# Group 47 – Automated Camera Stand

Good morning, my dear madam. We are group number 47. I'm Binari Dissanayake. Let me present our presentation.

## 1st slide: Title

In this period many wildlife photographers are dying while taking photos due to animal attacks. So, we are going to introduce a new device to avoid such kind of problem. It is an Automated Camera Stand.

## 2nd slide: Group Members

These are our group members.

## 3rd slide Wildlife Photography

What is wildlife photography?
Wildlife photography is all about capturing animals in their natural habitats.
Nowadays Wildlife photography is one of the famous approaches of the photographers.

## 4th slide: Problem In brief

Let's go through our problem.
In modern cameras, we have the feature to take remote photos we called it remote photography. Therefore, we can take pictures even we are far from the camera. But there is no way to bring the camera near to the animals rather than a person carrying the camera.

- When we analyze the problem, we found 3 main sides of this problem.
- When we take from the photographer's side; Imagine we need to capture a very close wild animal photo, we can't reach the animal. Because it will be very dangerous. In the past few years, many wildlife photographers have died due to animal attacks.
- We have to spend a lot of time, until the required animals come, to capture their photos.
- When the photographer needs to take a good quality photograph, taking a close correct angle is essential. But the photographers can't go near the animals to

achieve those requirements. Furthermore, from time-to-time light conditions are constantly changed.

• From the animal's side: If the animal is innocent, it does not stay until we go near them.

• When we get the environmental side: the photographer's behavior caused to change the biodiversity.

This is our problem in brief.

### 5th slide: Aim

Now we come to our project aim. Our aim is to Automate the distance photography process to make sure it is safer and effective.

### 6th slide: Objectives

When we discuss our project objectives, we mainly expect 5 objectives. Those are,

• Rotate the camera both vertically and horizontally,
• Move the stand according to given GPS coordinates,
• Reach the target safely
• if an animal tries to attack the camera holder, then we can sound the siren. Like that we can ensure the safety of the camera.
• Control the camera holder using a remote controller

Thank you. It is over to you Dasuni.

## Individual Contribution.

### Slide 41 – Slide 46

In our project, my responsibilities are getting inputs related to the angle of the servo motor and transmitting the processed data from the microcontroller. Also, Dasuni and I are responsible for all the remote controller functions. The microcontroller of the remote gets analog inputs related to the angle using a thumb joystick. To process that analog signal, I learnt about ADC that means Analog to digital conversion on AVR ATmega32. Furthermore, I used a 433 MHz RF transmitter to transmit the above-processed data from the microcontroller. I have

to use USART technology to communicate with the microcontroller. I am still studying USART technology to communicate among the transmitter and microcontroller.

## Thumb Joystick

Now let's talk about the used components by me one by one. I used a thumb joystick module to get input to set the vertical angle of the camera. We can move the camera up and down using this joystick. The joystick uses ADC to communicate with the microcontroller.

The joystick is a device that translates our hand movement into an electronic signal, and the movements are converted by the computational unit into entire mathematics, in other words, the joystick translates entirely physical movements.

When we talk about the specification of the thumb joystick, we want 5V to operate the joystick. The operating current is 3.5 mA. Usually, the joystick module gives values along the x-axis and y-axis. So, it contains two potentiometers, one for each axis.

As we move the joystick, the value of the resistance of both potentiometers get change. The joystick gives out an analog input within the range of 0 to 5V.

In the joystick module, internal potentiometer values are 10kΩ. The operating temperature of this joystick module is 0 to 70° C.

There are 5 pins in the joystick module. The first one is the GND pin. We connect this pin to the ground. We supply power to the module using the VCC pin. The third pin is the VRX pin. Using this pin, we can get a readout of the joystick in the horizontal direction, that means the input related to the X-axis. The fourth pin is the VRY pin, using this pin, we can take a readout of the joystick in the vertical direction, that means the input related to the Y-axis. The last pin is the SW pin. This is the output of the internally connected push button. It is normally open; it means that the digital readout from the SW pin will be high. When the button is pushed, it will connect to the ground by giving output as low.

## Circuit Diagram

Now let's come to the circuit diagram of the joystick module. I created the circuit diagram using the proteus simulation software. In proteus, there is no joystick module. Also, I couldn't find any library for the joystick module. So, I used a variable resistor to represent an axis. I connected this variable resistor to ADC pin which is PA0 pin in the microcontroller. Because I get an Analog reading using this variable resistor. Also, I learnt about ADC technology to communicate.

When using ADC, we can choose ARef or AVCC or Internal as the reference voltage. I selected AVCC as my reference voltage and give 5V to it.

## Compiled Code

This is the compiled code of the joystick module. I have written two functions in this, which are initializing ADC and getting readouts ADC. In the main function, I have written the code to get the input of channel A0.

## RF Transmitter

We use a 433 MHz RF module to maintain the communication between the remote controller and the host. RF module, as the name suggests, uses radio frequency to send signals. These signals are transmitted at a particular frequency and a baud rate. A receiver can receive these signals only if it is configured for that frequency. Out of that I am responsible for transmitter module. The transmitter module takes serial input and transmits these signals through RF. To do that serial communication I have to use USART technology.

Now let's talk about the specifications and the pin configuration of the RF transmitter.

The **Transmitter module consists of four pins namely Vcc, ground, ATAD, and optional ANT** pin as shown. The Vcc pin has a wide range input voltage from 3V to 12V. The transmitter consumes a minimum current of 9mA and can go as high as 40mA during transmission. The ATAD pin is the data pin to transmit the signal. This signal modulated and then sent on air at a frequency of 433MHz. This module has

an antenna pin which helps to connect the external wire to extend the range up to 100 meters. The size of the antenna will depend on the operating frequency.
The RF transmitter receives serial data and transmits it wirelessly through its RF antenna. The transmission occurs at the rate of 1 Kilobits per second to 10 Kilobits per second.

## Circuit Diagram

This is the circuit diagram. I created this to give serial data to the RF transmitter from the ATmega32 microcontroller of the remote. I used PD1/ TXD pin for connect transmitter to the microcontroller. I gave 5V to VCC pin. In that we communicate with serial data. So, I have to learn about USART method to coding.

My individual contribution part is over. It is over to you Dasuni.