



Smart System with Rice Pest Controlling IOT

Muhammad Fahril Pratama^a, Muhammad Siddik Hasibuan^b, Denny Arya^c

^cComputer Engineering Study Program, Polytechnic LP3I Medan, Indonesia

* E-mail: m.fahrilpratama@gmail.com, mhdsiddikhasibuan@gmail.com, aryadenny17@gmail.com

Abstract

Indonesia is one of the agricultural countries with an area of agriculture, especially rice which millions of hectares in extent. This is certainly making Indonesia one of the countries producing rice variants and quality vary. Apart from the abundant rice production, farmers also always have constraints that could affect the decline in yields, in terms of both quality and quantity. In terms of loss of quality, usually caused by human error factor or errors in the care of Rice farmers themselves. As for the decrease in the quantity of rice, the main factor is to attack various Plant Pest Organisms (OPT) as the Sparrow and the Mouse. To solve the problem of farmers using conventional rice midges tool and is still done manually. This research was conducted to develop tools midges conventional rice into Modern. A tool that can be controlled automatically and manually based IOT are implemented into intelligent systems. The system was built using the Arduino Mega 2560 connected to the Internet using sensors PIR (Passive Infra Red) as a sensor detecting the movement of pest birds and mice, Motor Servo SG90 as the output drive Repellent Pest Bird and Ultrasonic as output repellent Pest Mouse, Cameras as monitoring the paddy fields through the android app and android app can be used to control and Ultrasonic Motor Servo SG90 manually. It aims to facilitate the farmers in the process of monitoring and the expulsion of rice pests. A tool that can be controlled automatically and manually based IOT are implemented into intelligent systems. The system was built using the Arduino Mega 2560 connected to the Internet using sensors PIR (Passive Infra Red) as a sensor detecting the movement of pest birds and mice, Motor Servo SG90 as the output drive Repellent Pest Bird and Ultrasonic as output repellent Pest Mouse, Cameras as monitoring the paddy fields through the android app and android app can be used to control and Ultrasonic Motor Servo SG90 manually. It aims to facilitate the farmers in the process of monitoring and the expulsion of rice pests. A tool that can be controlled automatically and manually based IOT are implemented into intelligent systems. The system was built using the Arduino Mega 2560 connected to the Internet using sensors PIR (Passive Infra Red) as a sensor detecting the movement of pest birds and mice, Motor Servo SG90 as the output drive Repellent Pest Bird and Ultrasonic as output repellent Pest Mouse, Cameras as monitoring the paddy fields through the android app and android app can be used to control and Ultrasonic Motor Servo SG90 manually. It aims to facilitate the farmers in the process of monitoring and the expulsion of rice pests. Monitoring camera as the paddy fields through the android app and the android app can be used to control and Ultrasonic Motor Servo SG90 manually. It aims to facilitate the farmers in the process of monitoring and the expulsion of rice pests.

© 2019 Published by JOJAPS Limited.

Keywords: Hama, IOT, Smart Systems, Android

1. Introduction

Technological developments in the short span of time have progressed very rapidly, as well as technologies that later will be developed to various field aspects of life that is the Internet of Things (IOT), a concept that aims to extend the benefits of internet connectivity connect continuously. As for capabilities such as data sharing, remote control, and so on.

Technology Internet of Things (IOT) was basically created and developed by man to facilitate any work and business in various aspects of the life. One of them can be applied in the field of agriculture, especially for countries that have great potential in agricultural production. That way it will cause Plant Pest Organisms (OPT) leave the rice, so off to eat. However, with the manual system, the farmer must always be in the paddy fields to move the rope strands by using its own power through the hands, so it will take and waste of time for the farmers. Because of this, the IoT here will be used to convert conventional manual systems into a system that works automatically and efficiently connected to a network (Irvan et al, 2016).

Based on the problems of Plant Pest Organisms (OPT) is, it is very important to create a tool to help farmers monitor paddy fields and repel Plant Pest Organisms (OPT). So, an idea emerged to create a project entitled "Smart System Rice Pest Controlling with IoT". This tool can facilitate monitoring the fields from a distance and can help farmers to repel pests rice so as to reduce the number of crop losses caused by pests of them. This tool is equipped with a camera and connected to the Internet so it can be monitored wherever we are. As for the system of detection sensors and the output of this tool can detect the movement of pests attacking paddy fields for example rats and a bunch of sparrows eating grains, rodents and birds will later be detected by the sensor used is a PIR sensor (Passive Infra Red) after it is detected the microcontroller will process the data from the sensor will then generate output servo movement and Ultrasonic as a medium for rice pest repellent. Based on the results of the study, a series of these tools can be used to repel pest birds at a frequency of 20-25 KHz according to the habitat of the bird pest, but in this study have not been obtained with certainty about the level of frequencies that can be used to repel pest birds (Tuluk et al, 2012).

2. Methodology

SMART SYSTEM WITH RICE PEST CONTROLLING IOT is a device that can be controlled remotely using the Android app online. Android applications can access the camera in locations paddy directly and can control the device SMART SYSTEM WITH RICE PEST CONTROLLING IOT automatically or manually

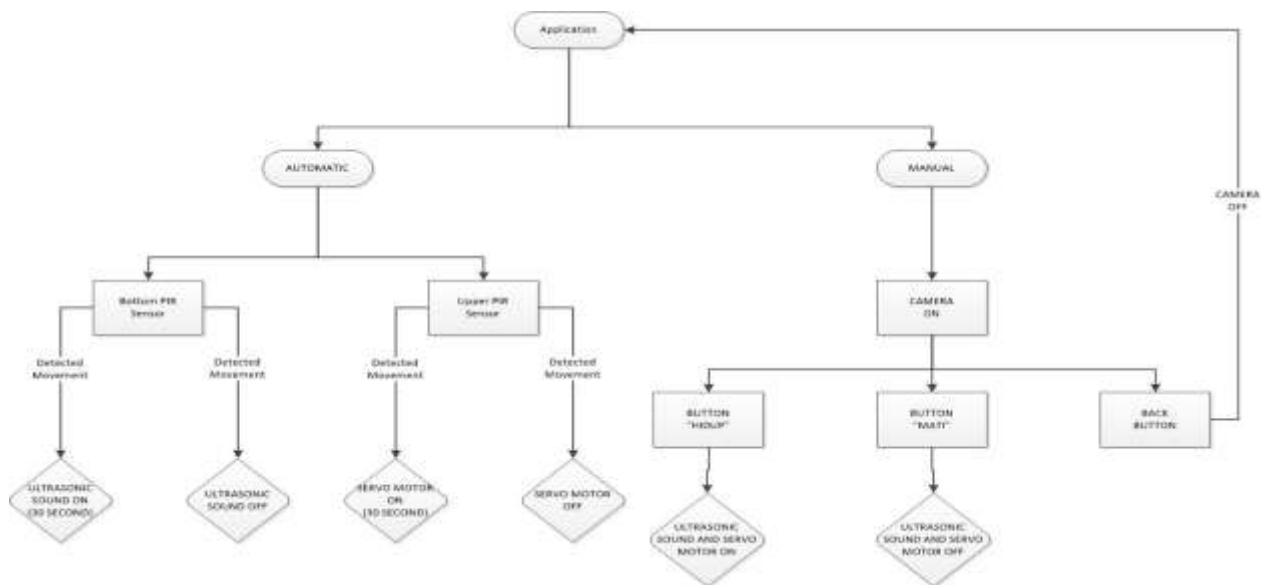


Figure 1 The circuit scheme Overall Equipment

From the above scheme can be seen that in the application there is the "Automatic" or "Manual". If you press the "Automatic" then the tool SMART SYSTEM WITH RICE PEST CONTROLLING IOT will run automatically. If the sensor detects motion pears below, the ultrasonic sound will live for 30 seconds and will die if no motion is detected. And when the sensor detects motion pears above, the servo motor will move for 30 seconds and will die if no motion is detected. If you press the "Manual" the appliance Smart System Rice Pest Controlling with IOT can be monitored online using the camera and can be controlled online as well and will appear a new display that contains the menu "Life", "Death" and "Back". If you press the "Live" the ultrasonic sound and servo motors will continue to live and will die if the "Off" in the press. If the "Back" button is pressed, it will go back to the start menu and the camera app will die.

A. Hardware

1. PIR sensor

Sensor PIR (Passive Infra Red) is a sensor used to detect infrared rays from an object. PIR sensors are passive, meaning that the sensor does not emit infrared rays but only receives infrared radiation from outside.

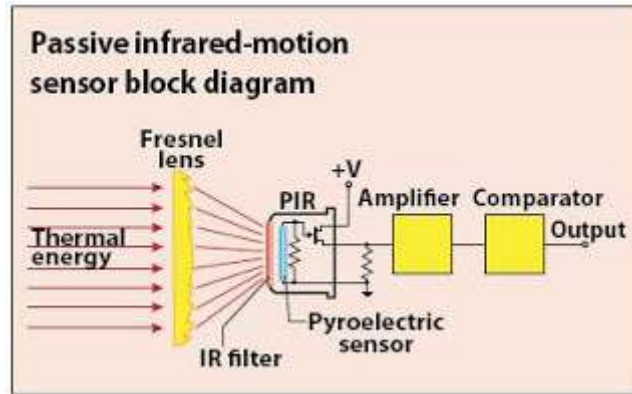


Figure 2. How it Works PIR Sensor

2. Servo Motor

Servo motors are one type of DC motor using a feedback system (feedback) in which the rotor position will be communicated to the control circuit that existed at the servo. This motor consists of a DC motor, a set of gear, potentiometer, and a control circuit. The potentiometer serves to determine the angle of rotation servo limit. While the angle of the servo motor axis is set based on the pulse width of the signal sent through the legs of servo motor cables.

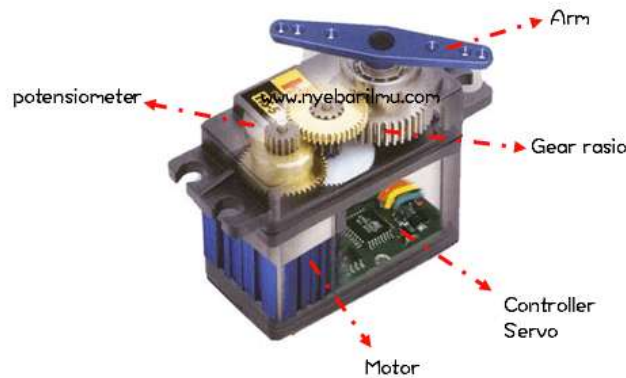


Figure 3. Servo Motor parts

3. Arduino Mega 2560

According to Solomon (2012), Arduino is an open source platform, both hardware and, software. Arduino is composed of microcontrollers mega AVR like ATmega8, ATmega168, ATmega328, ATmega1280 and ATmega 2560 using a 16 MHz crystal oscillator, but there are several types of Arduino which uses 8 MHz crystal oscillator. The power supply needed to supply sufficient minimum Arduino system with a voltage of 5 VDC. Port Arduino Atmega series consists of 20 pins that include 14 pin digital I / O with 6 pins can function as PWM outputs (Pulse Width Modulation) and 6-pins I / O analog.

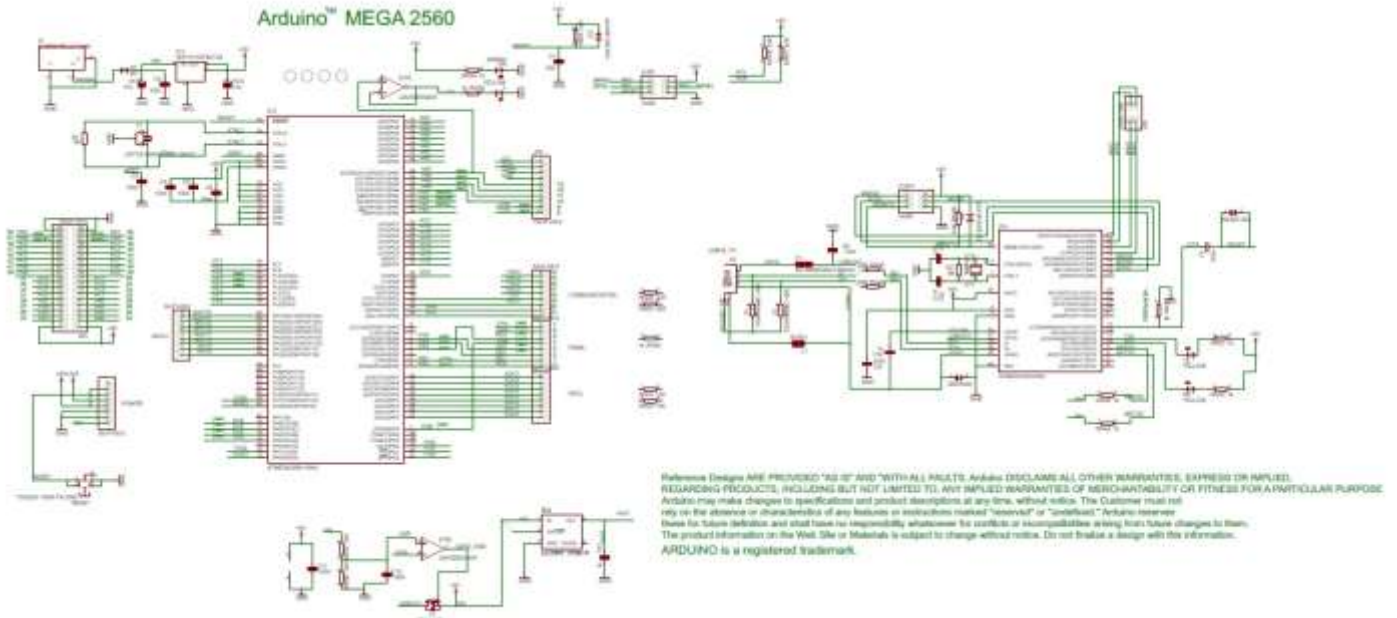


Figure 4. The series of Arduino Mega 2560

4. Ultrasonic sensors

Ultrasonic sensor is a sensor that serves to transform physical quantities (sound) into electrical quantities or otherwise converted into distance. The basic concept of this sensor which utilizes sound waves reflection principle can be applied to calculate the distance of the object with the specified frequency oscillator according to the source. Known as an ultrasonic sensor because this sensor applying ultrasonic waves as transducers. And here we only use the transducer.

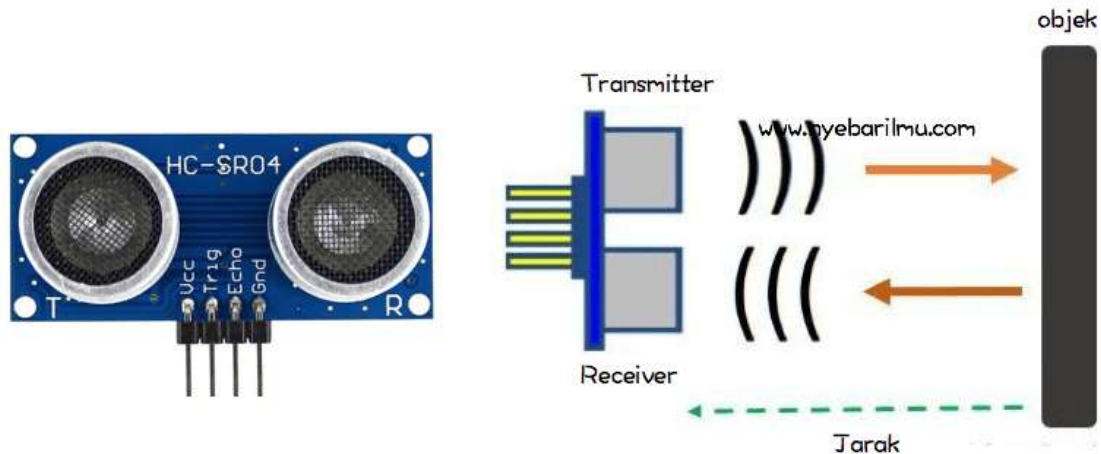


Figure 5. How it Works Ultrasonic Sensor

5. Module SIM800L

SIM800L Module is a type of module GSM / GPRS Serial of the most popular used by the electronics hobbyist, or professional electronics applied in various remote control, applications via mobile phones with sim Micro sim card types (Hasan and Hasibuan, 2017).



Figure 6. Module parts SIM800L

6. SPC-KST IP Camera 720P

IP Camera is a type of digital video cameras used for security monitoring and can send and receive data over computer networks and the Internet.



Figure 7 SPC-KST IP Camera 720P

B. Software

1. Android Studio

Android Studio is an Integrated Development Environment - Integrated Development Environment (IDE) for developing Android applications, based on IntelliJ IDEA. In addition to the code editor IntelliJ and powerful developer tools, Android Studio offers even more features to enhance your productivity when creating Android applications, for example:

- Systems based version flexible Gradle
- Emulator fast and feature-rich
- The unified environment for development for all Android devices

- Instant Run to push for changes to the applications that run without creating a new APK
- Template code and GitHub integration features to make the same application and import the sample code
- Testing tools and frameworks are extensively
- Lint tool to improve the performance, usability, compatibility version, and other problems
- Support for C ++ and NDK
- Native support for Google Cloud Platform enables easy integration of Google Cloud Messaging and App Engine

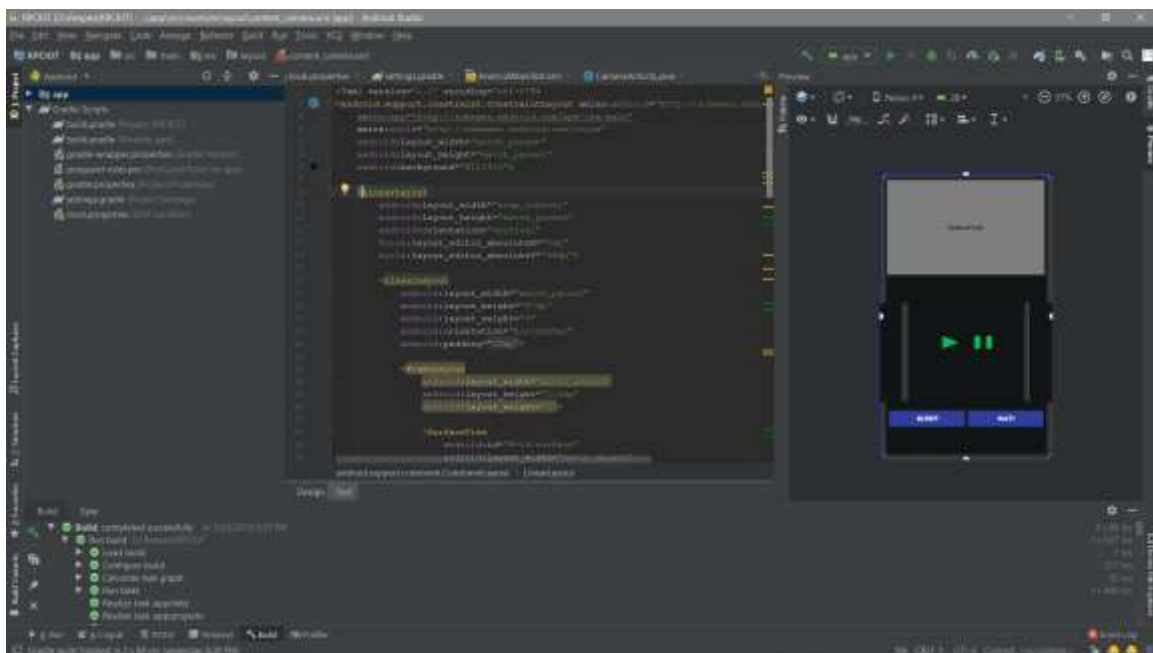
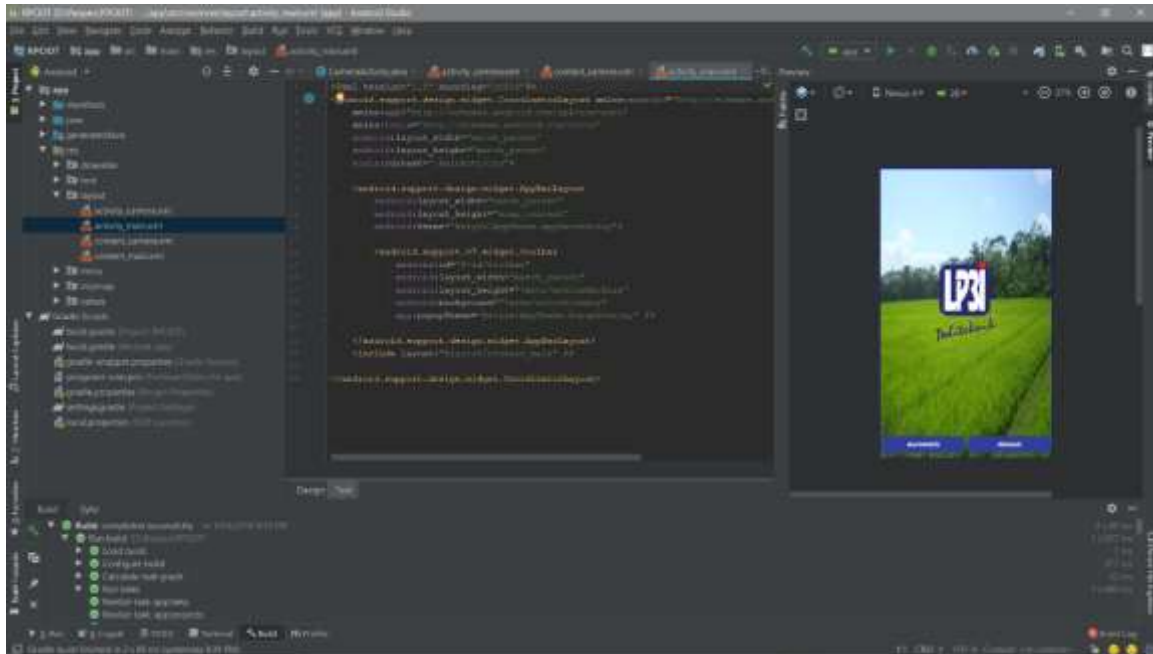


Figure 8 and 9 Using Android Application Design Studio

3. SMART SYSTEM WITH RICE PEST CONTROLLING IOT

After all the component installation is complete, the experiment carried out with the installation of the SMART SYSTEM WITH RICE PEST CONTROLLING IOT using Prototype.

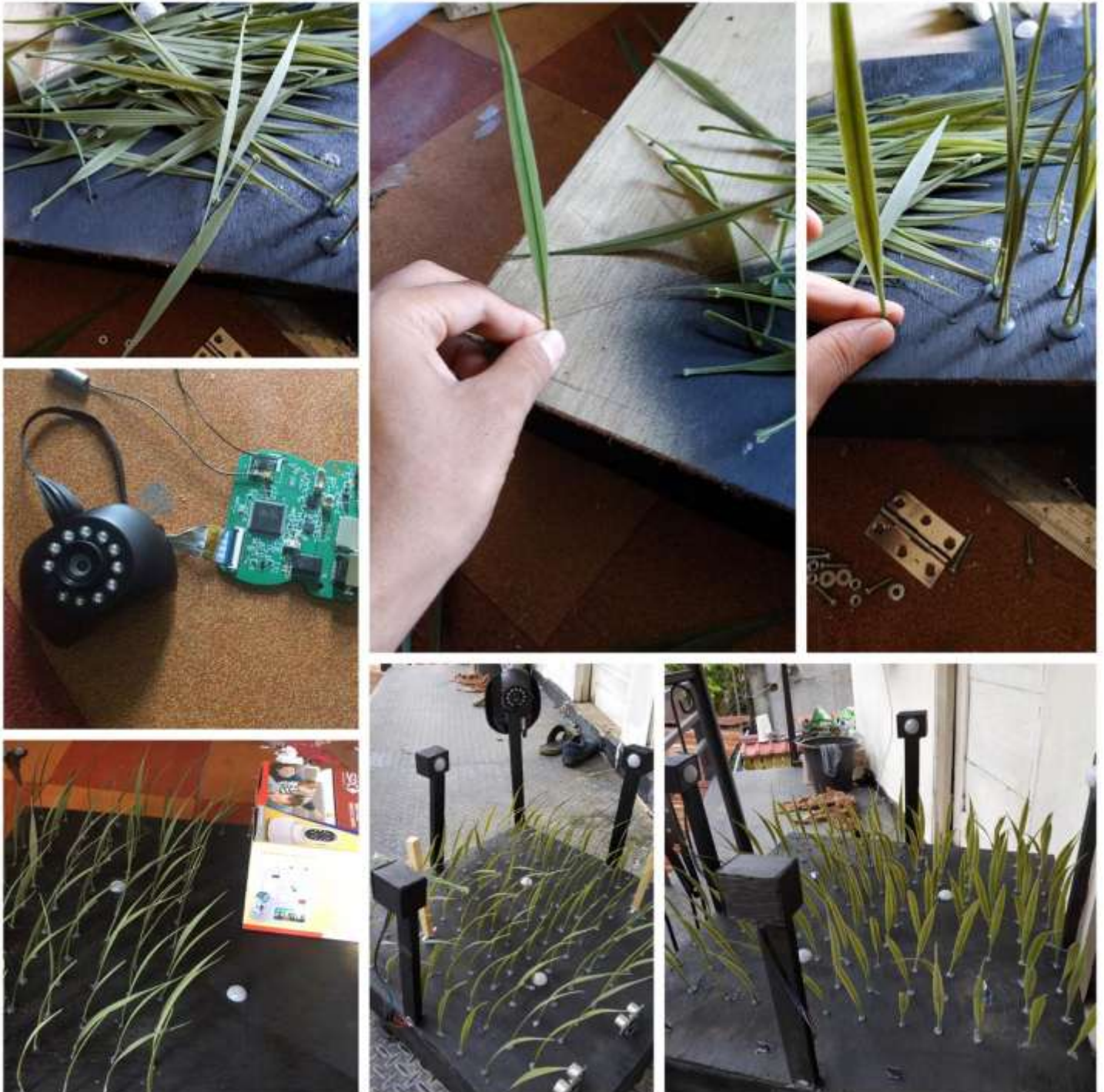


Figure 10, 11, 12, 13, 14, 15, 16. Overall Tool Making Process

4. CONCLUSION

SMART SYSTEM RICE PEST CONTROLLING WITH IOT can be run automatically or manually. Bird Pests will be controlled by a scarecrow that is driven by a servo motor, and the rat will be controlled by ultrasonic sound issued by the transducer Ultrasonic Sensor.

5. REFERENCES

- Arina, N., & Suhardi. (2017). *Nina Arina Politeknik LP3I Medan Video Rirual Reality Museum RAHMAT*, *Journal Online Jaringan COT POLIPD (JOJAPS)*, eISSN 2504-8457 Vol 11, Politeknik Port Dickson, Malaysia.
- Gupt, M. (2015). *How To Stream RTMP Live In Android*. Retrieved from <https://www.truicon.com/2015/03/stream-rtmp-live-android/>.
- Hakim, I., Harsani, P., & Ardiansyah, D. (2016). *Model Alat Pengusir Hama Padi Berbasis Internet of Things (IOT)*.
- Hasan, L. M., & Hasibuan, M. S. (2017). *Smart System Sent Gas Leak Detection Message By Using Arduino*, *Journal Online Jaringan COT POLIPD (JOJAPS)*, eISSN 2504-8457 Vol 11, Politeknik Port Dickson, Malaysia.
- Kadir, & Abdul. (2015). *From zero to Pro. Andi Offset*, ISBN: 978-979-29-5118-9.
- Ordinary, A. (2017). *Pengertian Internet of Things dan implementasi IoT*. Retrieved from <https://www.tembolok.id/pengertian-Internet-of-things-implementasi-dan-contoh-perangkat-iot/>.
- Panjaitan, B., & Khair, R. (2017). *MOTORCYCLE SAFETY TECHNOLOGY WITH IOT*, *Journal Online Jaringan COT POLIPD (JOJAPS)*, eISSN 2504-8457 Vol 11, Politeknik Port Dickson, Malaysia.
- Rasjid, F. E. (2014). *Android : Sistem Operasi Pada Smartphone*. Retrieved from http://www.ubaya.ac.id/2014/content/articles_detail/7/Android--Sistem-Operasi-Pada-Smartphone.html.
- Rinaldy, & Supriyadi, D. (2014). *Pengendalian Motor Servo Yang Terintegrasi Dengan Webcam Berbasis Internet Dan Arduino*. Retrieved from https://www.academia.edu/15356020/Pengendalian_Motor_Servo_Yang_Terintegrasi_Dengan_Webcam_Berbasis_Internet_Dan_Arduino.
- Safaat, H. N. (2011). *Pemrograman Aplikasi Mobile Smartphone dan Tablet PC*.
- Supardi, Y. (2015). *Belajar Coding Android bagi Pemula*. PT.Elex Media Komputindo.
- Suprianto, D., & Agustina, R. (2012). *Pemrograman Aplikasi Android*. MediaKom. Retrieved from *Pemrograman Aplikasi Android*.
- Thornsby, J. (2018). *App development: How to make calls, send SMS, and retrieve the user's contacts*. Retrieved from <https://www.androidauthority.com/send-sms-messages-app-development-856280/>.
- Tuluk, E., Buyung, I., & Soejono, A. (2012). *Implementasi Alat Pengusir Hama Burug Di Area Persawahan Dengan Menggunakan Gelombang Ultrasonik Berbasis Mikro Kontroler ATMEGA168*.