DESIGN AND FABRICATION OF HEXAPOD ROBOT

Y. VAMSEE
Dept.Of Mechanical Engg
Avanthi Institute Of Engg

V. MUKESH
Dept.Of Mechanical Engg
Avanthi Institute Of Engg

M.MANIDEEP
Dept.OfMechanicalEngg
Avanthi Institute Of Engg

V. BHARANI KUMAR
Dept.Of Mechanical Engg
Avanthi Institute Of Engg

S.J.S.S.S SIVAKANTH REDDY
Dept.Of Mechanical Engg
Avanthi Institute Of Engg

Dr.T.RajaSanthoshKumar
(ASSOCIATEPROFESSOR)
Dept.OfMechanicalEngg
Avanthi InstituteOfEngg

M.LakshmiSramika
(ASSOCIATE PROFESSOR)
Dept.Of Mechanical Engg
Avanthi Institute OfEngg

DEPARTMENT OF MECHANICAL ENGINEERING

AVANTHI INSTITUTE OF ENGINEERING AND TECHNOLOGY

*(*Affiliated to Jawaharlal Nehru technological university, Kakinada, A.P

CHERUKUPALLY, BHOGAPURAM MANDAL,
VIZIANAGARAM DIST.

Abstract :

- We report on the design and development of X-RHex, a hexapedal robot with a single actuator per leg, intended for real-world mobile applications. X-RHex is an updated version of the RHex platform, designed to offer substantial improvements in power, run-time, payload size, durability, and terrain negotiation, with a smaller physical volume and a comparable footprint and weight. Furthermore, X-RHex is designed to be easier to build and maintain by using a variety of commercial off-the-shelf (COTS) components for a majority of its internals. This document describes the X-RHex architecture and design, with a particular focus on the new ability of this robot to carry modular payloads as a laboratory on legs. X-RHex supports a variety of sensor suites on a small, mobile robotic platform intended for broad, general use in research, defense, and search and rescue applications. Comparisons with previous RHex platforms are presented throughout, with preliminary tests indicating that the locomotive capabilities of X-RHex can meet or exceed the previous platforms. With the additional payload capabilities of X-RHex, we claim it to be the first robot of its size to carry a fully programmable GPU for fast, parallel sensor processing.

Introduction

Robotics researchers regularly endow robot platforms with new capabilities that increase the breadth of potential applications and push the boundaries of autonomy. In contrast, industrial automation is driven by a pragmatism dictated by the need to optimize throughput and reliability. The hope of both is that, as multi-purpose robotic platforms become more capable, they will be able to take over an increasing fraction of the tasks currently handled by application specific, fixed installation automation, thereby granting all applications greater levels of modularity and adapt ability which is expressed in

. We are now seeing an acceleration of the rate at which research robotics feeds into engineering practice. In this project we are trying to establish both wireless communication between the mobile robot and the remote base station, and serial communication between the remote base station and the GUI application.

Components of the Hexapod Robot

Specifications:

- **Battery :**Battery capacity was 12V and 8AH .Battery was used to store theenergy**.**

Power : 12V

Capacity of the battery : 12V 8 AH / 20 HR

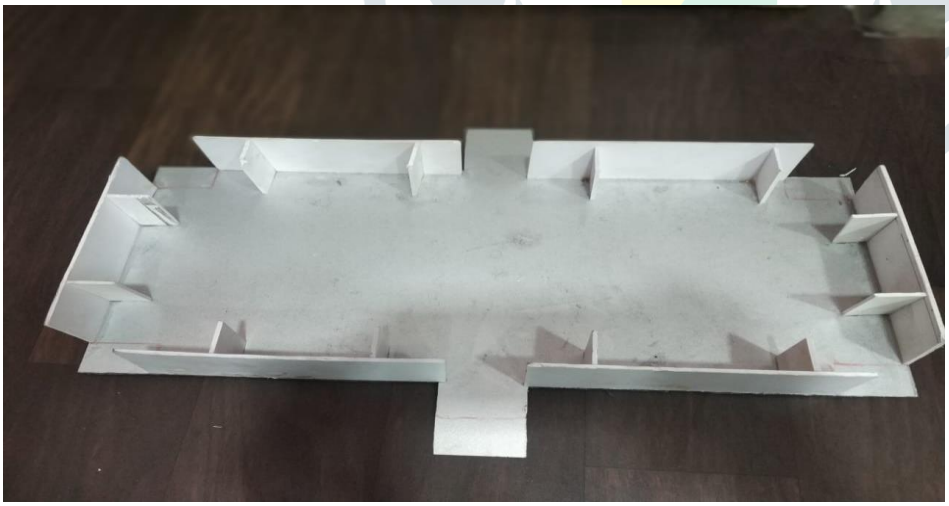
MaterialUsed :Plastic

Typeofbattery :Lead-Acid

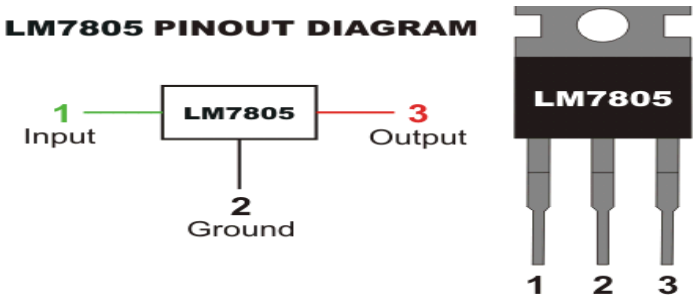
Cost :800/-

Foam Plastic:
A polymeric foam is a foam in liquid or solidified form, formed from polymers

Material: Foam Sheet



REGULATOR :

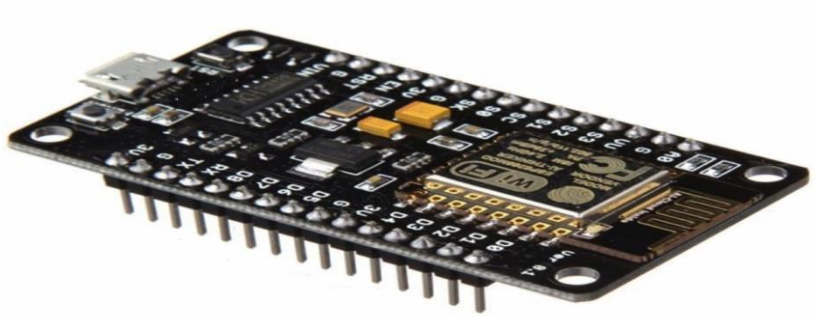


.

Regulator Type :LM7805
It is used to maintain the voltage difference

NODE MCU :

NodeMCU is an open source IoT platformIt includes firmware which runs on the ESP8266 Wi-Fi SoC from Espresso if Systems, and hardware which is based on the ESP-12 moduleThe term "NodeMCU" by default refers to the firmware rather than the development kits. The firmware uses the Lua scripting language. It is based on the eLua project, and built on the Espressif Non-OS SDK for ESP8266. It uses many open source projects, such as lua-cjsonand SPIFFS



No of NODE MCU = 1

Type of NODE MCU is ESP8266

DC MOTOR

A DC motor is any of a class of rotary electrical machines that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodicallychange the direction of current flow in part of the motor**.**

No of motors 8

Weight = 5kgs & Speed = 30 rpm

IOT

The **Industrial Internet of Things** (**IIoT**) refers to interconnected sensors, instruments, and other devices networked together with computers' industrial applications, including, but not limited to, manufacturing and energy management. This connectivity allows for data collection, exchange and analysis, potentially facilitating improvements in productivity and efficiency as well as other economic benefits The IIoT is an evolution of a Distributed Control System (DCS) that allows for a higher degree of automation by using cloud computing to refine and optimize the process controls.

Application: Blynk Application

Cost Analysis of the Hexapod Robot

S.No	Material	Specification	Quantity	Price
1	Battery	12v	1	800/-
2	Foam Sheet		2 sheets	350/-
3	DC Motor	30 Rpm, 5 Kgs	8	1200/-
4	NODE MCU	ESM8266	1	600/-
5	Regulator	LM7805	1	300/-
				3250/-

CONCLUSION

RHex platforms all include six legs, each with a single rotary actuator at the hip. Legs are designed from compliant materials to produce energetic running gaits. The leg modules are controlled from a central computer, which takes user commands or sensor feedback to decide how the legs should move.
The project has been mostly focused on higher order autonomy for the RHex robot, incorporating additional sensors for robust state estimation, visual navigation, and obstacle avoidance, as well as greater dexterity in controlling its legs to climb over and through obstacle fields.

REFERENCE'S

C2 T.Raja santhosh kumar, K.suresh babu, Dr.ch.mallikarjuna, D.V Srikanth, Flow and Motion of a Six Degree of Freedom Robot Manipulator, OSR Journal of Mechanical and Civil Engineering (IOSR-JMCE) e-ISSN: 2278-1684, p-ISSN: 2320-334X PP. 45-53,.

J12. E. SURESH, T. RAJA SANTHOSH KUMAR & Mr. DV SRIKANTH STATIC AND THERMAL ANALYSIS OF TRAIN BRAKE PAD AIJREAS, VOLUME 3, ISSUE 1 (2018,JAN) (ISSN-2455-6300)

J14. V. SHILPA, T. RAJA SANTHOSH KUMAR, MR. DV SRIKANTH MODELING AND ANALYSIS OF BASE PLATE BY FEM USING ANSYS, AIJREAS, VOLUME 3, ISSUE 1 (2018,JAN) (ISSN-2455-6300)

C3. T. Rajasanthosh Kumar, Dr.K.Mahadeva Literature on Machining of Aluminum Alloys, Proceeding for International Conference on Science,Engineering & Technology(ICSTE-15)

J5. M Pravalika,T Namratha,T Raja Santhoshkumar,D V Srikanth, "Heat Transfer Analysis of Advanced ic Engine Cylinder", IOSR Journal of Mechanical and Civil Engineering (IOSR JMCE)e-ISSN: 2278-1684, p-ISSN: 2320-334X, Volume 13, Issue 3Ver. IV(May-Jun. 2016), PP 45-52