Sumobot code book

The github repository can change breaking the links in the presentation. The code is here for simplicity.

The higher tree of the resources can be found here: <https://github.com/kaiwhata>

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# Drive Forward Code

// Based on Sweep Example

// This example code is in the public domain.

#include <Servo.h>

Servo leftwheel; // create servo object to control a servo on a wheel

Servo rightwheel; // create another servo object to control the other wheel

void setup()

{

 //assuming these are continuous rotation servos

 leftwheel.attach(9); // attaches the servo on pin 9 to the servo object

 rightwheel.attach(10); // attaches the servo on pin 10 to the servo object

}

void loop()

{

 //for continuous rotation servos a number above 90 means turn in one direction

 // and a number below 90 measn turn in the opposite direction.

 // the further away from 90 the number is the faster the servo rotation

 leftwheel.write(65); // tell servo to turn slowly in opposite directions

 rightwheel.write(115); // this should make the robot drive roughly straight ahead

 delay(500);

 //drive\_forward(500, 5); //this uses the method below to achieve the same effect as the 3 lines of code above

 leftwheel.write(90); // tell both servos to stop

 rightwheel.write(90);

 delay(500);

 leftwheel.write(115); // tell servo to turn slowly in opposite directions

 rightwheel.write(65); // this should make the robot drive roughly straight in reverse

 delay(500);

 leftwheel.write(90); // tell both servos to stop

 rightwheel.write(90);

 delay(500);

}

void drive\_forward(int drivetime, int speed)

{

 //the speed parameter should be between 1 and 10

 leftwheel.write(90-speed); // tell servo to turn slowly in opposite directions

 rightwheel.write(90+speed); // this should make the robot drive roughly straight ahead

 delay(drivetime);

}

# Turning code

// Based on Sweep Example

// This example code is in the public domain.

#include <Servo.h>

Servo leftwheel; // create servo object to control a servo on a wheel

Servo rightwheel; // create another servo object to control the other wheel

void setup()

{

 //assuming these are continuous rotation servos

 leftwheel.attach(9); // attaches the servo on pin 9 to the servo object

 rightwheel.attach(10); // attaches the servo on pin 10 to the servo object

}

void loop()

{

 //drive forward for 500 milliseconds at a speed of 5

 drive\_forward(500, 25); //this uses the method below to achieve the same effect as the 3 lines of code above

 //turn slowly left for 500 milliseconds

 turn\_left(500);

 //turn slowly right for 1 second

 turn\_right(1000);

 //

 stop();

}

void drive\_forward(int drivetime, int speed)

{

 //the speed parameter should be between 1 and 10

 leftwheel.write(90-speed); // tell servo to turn slowly in opposite directions

 rightwheel.write(90+speed); // this should make the robot drive roughly straight ahead

 delay(drivetime);

}

void stop()

{

 leftwheel.write(90); // stop left motor

 rightwheel.write(90); // stop right motor

 delay(100);

}

void turn\_left(int turntime)

{

 leftwheel.write(90); // stops left wheel

 rightwheel.write(115); // drives right wheel (this should make the robot drive roughly turn left)

 delay(turntime);

}

void turn\_right(int turntime)

{

 leftwheel.write(115); // drives left wheel

 rightwheel.write(90); // stops right wheel (this should make the robot drive roughly turn right)

 delay(turntime);

}

# Serial Control code

// Based on Sweep Example

// This example code is in the public domain.

#include <Servo.h>

Servo leftwheel; // create servo object to control a servo on a wheel

Servo rightwheel; // create another servo object to control the other wheel

void setup()

{

 //assuming these are continuous rotation servos

 leftwheel.attach(9); // attaches the servo on pin 9 to the servo object

 rightwheel.attach(10); // attaches the servo on pin 10 to the servo object

 //setup serial communication for debugging and testing threshold

 Serial.begin(9600);

}

void loop()

{

 //read data from serial connection

 if (Serial.available() > 0) {

 char inChar = Serial.read();

 // print out the value you read:

 Serial.println(inChar);

 delay(1); // delay in between reads for stability

 //if serial input is something

 switch (inChar) {

 case 'u':

 // move robot forward

 drive\_forward(500, 5);

 break;

 case 'd':

 // move robot backward

 drive\_backward(500, 5);

 break;

 case 'l':

 // move mouse left

 turn\_left(500);

 break;

 case 'r':

 // move mouse right

 turn\_right(500);

 break;

 }

 stop();

 }

}

void drive\_forward(int drivetime, int speed)

{

 //the speed parameter should be between 1 and 10

 leftwheel.write(90-speed); // tell servo to turn slowly in opposite directions

 rightwheel.write(90+speed); // this should make the robot drive roughly straight ahead

 delay(drivetime);

}

void drive\_backward(int drivetime, int speed)

{

 //the speed parameter should be between 1 and 10

 leftwheel.write(90+speed); // tell servo to turn slowly in opposite directions

 rightwheel.write(90-speed); // this should make the robot drive roughly straight backward

 delay(drivetime);

}

void stop()

{

 leftwheel.write(90); // stop left motor

 rightwheel.write(90); // stop right motor

 delay(100);

}

void turn\_left(int turntime)

{

 leftwheel.write(90); // stops left wheel

 rightwheel.write(95); // drives right wheel (this should make the robot drive roughly turn left)

 delay(turntime);

}

void turn\_right(int turntime)

{

 leftwheel.write(95); // drives left wheel

 rightwheel.write(90); // stops right wheel (this should make the robot drive roughly turn right)

 delay(turntime);

}

# Random exploration code (U/S sensor)

/\*

HC-SR04 Ping distance sensor]

VCC to arduino 5v GND to arduino GND

Echo to Arduino pin 13 Trig to Arduino pin 12

 to Arduino pin 11

 to Arduino pin 10

\*/

#include <Servo.h>

#define trigPin 13

#define echoPin 12

#define led 11

#define led2 10

const int threshold = 10; //cm - sets how far robot responds

Servo leftwheel; // create servo object to control a servo on a wheel

Servo rightwheel; // create another servo object to control the other wheel

void setup() {

 //setup serial communicstoin for debugging and testing threshold

 Serial.begin (9600);

 //setup ultrasouns sensor

 pinMode(trigPin, OUTPUT);

 pinMode(echoPin, INPUT);

 //assuming these are continuous rotation servos

 leftwheel.attach(9); // attaches the servo on pin 9 to the servo object

 rightwheel.attach(10); // attaches the servo on pin 10 to the servo object

 //setup random number generator - yes this could easily be improved!

 randomSeed(analogRead(A0));

 //randomSeed(2023);

}

void loop() {

 long duration, distance;

 digitalWrite(trigPin, LOW); //

 delayMicroseconds(2); //

 digitalWrite(trigPin, HIGH);

 delayMicroseconds(10); //

 digitalWrite(trigPin, LOW);

 duration = pulseIn(echoPin, HIGH);

 distance = (duration/2) / 29.1; //converts from 10 bit binary to cm

 //controller logic

 if (distance < threshold) {

 int randomNumber = random(1,10);

 Serial.print("Object detected: Turning ");

 Serial.println(randomNumber\*100);

 turn\_left(randomNumber\*100); //turns left for a random length of time

 //turn randomly left or right?

 }else{

 Serial.println("Nothing Detected: Driving Forward");

 //drive forward for one second

 drive\_forward(1000, 15); //(time, speed)

 }

 /\* this code is not necessary for robot exploring

 if (distance >= 200 || distance <= 0){

 Serial.println("Out of range");

 }else {

 Serial.print(distance);

 Serial.println(" cm");

 }

 \*/

 Serial.print(distance);

 Serial.println(" cm");

 delay(500); // time between sensor checks

}

//method for controlling robot movement

void drive\_forward(int drivetime, int speed)

{

 //the speed parameter should be between 1 and 10

 leftwheel.write(90-speed); // tell servo to turn slowly in opposite directions

 rightwheel.write(90+speed); // this should make the robot drive roughly straight ahead

 delay(drivetime);

}

void stop()

{

 leftwheel.write(90); // stop left motor

 rightwheel.write(90); // stop right motor

 delay(100);

}

void turn\_left(int turntime)

{

 leftwheel.write(80); // stops left wheel

 rightwheel.write(115); // drives right wheel (this should make the robot drive roughly turn left)

 delay(turntime);

}

void turn\_right(int turntime)

{

 leftwheel.write(115); // drives left wheel

 rightwheel.write(80); // stops right wheel (this should make the robot drive roughly turn right)

 delay(turntime);

}