REMOTE CONTROLLED TREE CLIMBING MACHINE FOR ARECANUT TREE

PROJECT REFERENCE NO.: 38S1514

COLLEGE : CANARA ENGINEERING COLLEGE, BENJANAPADAVU
BRANCH : ELECTRICAL AND ELECTRONICS ENGINEERING
GUIDE : MR H RAGHUVEERA
STUDENTS : MR. CHANDRAKANTH SHENOY K
           MR. LOYAL RAYAN
           MR. MANOJ KUMAR
           MR. ARPITH

Introduction:

In recent years, labour scarcity has emerged as one of the foremost challenges in farming. One crop that has been most affected by this is the supari, or arecanut. Arecanut trees attain a height of about 60-70 feet. It is mandatory to climb the trees a minimum of five times a year for a successful harvest - twice for the preventive spray against fungal disease, and thrice to harvest the arecanut.

Only skilled labourers can carry out these farming operations. They have to climb the trees using muscle power. In an acre that has 550 trees, a labourer has to climb a minimum of 100 to 150 trees. As this involves real hard, physical exertion, younger generations of labourers are losing interest, with potentially harsh implications for arecanut cultivation. The spraying is done in monsoon, while harvest time is typically in summer.

Objectives:

Arecanut plantation is one of the main agricultural activities in the southern part of India. The regular spraying of pesticides to areca trees, plucking of arecanuts and coconuts, which is done manually to a large extent, requires specialized labourers, who have to climb the tree to do that. This is a risky job. Most of the climbers do not have any medical insurances and thus hardly have any risk-coverage.

Considering all the casualties in conventional tree climbing we decided to make a robot that does the necessary job which eliminates risks to human life.
Methodology

Project contains

1. Rectangular base frame

   The base frame is one which supports all the components to be built upon. It is fitted with four stepper motor sets for the climbing. The frame also has a movable arm on top. The frame can be opened as shown in figure so as to attach to the tree. There is a locking system to attach securely into the tree.

2. DC motor set

   The DC motor set consists of a speed reduction kit along with it. This helps to get the maximum torque to climb the tree. The whole DC motor assembly is attached to a spring mechanism to get the required grip between the wheel and the tree. There are 4 motor sets attached at each corner of the frame.

3. Remote control kit

   The whole set is controlled by remote. So the entire climbing mechanism and spraying mechanism are controlled by a remote.

4. Movable arm

   Movable arm can go up and down and is able to rotate its tip 360°. Its tip can be attached with a cutting mechanism or a weed sprayer. It is also remote-controlled by the operator.

5. Battery

   The battery is not included in the robot. We would make a flexible wired connection between the robot and battery. Since the battery is heavy, it would be lying on the ground.
Result and conclusion:

In the present day, to spray pesticides on arecanut trees people have to climb and risk their lives. It is also difficult to find workmen to do this job. We are successful in putting together a prototype that can replace the man force involved into doing this job. The use of this prototype makes it economical and reduces workmen.

Future improvements:

Further research into the mechanical design of the wheel alignment or body would allow for the final project to be more effective in completing our list of requirements. The design of the wheel alignment is something that could be explored in great detail by future projects. The shape and strength of the base could be redesigned to make them smaller and lighter possibly allowing for the robot to climb around the tree. Research on this could also look into designs that would allow for more force to be applied to the wheel allowing for heavier payloads to be carried. Our design can be improved by installing a camera on the tip of the movable arm so as the operator can easily identify the target area of the sprayer.