

# Smart Areca Nut Plucking Robot

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**Abstract**—with shortage of workers, areca cultivators are thinking that it's hard to collect their harvest. Be that as it may, culling areca nuts need never again be a repetitive assignment. Areca nut tree climbing is a dangerous activity that requires talented workers. On the off chance that the person slips, it will be unsalvageable harm to him and as to his family. Shortage of workers is rising as one of the difficulties in cultivating. As of late, getting works who climb areca nut tree is a noteworthy test. Areca nut trees develop to a stature of around 60 to 70 feet. It is required to climb the areca nut tree around four to multiple times in a year for gathering. Just talented workers can complete these activities. In the undertaking a robot is planned through which a portion of the above challenges are tended to. This robot climbs the areca nut trees of differing breadth. In the venture, The robot moves as human ascensions the tree and a sensor is mounted on the robot. The robot moves the tree and sensor choose which areca nuts are matured and prepared to cut. So by this the client can control the cutting task.

**IndexTerms**— Areca Tree Climbing, Robot, Sensor.

## I. INTRODUCTION

As of now, storage of workers has become one of the preeminent difficulties in areca nut cultivation. Areca trees grows to maximum height of around 60-70 feet. It is compulsory to climb the trees around four to five times each year for an effective reap. Only trained workers can do these activities. They need to climb the trees using muscle power. In a hectare of land around 500 areca nut trees can be grown and a workers needs to climb at least 100 to 150 trees to harvest the yield. As this involves real hard physical exertion, Youths are losing interest in such risky job which resulted in demands for skilled labours. The people from rural part of India mainly depends on agriculture for their livelihood. Areca nut and coconut are the main crops cultivated in Karnataka and Kerala. Regardless of mass distribution and widespread of areca nut tree around these

regions, areca nut reaping is still done without safety measures which can prompt major issues. Farmers are discovering hard to climb areca nut trees and there is a scarce of trained areca nut tree climbers. Skilled workers need to climb the tree manually for collecting the areca nuts. This is a procedure looks simple. However, it is a risky and dangerous. To help the formers in areca nut harvesting there are numerous machines in the market. They are not successful since they require a lot of muscular power of the labor for its operation at present there is no 100 percent safe device in the market for harvesting the areca nuts. To address both productivity and security there is a need to invent a machine for areca nut harvesting. In this project. A robot is design to climb the areca nut tree and cut the areca nuts.

The main objective of the project is to design a robot which as to the following activities:

1. Climbs up and descends the areca tree.
2. Cut the areca nuts.
3. Colour detecting while check the areca nut is prepared to harvest or not.

## II. IMPLEMENTATION

The figure 1 shows the block diagram of the smart areca nut plucking the robot. The system consists of two unit namely, robotic unit and user unit. Robotic units consists of relay driver, relay, motor, USB to UART, MAX 232. The user unit consists of micro controller Arduinouno, transmitter and receiver. The USB-UART in this device the transmit to receiver pins can be connected directly to receiver and transmitter pins of your preferred micro controller application for a simple serial cable MAX232 connection. It is an IC which converts the signals from serial port to the proper signal. MAX232 can convert the signals like transmitter, receiver and it is a dual driver. It sends the information to the control unit. It consists of Arduinouno ATmega328PU which is used to control the motors for climbing the trees and to move the stepper motor attached to the robot. It consists of ULN2803 IC and 12 V relay connected in H-Bridge fashion to drive the DC motors in clockwise and anticlockwise direction. In this project 5motors are used. It will give the appropriate movement to the robot for ascending or down. The shaper which is set on the robot which cuts the areca nuts depends on the guidance given to the client.

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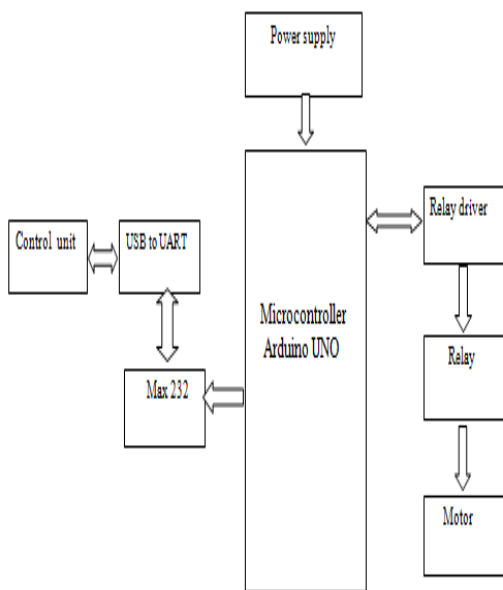


Figure 1: Smart areca nut plucking robot

### III. METHODOLOGY

Areca nut tree climbing and reaping machine works on the fundamental standard of erosion that is the relative horizontal movement of two strong surfaces in a contact. The machine created comprises of a base edge with 4 nylon wheels driven by 4 high torque equipped engine. The machine is having a rectangular shape, pivots are given on every connect to the development of connections with the variety in size of the tree. A spring is utilized to give adequate grasp to the wheel on the as indicated by the adjustment in the extent of the tree. In this tree climbing machine control is acquired from the supply through which drive engines are given that energy. The energy is utilized to control the engine. At the point when the drive engine is exchanged ON, the engine pivots the pole which thus turns the wheels. Due to the grinding the drive wheel of the tree machine ascends along the length of the tree. The contact between the wheel and the tree is maintained with the help of springs and grippers on the wheel. The main part which is in contact with the tree is the wheels which are comprised of nylon. Henceforth it doesn't make any harm the bark of the tree. At the point when the setup comes to over the tree the drive engine is turned OFF. The pressure of the spring holds the machine at the required height. Then the shaper engine is exchanged ON. At that point the shaper is being cutted the yield. After Which the shaper engine is halted, the entire setup is being brought back by changing the extremity of the switch with the goal that the drive engines pivots inverse way there by influencing the wheels to turn inverse way. Subsequent to achieving the ground the setup is expelled from the tree and joined to the following tree.

### IV. FLOW CHART AND ITS DESCRIPTION

Initially the motor attached in the robot will be switched

off. When we apply the power the relay in the motor is switched on then the motor will gets energized. Once the motor is energized then the robot will start climbing the tree when the robot reaches the top of the tree the sensor mounted in the robot will sense the color of the areca nut by applying the image processing algorithm. If the color is red which means the nut is ripped. The cutter mounted in the robot will get energized and it cuts the ripped areca nuts and after cutting the nut the robot will climb down. If the robot sense that the nut is green which means its not yet ripped. The robot will automatically climbs down without cutting the nut and then the robot as to be attached to the next tree for plucking the nut the same process will be repeated with all the trees in the area which intern reduces the man power required for plucking the nut in ground and even reduces the arms phased by the labours while climbing the tree or plucking the nut as shown in the Figure2 flow chart for working of the smart areca nut plucking robot

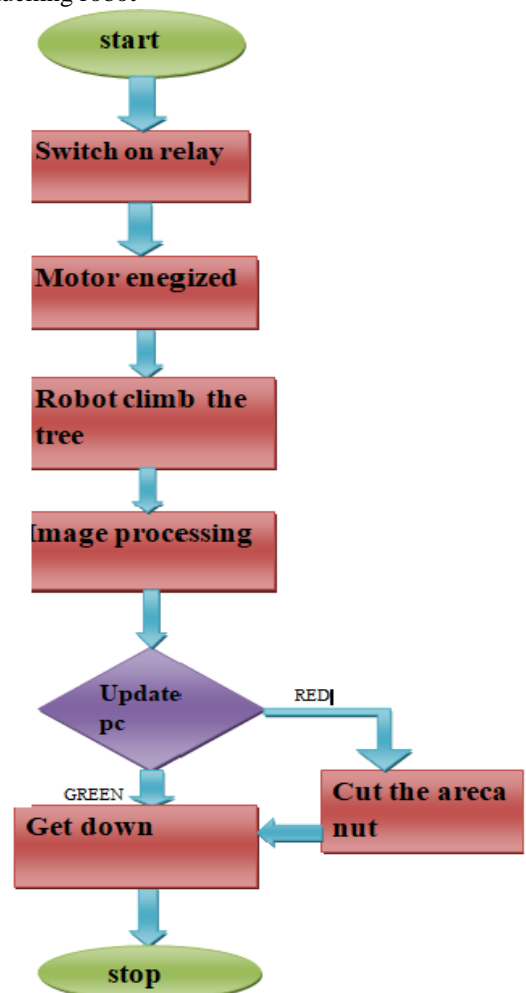


Figure 2: Flow chart for smart areca nut plucking robot

### V. ADVANTAGES

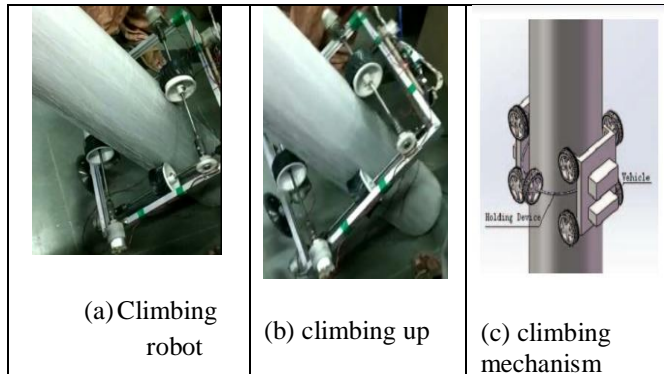
- 1.This is more cost effective and environment friendly system.
- 2.The robot is compact and user friendly.
- 3.It reduces time and dependence of labour.

4.This is most suitable machine without man climbing on the tree degree

## VI. APPLICATIONS

- 1.To spray pesticides.
- 2.To cut areca nuts.
- 3.To collect areca nut to avoid damages and wastages.

## VII. RESULTS



## VIII. CONCLUSION

Subsequent to testing the model of an areca nut tree we found that

- 1.The structure is a proficient to climbing the tree in all respects easily without harming the tree.
- 2.To design this mechanism human won't climb the tree, so wellbeing is expanded.
- 3.The structure is straightforward and speaking to the majority. An untalented work can work the machine wellbeing.

so, we presume that the robot machine is security, reliable, efficient and programmed tree climber which decreases the issues in climbing the areca nut tree and furthermore take care of all areca nut collecting issue and it maintains a strategic distance from the areca nut squanders to a decent

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