANDROID APPLICATION

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### Abstract

When the rainy season, most of people are anxious when they are hanging clothes. The anxiety is increased when hanging clothes but the owner is out of the house. And most of people hanging clothes on the porch of the house, this is done to avoid clothes clothes exposed to the rain. From the above problem, I created an Automatic Motor tool to move the roof automatically. The motor uses an Arduino microcontroller coupled with a light sensor, water, and Bluetooth module connected to android applications. The workings of this tool is to detect the weather around through the light and water sensors, when the sensor does not receive light then the tool will translate that the rain come rain or it could be because it is late night, so the motor will pull the roof of the clothesline to avoid rain water. When the light sensor detects the sunlight, the instrument will translate that the weather is bright, so the appliance will pull the roof of the clothesline so that the clothes that had been closed become expose to the sun. When the water sensor is exposed to water droplets then the tool translates that rain comes, although there is sunlight motor will pull the clothes roof to avoid rain water. And the Bluetooth Module will translate commands sent from android to the arduino microcontroller to control the automatic or manual working motor as desired. The benefit of this tool is to make people feel comfortable easy and have no worry anymore with the clothes.

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*Key - words: Arduino Uno, Automatic Motor, android app, bluetooth module, light sensor, water sensor.*

### 1. Introduction

The design of automatic system in science and technology is growing rapidly. The advancement in science and technology makes everyone is trying to produce new innovations. It can be seen from the new technology of household tools. In the big city so many household appliances that use the latest technology. But the problem now is land or home page. Because that growth number of people very fast, land for backyard is unavailable and make difficult to work at home. One of the activities for housewives such as hanging clothes. Hanging clothes is one of the most frequent activities in household life, and we usually hanging clothes but we are in the office or work place, so we do not have time to pick up the clothes in time if the rain fall or at night. The current global warming is causing a very difficult to detect, sometimes the change of weather from hot to rain extreamly so that clothes drying activities is very disturbed. To overcome these problems need an automatic control system, by making the roof automatic clothesline system. In the process to design including: electronic and mechanical devices then integrated to realize the automatic roof effective and efficient, it will be connected to motor automatic. The title of Automatic Motor For Clothes Apparel Clothes Using Light Sensors, Water Sensors and Android Applications.

Android is a software for mobile devices that includes operating systems, middleware and key applications. Application development on Android platform using Java programming language. A series of core Android apps include email clients, SMS programs, calendars, maps, browsers, contacts, and more. By providing an open development platform, Android developers offer the ability to build extremely rich and innovative applications.

Developers are free to take advantage of hardware, access location information, run background services, set alarms, add notifications to status bars, and more. Android depends on Linux version 2.6 for core system services such as security, memory management, process management, network stack, and driver model. The kernel also acts as an abstraction layer between hardware and the entire software stack. (Fadjar Efendy Rasjid, 2014)

## 2. Methodology

Automatic Motor for Roofing Clothes Clothing is an interconnected tool that serves to facilitate the domestic work, one of them is hanging clothes, which uses android application connected with arduino uno microcontroller, servo motor, light sensor and water sensor. The essential components in this tool have different functions, the incorporation of components with the other components is done by way of soldering to combine each component. The Arduino uno component, the HC05 bluetooth module is arranged in a box, while the servo motor, light sensor and water sensor are removed from the container which will be placed outside the container. Arduino Uno is a microcontroller that works to process data received from HC05 bluetooth module, light sensor and water sensor into an action, which will give command output and in this circuit the output is servo motor that will move the roof of clothesline up and down accordingly command or input that has been translated arduino uno.

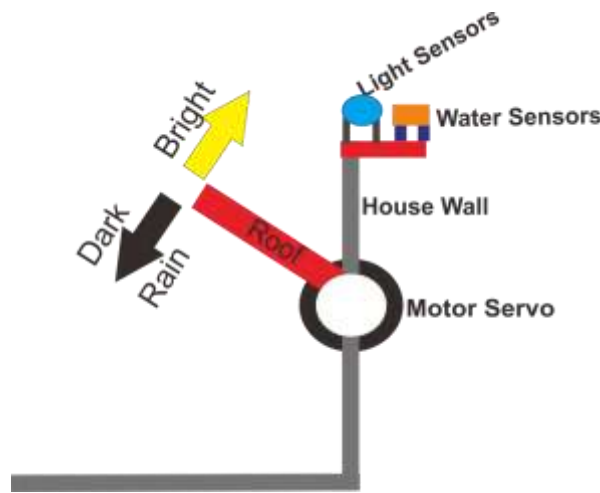


Figure 1. Prototype circuit scheme

The bluetooth module has 6 foot counts consisting of VCC, GND, TX, RX, STATE and EN. Each foot has a different function that is, VCC pin serves as a pin / leg to supply 3.3 volts DC power to the bluetooth module, GND pin serves as a leg / pin for grounding, TX pin serves as a pin to transfer data to arduino uno, pin RX functions as a pin to receive data from arduino, EN pin function to reset bluetooth module like name and password, and STATE pin function to view and collect bluetooth module status.

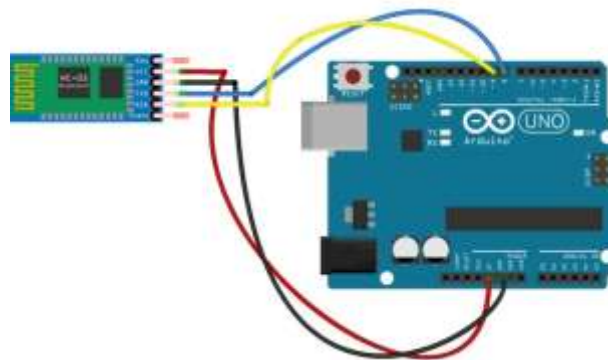


Figure 2. The Bluetooth module installation circuit scheme

Servo motor is a motor with a closed feedback system where the position of the motor will be informed back to the control circuit in the servo motor. This motor consists of a DC motor, a series of gears, a potentiometer and a control circuit. Potentiometer serves to determine the angle limit of servo rotation. While the angle of the servo motor axis is set based on the width of the pulse sent through the signal foot of the motor cable. In general there are 2 types of servo motors. That is a standard servo motor and Continuous motor servo. Standard type servo motors can only rotate 180 degrees. Standard servo motors are often used in robotics systems for example to create "Robot Arm" (Robot Arm). while the continuous motor servo can rotate by 360 degrees. Continuous motor servo often used for Mobile Robot. In the servo body is written type of servo in question. Standard servo motor which is used this time has 3 pieces of cable that is, power, ground and signal. The servo pin pin configuration with arduino uno is shown in the following figure:

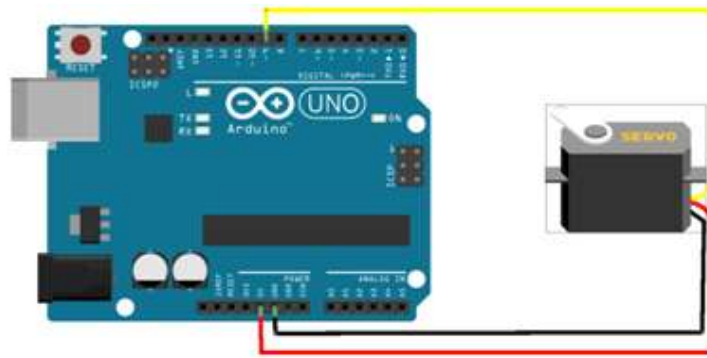


Figure 3. Schematic of servo motor mounting circuit

Light Sensor (LDR) is one of the electronic components that enter into the family of resistors where the resistance value is influenced by the intensity of light. In this tool the light sensor serves as a weather detector that will provide input to arduino uno and made the output through servo motor.

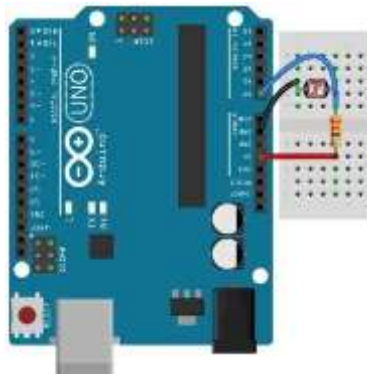
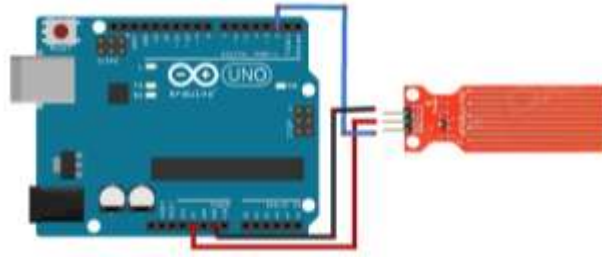


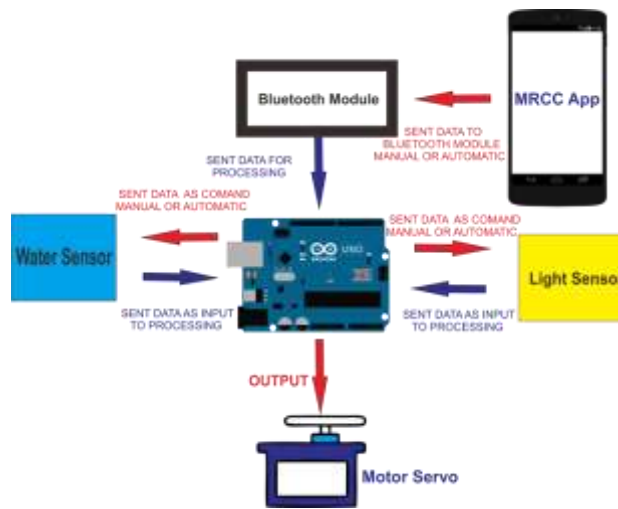
Figure 4. Scheme of light sensor mounting circuit

Water sensor is a tool used in detecting water levels for various applications. The water sensor consists of several types of ultrasonic sensors, pressure transducers, bubbler, and float sensors. In this tool the water sensor acts as a rainwater detector, if the water sensor detects water it will send an input command via arduino uno and will be forwarded as output to the motor servo to move the roof of the clothesline. The water sensor has 3 feet, namely VCC, GND, and STATE.



**Figure 4.** Water sensor sensor installation scheme

This software include android app MRCC App. Android is a linux-based operating system used for mobile phones (mobile), such as smart telephone (Smartphone) and Tablet Computer (PDA), (Ir.Yuniar Supardi, 2015).App MRCC App is used to control hardware by sending data-shaped commands with integer data types to arduino uno using bluetooth module connection. The MRCC App application features a button switch to make the device in manual or automatic mode, and has 4 buttons that act as Cover, Opener, Connector to Bluetooth and as a Bluetooth connection breaker, so users can control this tool at their own liking and very young to understand.



**Figure 5.** Overall Device Workflow

### 3. Automatic Motor To Roofing Garments using Light Sensor, Water Sensor and Android Applications

After all the installation process manually and automatically finished, automatic mode tool will work based on the weather that occurs around the tool. Figure 6.7,8,9 shows the existing work processes in the creation video and the results.



**Figure 6.** Assembling the prototype



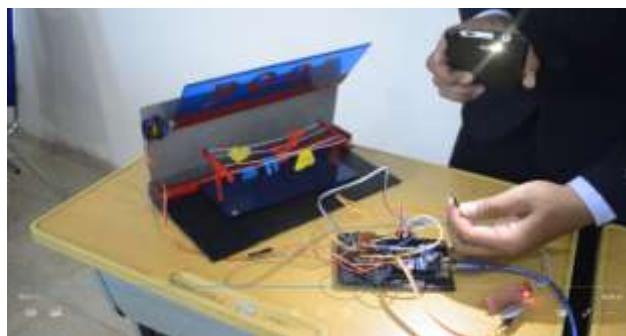
**Figure 7.** Building the Android Application



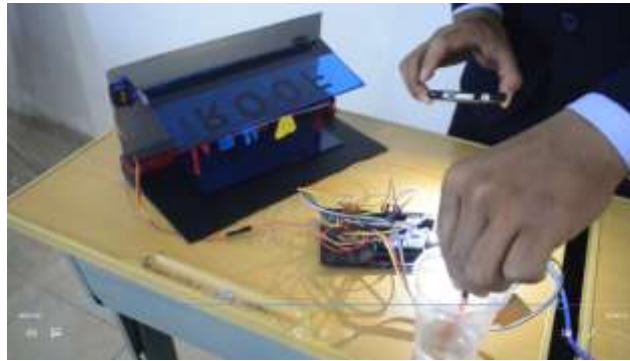
**Figure 8.** Building the Code on Arduino



**Figure 9.** Experimental Mode Mode Stage



**Figure 8.** Experiment Stage on the Light Sensor



**Figure 11.** Experiment Stage on Water Sensor

#### 4. Conclusion

Automatic Roof Clothing Motor use Light Sensor, Water Sensor and Android Applications After all the installation of the tool works manually and automatically, and in automatic mode the tool will work based on the weather that happens around the tool.

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