

Hexapod Spider

Final Project Proposal

Group 8

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Objectives

- Implement a hexapod robot with auto collision avoiding.
- Control the robot with hand gestures remotely.

Overview

- Movement with 6 feet and 12 servos.
- Implementing stopping, moving forward, moving backward, turning clockwise, and turning counterclockwise.
- Controlled through hand gestures using a wearable device with motion tracking device via Bluetooth.
- Refusing moving forward when obstacles are detected by ultrasonic distance sensor.

Mechanical Structure

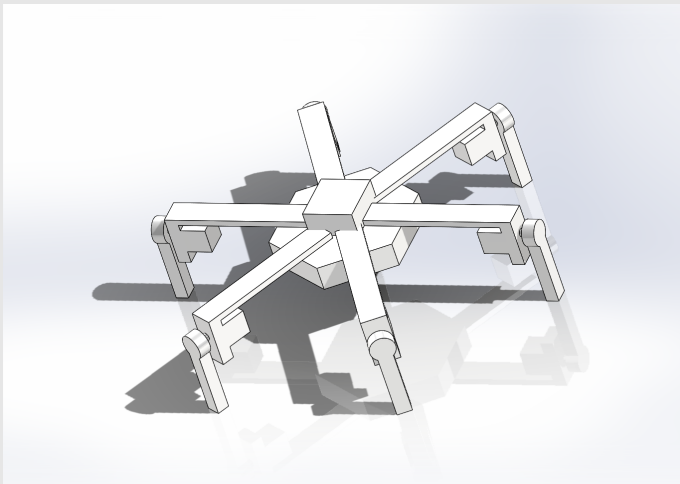
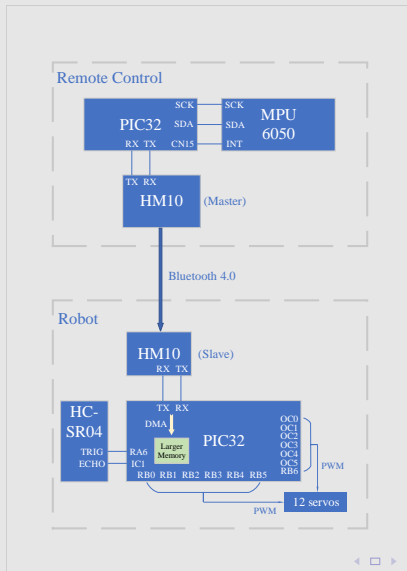


Figure 1: Mechanical Structure.

Functional Block Diagram



Motion Tracking Device

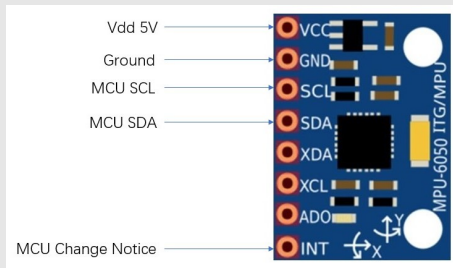


Figure 3: Component diagram of MPU-6050.

- Six DoF (x, y and z axis) accelerometer and gyroscope.
- Configuration and data transmission via fast mode I2C.
- Programmable internal interrupts and sample rate.

Bluetooth

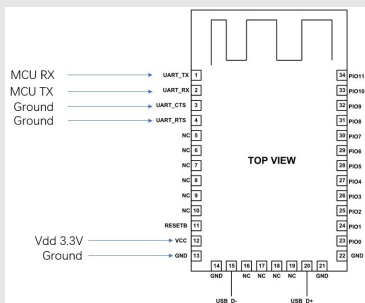


Figure 4: Component diagram of HM-10.

- Communications with MCU via UART at 9600 baud rate.
- Programmable master mode and slave mode.

Servo

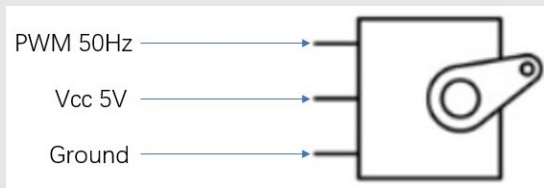


Figure 5: Component diagram of MG90S.

- 0-180 degree rotation decided by 50Hz PWM duty cycle.

Distance Detector

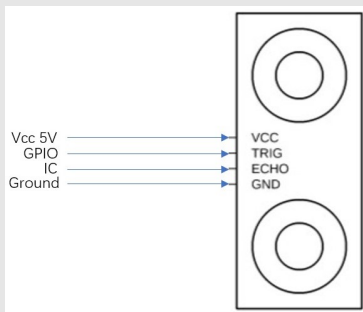


Figure 6: Component diagram of HC-SR04.

- Starting ultrasonic wave sending with TRIG pin.
- Calculating distance with time of high value in ECHO pin.

Preliminary Component List

Part	Part Number	Price (rmb)
PIC32 Board (x2)	PIC32MX795F512L	N/A
Accelerometer	MPU6050 6DOF	14
Bluetooth Tx/Rx	HM-10	42
Arduino Motor Shield	REV3	199
Micro Servo (x12)	MG90S	125
Lipo Battery	7.4V 1500mAh	33
Ultrasonic Sensor	HCSR04	6
Dupont Lines	N/A	0
Wood/Cardboard	N/A	0
Total Price		419

Figure 7: Preliminary Component List for the Hexapod Spider.

Preliminary Project Timeline

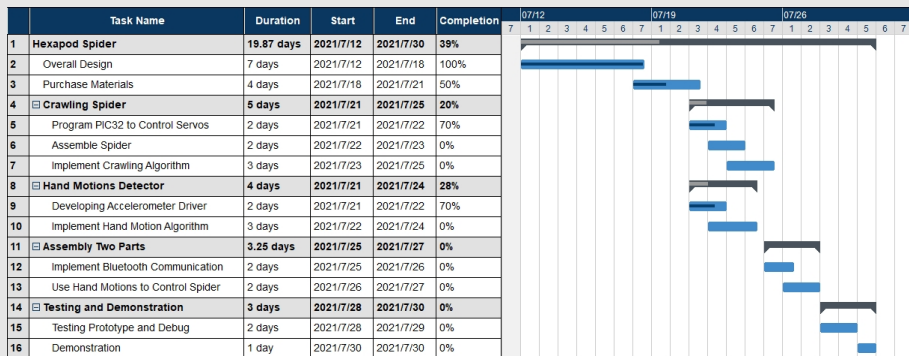


Figure 8: Gantt Chart for developing the Hexapod Spider.

Q & A

Thanks!