

05_Servomotor Control

Introduction

Being able to detect and identify numbers and detecting obstacles are one of the main functionalities of the robot. As such being able to move the camera and the servomotor is a must. To achieve that we are going to use two SG90 Tower Pro servomotors.

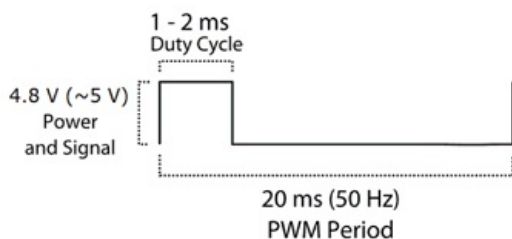


Servomotor overview

As said earlier, the servomotors used are the SG90 from Tower Pro. To operate these servomotors, you to supply them VCC (5V), GND and a PWM. Below are the corresponding signal on each wire and the diagram of the PWM to be sent to the servomotor.

SG90 Servo Motor

PWM=Orange (⏏)
Vcc = Red (+)
Ground=Brown (-)



The PWM has to be of a frequency of 50 Hz, for which the duty goes from 5 % to 10 % according to the diagram above. Further investigation allows us to see that while in theory, 5 % to 10 % duty cycle is supposed to corresponds to 0 ° to 180°, the reality is different. For the servomotor used in my case, the duties for a 0 and 180 ° position are approximately 3,5 and 13,25. There may be a need to change these duty cycle values in case the servomotor used changes.

Servomotor control functions

To control the servomotor motion two main functionalities are needed:

1. being able to hold the servomotor in a certain position
2. sweeping the servomotor between a start and end point

Should modification be in order about duty cycles, go to servomotor.h and modify the #define DUTY values. The move_servo() function should also be modified as it calibrated on the servomotors used during coding.

1. Holding the servomotor in position To hold the servomotor in position, one only need to constantly send the same PWM signal on the signal pin of the servomotor.

2. Sweeping the servomotor To have the servomotor sweep, the principle is simple. We just need to go from an start to an end point and so on. For the servomotor these start and end points are values of duties. We will then use an interrupt to go from start duty to end duty, and respectively from end to start duty via increments defined in servomotor.h.

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