

Fabrication Of Remote Controlled Coconut Harvesting Machine

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ABSTRACT: The main aim of the project is to minimize human effort required for climbing and plucking the coconut. With the advancement of the technology things are becoming simple and easier for us. Coconut harvesting is still done without proper safety measures which can have to serious causes. Nowadays the climbers are not available in required quantity to overcome these problems our project is presented here focus on coconut harvesting and controlling remotely by an operator on ground which reduces wastage of money and time.

Keywords:- remote controlled, wireless climbing .

Section 1: INTRODUCTION

Coconut palms are grown in more than 80 countries of the world, with a total production of 61 million tonnes per year India produces about 25% of the world's coconut meat and fibre, which is eaten or made into soap, oil, shampoo, rope, and door mats. An experienced climber takes about 8-12 minutes alone just to climb the trees (this doesn't include cutting the coconuts and the return trip). In more developed areas, methods of harvest and coconut removal involving rope-climbing gears and spiked shoes are used, but are impractical and in efficient for use in large scale plantation harvesting.

Section 2: LITERATURE SURVEY

The post-independence period marks a turning point in the history of Indian agriculture is clear from the fact that compared with a rate of growth of less than 0.5 percent per annum during 1904-5 to 1944-45. The agricultural sector recorded an annual growth rate of 2.7 per cent during 1949-50 to 1983-84. This growth has been achieved as a result of high priority accorded to agriculture. The policy makers brought a twofold strategy for regenerating agriculture immediately after freedom. The first element of this strategy was to implement land reforms in order to remove institutional bottlenecks and the second element was to undertake massive investment in irrigation and other infrastructure in order to update the existing agricultural technology.

- Doubled-rope technique
- Single-rope technique
- Lead climbing

2.1. OBJECTIVE OF PROJECT

To plucking of 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 and also time consuming, hence to eliminate those risks and to reduce time this project is carried out.

Section 3: COMPONENTS USED

3.1. Frame



Fig 1: Frame

It is a structure which withstands the whole weight of the apparatus. The frame is as shown in fig.1, is made of mild steel. It is the basic structure in which the fabrication work is carried out. The frame is fabricated using mild steel. Mild steel frame is of thickness 5mm, 350mm diameter.

3.2. Wiper motor



Fig 2: Wiper motor

The electric wiper motor is a permanent magnet, rotary electric motor as shown in fig.2. A worm gear machined on the armature shaft drives the output shaft and gear through an idler gear and shaft. The output shaft operates the output arm, which is connected to the wiper linkage.

3.3. Wheel



Fig 3: Wheel

The wheel used here is a nylon wheel. The whole set-up moves through the wheels, as shown in fig.3. Here three sets of wheels are used. The wheel is covered with rubber tape for the purpose of gripping. Here the three wheels are used for just guiding and motion purposes.

3.4. Gear motors



Fig 4: Gear motor

Gear motor is electric motors that utilize a type of gear system on the output of the motor. This gearing arrangement is called a gear reducer or gearbox. The combination of an electric motor and gearbox reduces design complexity and lowers cost, particularly for motors built for high torque and low speed applications. In addition, gearboxes can be used as a means to reorient the output shaft in a different direction. The gear motor is as shown in fig.4.

3.5. Spring steel



Fig 5: Spring steel

Spring steel is a name given to a wide range of steels used in the manufacture of springs, prominently in automotive and industrial suspension applications. Here the spring used is mild steel spring of grade EN-83 as shown in fig.5. These steels are generally low-alloy manganese, medium-carbon steel or high-carbon steel with a very high yield strength. This allows objects made of spring steel to return to their original shape despite significant deflection or twisting.

3.6. Battery



Fig 6: Battery

An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smart phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. Here we have used 12V, 7.5ah zeus battery which can generate sufficient power for the system and its as shown in fig.6.

Section 4: WORKING PRINCIPLE



Fig 7: coconut harvester

The three types of motion are continuous, discrete and serpentine. Here continuous types of motion is used because energy consumption is reduced and speed is increased, the model developed is as shown in fig.7. In discrete type the speed of climbing is less compared to continuous type. First, the system is attached to tree trunk with the help of grippers and locked using spring. The gripper on the tree trunk provides adequate friction such that it does not slip. The motors used for climbing overcome the movement caused by its weight.

The movement takes place as follows:

1. First the power supply is given to the motors so that the wheel starts the movement.
2. The above three wheels are for guiding the path and the below three wheels are for the purpose of motion
3. As the diameter of the coconut tree decreases when it is moving up, the compression of spring takes place and adjusts to the diameter of the tree

Once the robot reaches the top most point of the tree trunk, the whole body is gripped on to the tree trunk without any further movement, i.e. body is grounded, and thereafter miscellaneous action like harvesting or maintenance work can be performed.

Section 5: ZIGBEE WIRELESS SYSTEMS AND SENSORS

The range of Wireless Sensors and Systems designed and manufactured by Industrial Interface is based primarily around the ZigBee protocol working on the world-wide wireless hardware standard, as shown in fig.7&8. The benefits of using the ZigBee protocol are highlighted in the bullet points above. Of course the main benefit of wireless technology is the flexibility and cost savings obtained through not having to lay cables between sensors and control systems. It also allows for easy add-ons to existing wired systems.

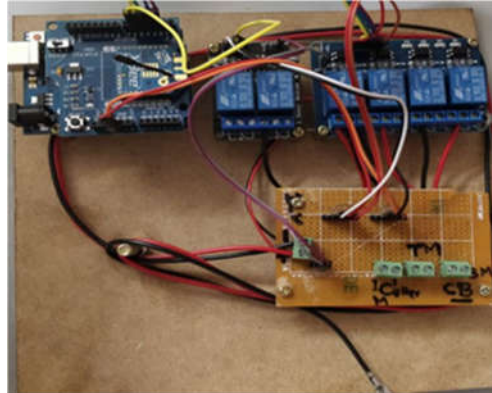


Fig 8: ZigBee receiver

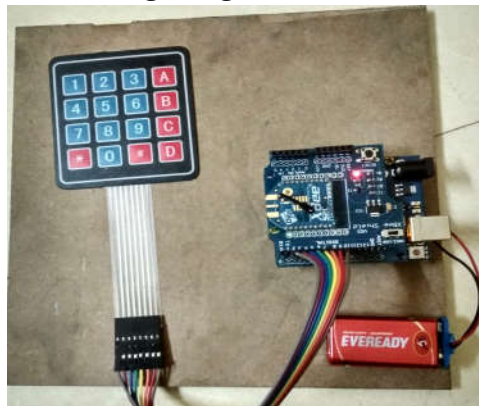


Fig 9: ZigBee transmitter

Section 6: ADVANTAGES

- The machine is cheap of cost that it can be affordable by the small scale agriculturist.
- The machine is user friendly, so that it can be operated by anyone.
- No need of skilled labour.
- It provides a suppurating aid for the small scale formers in labour scarcity.
- The machine fabrication more simple construction process.
- The machine frame is fabricated using steel so that it can withstand the required load providing less wait to load ratio.
- Risk of human climbing can be avoided.

CONCLUSION

The study was started to develop a coconut tree climbing device. Due to the lack of professional climbers, the existing professionals may charge more from the owners, moreover as the educational background of Indian youth is increasing most of the people may hesitate too come in this type of profession. Considering this scenario a device which helps the user to climb coconut tree easily will be useful for the people who is large coconut cultivation as well as residents who is having less coconut trees By this design, the structure is able to carry a load of 100kg and anyone can use it easily. At the beginning it is time consuming but with continuous use and practice it will reduced the time required for the Climbing. It is flexible to change the height of the equipment up to 100m according to the requirement of the user. It has easy maintenance. This structure will be beneficial for middle class family with its affordable cost.

The design and erection of this equipment involved a great deal of effort to make the project successful and useful. We conclude the project on “FABRICATION OF REMOTE CONTROLLED COCONUT HARVESTING EQUIPMENT” will be very useful in the field of agriculture

FUTURE SCOPE

Our project can be further implemented by giving 360deg movement to the arm and arm may be replaced by telescopic type and providing the camera at tip of arm to identify the coconuts and the shape and size can be modified to reduce the weight which results in faster climbing.

Reference

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