Hexapod -BCREC

Dept. of · Electronics & Communication Engineering
Texas Instruments Innovation Lab

About Hexapod

A hexapod mobile robot is a mechanical vehiecle that has the ability to walk. As a robot could be stable statically standing on three or more legs, a six legged walking robot can be highly flexible in movements and perform different missions without dealing with serious kinematic and dynamic problems. In hexapods even if one or two legs become malfunctioned or fail to work, the robot still can have the ability to walk and continue its mission.

Why Hexapod

We have decided to build a Hexapod as our final year project because of several reasons. Some of them are, Mobile robots are finding their way into a number of tasks that are unfit for humans, They allow the traversal of rougher terrain and can continue to function even after losing use of a leg (if so designed) These features are very useful in hazardous environments where maintenance cannot be performed, again the application of machine learning and love towards embedded system is one of the major reasons.

The Plan

We have decided to build the A-to-Z of the hexapod body by ourselves because of the availability of the 3D Printer.
The overall plan in brief can be defined as ”making a hexapod and implementing machine learning on it”
But this needs a greater explanation somehow, to understand the motive entirely. Which goes as follows :

Learning the Theory : As the hexapod will have 6 legs and 3 degrees of freedom on each, its important to know the theory of inverse kinematics. Besides this, basics of machine learning, in particular Reinforcement learning is the must-have knowledge to gain beforehand.
The 3D Printing : All the parts of the body of the hexapod are to be printed by 3D printing.
Formation of the Body : Efficiency of the hexapod demands proper size of the body and joining each portions tightly by screws. Embedding of the hardwares i.e sensors, modules, servo motors, power supply, microcontrollers with the Body.
Calibration of the Hardwares : In order to obtain 3 DOF the servos should be calibrated properly.
Implementing the software : Implementation of Reinforcement learning through microcontroller.
Training : Training the bot after implementation of reinforcement learning.

This is the overall plan of the project in brief. Obviously there are much more of this but to give the reader a basic idea on what we intend to do, we created this file.