



Bio Inspired Walking Robot - Spider

Mini Project – Bionic – EEE437

Bachelor of Science

In Engineering in Electronics

at

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Padukka

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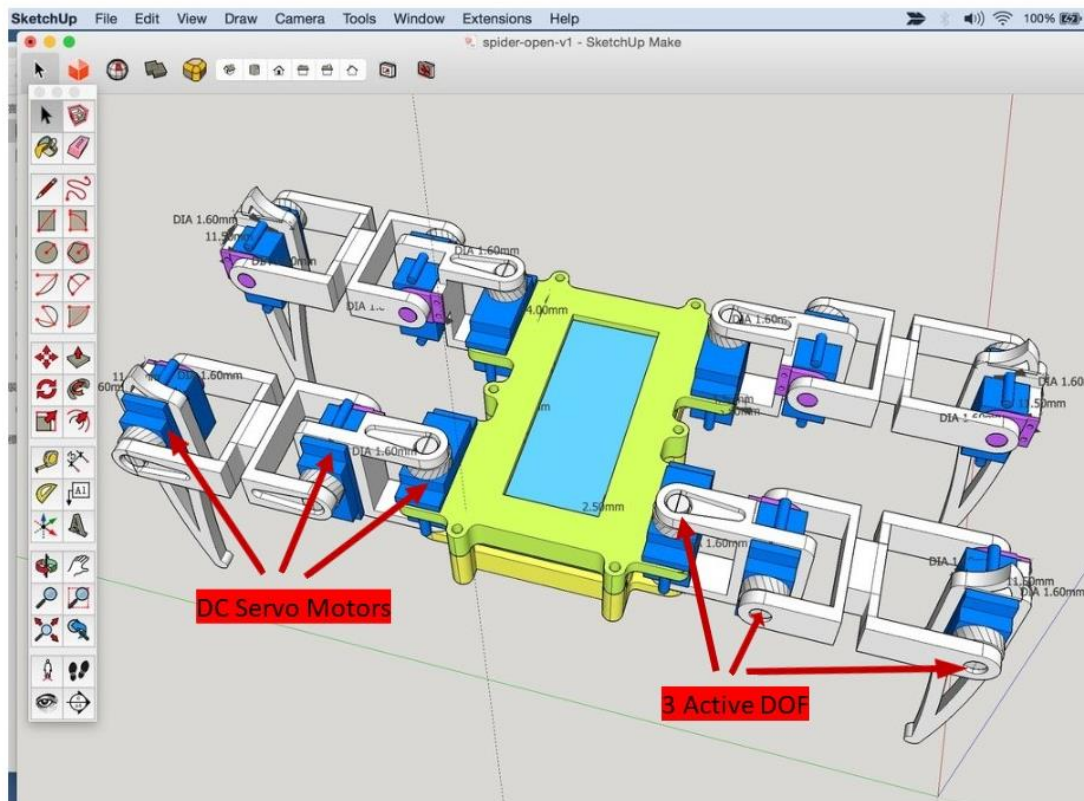
Detailed Structural Design

Our robot is a basic representation of spider movements, but since we only use four legs instead of eight, it won't perform exactly the same body movements. For a total of eight degrees of freedom, this robot has four legs, each of which has two degrees of freedom. This is the very minimum requirement a spider needs to be able to take on a comparable shape and move in a reasonable manner. Since it has four legs, it performs movements using these legs. Hence, it is also called quadrilateral because the movement of each leg is connected to the other legs to detect the position of the robot's body and control the robot's body balance.

Due to this decision, a controller must be used to regulate the locations and speeds of eight separate servomotors.

A servomotor is typically a rotary actuator or linear actuator that allows precise control of angular or linear position, velocity, and acceleration. It comprises of an appropriate motor coupled to a position feedback sensor. Additionally, a somewhat complicated controller is needed. frequently a specialized module made especially for servomotor application.

We have focused more on the shapes here so that challenging soldiers and bindings can be avoided so that it can be assembled using double stick straps. The chassis of the spider consists of a base, on which the servomotors and legs are attached. A design of our project “Spider Robot” is given below.



Project Objectives

Resource	Comment	Level of completion
Choosing animal	Choose spider	100%
Design the structure	Designed as 4 legs	100%
3D printing skeleton	Designed printed and acquired	100%
12 X Actuators (Servo Motors)	Ordered	50%
Mini Arduino	Ordered	50%
Bluetooth module	Ordered	50%
12V battery	Ordered	50%
Fixing the actuators to the skeleton	Not completed	0%
Coding the Arduino	Not completed	75%
Testing the robot	Not completed	0%

Technical challenges and Suggestions

1. Human oriented interaction

It can be considered as a certain problem not to introduce human as well as environment-friendly interactions into the created robots. For this we will use an Arduino board and the process can be simplified through coding.

2. Process slowness in building bio-based robots

Due to reasons such as slow operation of the robot legs, accumulation of waste in the robot legs joints, the system may heat up through taking a high-power supply. Therefore, it is expected to provide a suitable power supply for the system and the process can be simplified through the coding of Arduino functions to increase the functionality between the joints.

3.Communication in Robots

Although the system is operated by Bluetooth communication, sometimes communication problems between robots and humans may occur due to distance. For this, a Bluetooth module with better connections is used and communication problems can be reduced through correct coding.

4. Obstacle detection problems

Some collisions on obstacles may occur while operating this system. System performance may vary depending on environmental factors. For that, all obstacles can be minimized by using a smooth cover at the ends of the robot legs.