International Journal of Innovative Research in Science and Engineering
Vol. No.2, Issue 03, March 2016
www.ijirse.com
ISSN: 2454-9665

WIRELESS ASCENT ROBOT

Prof. Ashish Malgave[1], Suraj Sathe[2], Chetan Mule[3], Amruta Kamble[4] , Rahul Powar[5] ,Vaibhav purohit[6]

[1,2,3,4,5,6] *Electrical Department, Amgoi, (India)*

ABSTRACT

Day by day things are becoming simpler and easier for us, because of advancement in technology. Automation has an importance in the world economy and in daily experience. In robotic technology rapid development is done in last few decades various types of intelligent machines which does various task in industry are becoming popular. The main objective of this project is to design tree climbing robot along with application. Our main consideration in designing tree climbing tree climbing robot is that how the tree climbing robot grip the tree and its motion planning. It has arm which consist of four legs and sharp end at feet.

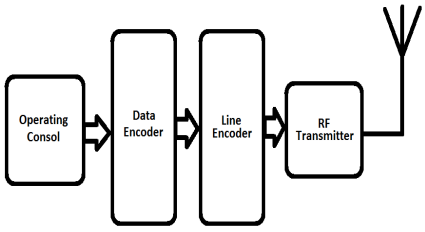
Key Words: RF module, Rack and pinion, DC gear motor

I. INTRODUCTION

All around the world most of researchers are work on climbing robot. The limitation of climbing robot is that it is applicable only for coconut tree and it is not applicable to tree having branches. Coconut tree is the only tree which has less number of branches or no branches. A minimum of 5-6 billion coconut tree are harvested each year with 12 million coconuts. Inch warm design is preferred for climbing robot. The structure consists of two parts upper and lower part. The movement of these two parts is relative to each other. Harvesting of coconuts is still done by a man without any protection. These people are good in that but they are not expert so there is still 10% chance of injury to these climbers. Each climber has its own capacity to climb and harvesting of coconut it is another limitation of climbers.

II. BLOCK DIAGRAM OF THE SYSTEM

Fig.1 Block diagram of transmitting section



International Journal of Innovative Research in Science and Engineering
Vol. No.2, Issue 03, March 2016
www.ijirse.com
ISSN: 2454-9665

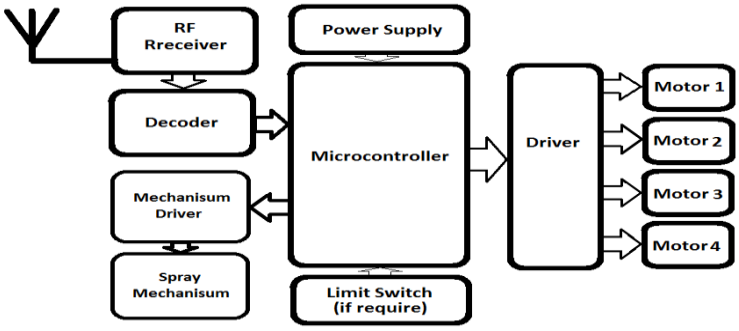


Fig.2 Block diagram of receiver section

Fig. shows the block diagram of transmitter & receiver section. Transmitter section consists of four blocks operating consol, data encoder, line encoder and RF transmitter.

Operating consol is nothing but switch pad. Every switch on the switch pad is assigned a different function. When the user presses a particular switch, say if "X" switch is pressed the data associated with that switch will be recognized by the IC 74147 i.e directly connected to the switch pad. The data will be further given to the encoder IC HT12E; the encoder IC is one of the most important part of the robot, the data transmitted from the switch pad connected to the decimal to BCD converter IC 74147 reaches the address or data multiplexed pin of the encoder IC HT12E. As soon as the data is received, then through the output pin of the encoder IC the data is transmitted in open air. At the end the data is collected by the receiver unit and the intended task is performed and the need is fulfilled. Over here encoder IC HT12E plays a very important role of encoding the data that is required for the intended task. Once the switch is pressed the data is given to the decimal to BCD converter IC 74147 from where the data is again recollected by the HT12E encoder and from there the data in digital format is converted to serial format and is transmitted. The two encoder IC have great deal of work in the whole project and are therefore treated as one At the receiver end the most important and biggest operation is performed by the microcontroller. The data is received by the RF module and is provided to the decoder IC HT12D. The decoder IC further provides data to the microcontroller unit and the pre-programmed function associated with the switch is executed and the operation is performed. Here the address pins of the decoder IC plays an very important role, the address pin combination of the encoder and decoder must be same for the proper function and operation of the most important part of the project.

III. SYSTEM MODEL AND WORKING

The mechanical structure of robot consists of two segments: upper segment and Lower segment. Each Segment consists of four legs with sharp end as feet. The up and down movement of robot is done with the help of rack and pinion mechanism. The implementation of continuous motion of robot is difficult so discrete motion adopted in this project. The legs of both the segment is made up of aluminum .The reason behind this is it has light weight. Legs are very important part in robot because climbing and gripping of tree depend on design of legs. The legs are made by Al bar and fitted with very sharp feet. To make the legs, cut four 8'' lengths of the aluminum bar. Mark the segment 4''from each end. At those marks, bend the aluminum at a right angle, to make a "C" shape. Upper and lower segment consist of to dc motors and a single motor is used for up and down

ISSN: 2454-9665

mechanism. The motors are used here is dc gear motor. The gear is made up of nylon to reduce the weight of robot. Also the rack & pinion mechanism is made up of nylon material.

IV. MOTION PLANNING

The operation of robot is totally depends on remote that is transmitter. The remote consist of total 8 switches. Two switches are used to grip and release upper segment, two switches are used to grip and release lower segment, and two switches are used for up & down mechanism. One switch for application & remaining one switch for future scope. For controlling dc gear motor we use AT mega 328 microcontrollers. The design of robot is similar to inchworm design. First the top segment grips the tree then bottom segment grip the tree. After that top segment release from the tree, it goes upward by using up-down mechanism and again grips the tree. The whole function of robot depends on program. Each tree has different diameter so climbing of legs for various diameter of tree is little bit complex, so the design of legs is very much important to grip a wide variety of diameter without reprogramming the robot for each size.

V. RESULTS

- The robot can climb various branches less trees.
- The robot can climb trees having 25 cm diameter.
- The robot has a load carrying capacity of 500 gms.
- The robot takes 5 minutes to cover vertical distance of half meter.

Fig.3 Experimental setup

ISSN: 2454-9665

VI. CONCLUSION AND FURTHER WORK

The main objective of this paper is to design a tree climbing robot. Our prime consideration in designing tree climbing robot is of the motion planning and method of gripping. The mechanical structure & gripping mechanism designed & implemented successfully.

This ascent robot can be used to replace human from plucking coconut from tree. It will reduce human life risk while plucking the coconut tree. Further modification can be worked out like high quality video camera which can be used for pet rolling purpose in police department or military department. Some way extended degree of freedom can be incorporate by changing grip mechanism of arm, so that work related to climbing can be done very easily without direct human involvement in the work.

R EFERENCES

[1]. Salice Peter, Jayanth M, ArunBabu M.K, Ashida P.V, Akhil K.T, "Design and Construction of Tree Climbing Robot" in IJAREEIE . ISSN (Print) : 2320 - 3765. Vol. 4, Issue 4, April 2015.

[2.]Rajesh KannanMegalingam, Tom Charly Kattakayam, HarikrishnaMenonT,RaiduVenuMadhav "A Kinect Based Coconut TreeClimber" in International Journal of Applied Engineering Research, ISSN 0973-4562 Vol.7 No.11 (2012)

[3]. HamedShokripour, Wan Ishak Wan Ismailand Zahra MoezKarimi "Development of an automatic self-balancing controlsystem for a tree climbing robot" African Journal of Agricultural Research Vol. 5(21), pp. 2964-2971, 4 November, 2010.

[4]. Hariskrishna TV, VineetPandeyand PDPR Harshavardhan "Design of Climbing Mechanism for a Tree Climbing Robot " in International Journal of Mechanical Engineering and Research. ISSN 2249-0019, Volume 3, Number 6 (2013), pp. 647-654.

[5]. Rahul V, SebinBabu, Sameer Moideen CP, Vineeth VP, Nikhil Ninan "SEMI AUTOMATED COCONUT TREE CLIMBER" in International Journal of Research in Engineering and Technology eISSN: 2319-1163 | pISSN: 2321-7308