

Design and Development of Volleyball Shooter

Sanjay K^{#1}, Ram Kumar S^{*2}, Sandeepraj Kumar S^{#3}

Mechanical engineering, Bannari Amman Institute of Technology, Sathyamangalam, Erode, Tamil Nadu, India

¹sanjayk.me19@bitsathy.ac.in

²ramkumar.me19@bitsathy.ac.in

³sandeepraj Kumar.me19@bitsathy.ac.in

Abstract— There have been many improvements and advancements in the field of agriculture in recent years, but sadly, when the ratios are compared, large farmers always earn more than small farmers. Focus on growth. This corresponds to the growth of large farmers in the agricultural sector in the cultivation of palm trees. Palm trees typically grow in a small area and take about 3 to 4 years to produce fruit. The total investment is based on the crop, the cost and machinery to harvest the nuts is huge, and the smallholder farmers have a lot of trouble, which leads to losses. Also, palm tree tops Harvesting from the vine may result in a loss of yield as all the berries will scatter and fall to the ground.

We wanted to develop a product that farmers could operate, use, and handle, and we also focused on ensuring that harvested nuts could be safely landed from the tops of palm trees. The product works entirely on a mechanical concept and was developed with mechanical connections. It is now manually operated. It will be automated in the future. This product reduces harvesting costs and increases profits for small farmers to grow rations like large farmers. This will revolutionize the field of crop harvesting and help many farmers get out of bad times and into good times.

Keywords— - Arecanut harvester, Tree climbing machine, etc

I. INTRODUCTION

The areca nut is the fruit of the areca palm, which grows in much of the South Asia, Southeast Asia, and parts of east Africa. It is commonly referred to as betel nut. Areca nut has been an integral part of traditional medicine for many centuries and is used extensively in Ayurveda and traditional Chinese medicines. The Arecanut has many uses like anti-inflammatory, antioxidant, antiulcer. But there are difficulties in harvesting arecanut because the tree is not strong as other trees so it may risk the humans who climb the tree to harvest the arecanut in danger even though now some innovation but they still need human on it.

My project is to avoid the human involvement in climbing and risking his life by make it operate on a remote-control system and to avoid damage of Arecanut that's falling down from the height of 20 meter. As in olden days they use ropes in leg to climb the tree based on that weight balance concept I am going to implement it in my project. The machine is going to have two wheels one is drive and another one is a drive wheel both are connected in a single pipe on both sides the drive wheel have the

or and the battery on its side for the weight by now the drive el is kept on one side of the tree and the drive when on other below the height of drive wheel due the weight it will hold the and as it is high torque motor with high stall torque it can stay on the tree even with the load

II. OBJECTIVE

Before starting the project first the required objective is decided the main objective of our project.

- Avoid risking of human life
- Reducing the wastage of fruits while harvesting
- To make it cost efficient so small scale farmers can make use of it
- Should not require special training and should be easy handling
- Should be able to operate by a single person
- Avoid risking of human life

III. DESIGN REQUIREMENT:

Before starting the design, we have some of the design requirements they are

- Portable
- Easy to dismantle and carry everywhere
- Avoiding risk of human life
- Battery powered machine
- Reduce wastage of fruits
- Does not require power plugs everywhere

IV. METHODOLOGY

As in olden days they use ropes in leg to climb the tree based on that weight balance concept I am going to implement it in my project. The machine is going to have two wheels one is drive and another one is a drive wheel both are connected in a single pipe on both sides the drive wheel have the motor and the battery on its side for the weight by now the drive wheel is kept on one side of the tree and the drive when on other side below the height of drive wheel due the weight it will hold the tree

and as it is high torque motor with high stall torque it can stay still on the tree even with the load

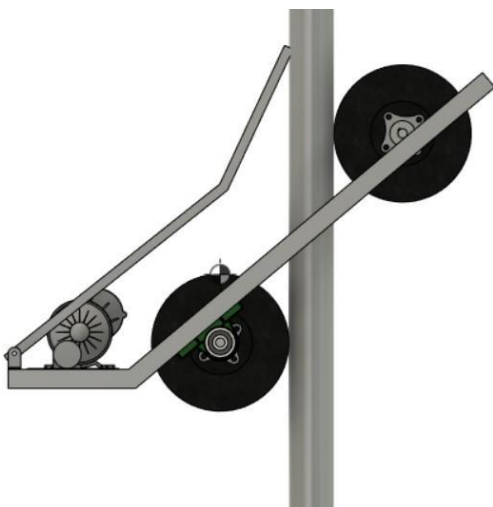
To calculate the torque the weight of the machine with a harvest fruit is assumed as 20 kg so the torque required if a 2inch pulley is used is

$$=20 \times 9.8 \times 2.54$$

$$=494 \text{ N cm}$$

$$=500 \text{ N cm (approx.)}$$

So, the motor needs to have a minimum of 50 N cm to lift the machine. So, till now two motors were shortlisted after analyzing the cost the motor will be purchased



V. PRINCIPLES AND DESIGN OVERVIEW

The concept works only depending upon the gravity as the most of the weight is placed at one side the gravitational force provides the required force to grip the tree and hold the fruits while harvesting.

VI. DESIGN REQUIREMENTS

The design requirements were reviewed based on the concept design

S. No.	Design Requirement	Design	mechanism meeting the requirement
1	Portable	✓	It can be Transport from one place to another
2	Easy to dismantle and carry everywhere	✓	It can be easily carried but the table is big making it occupy a lot of space
3	Avoiding risk of human life	✓	The cameras are used and the shooter detects the court and shoot random shoots
4	Battery powered	✓	Only 3 balls in a time. But will be improved
5	Reduce wastage of fruits	✓	Power from a rechargeable battery can be used.
6	Does not require power plugs everywhere	✓	The speed can be varied from 8 m/s to 30 m/s
7	Easy handling	✓	This height can be attained at different speeds at different angle for different shoots

VII. CONCLUSIONS

THE DESIGN AND ANALYSIS OF AN ARECA NUT CRAWLER WITH A PESTICIDE SPRAYER WILL BE IMPLEMENTED AT A RELATIVELY LOW COST. THIS WILL REDUCE ACCIDENTS IN THE FUTURE. THIS IS A MORE EFFICIENT TECHNOLOGY FOR CLIMBING ARECA NUT TREES. THE PURPOSE OF OUR DEVICE IS FULFILLED. THE DESIGN OF THE PRODUCT IS MADE ACCORDING TO THE CALCULATION AND THE EXACT EFFICIENCY IS ACHIEVED BY THE FINISHED PRODUCT. LOAD PARTS AS WELL AS FRUIT NUTS WERE

FIRMLY HELD BY THE PRODUCT. THE PRODUCT FULFILLS THE PURPOSE OF THE SMALL FARMERS BY PROVIDING THEM WITH HIGH PROFIT IN THE HARVESTING PROCESS AND THUS ULTIMATELY PROVIDES THE RIGHT TIME TO HARVEST THE NUTS. THE YIELD CAPACITY IS PERFECT SO THAT THE HARVESTING PROCESS ONLY TAKES ONCE PER TREE AS THE PRODUCT CAN HARVEST THE NUT CROPS FROM THE PALM TO BE HARVESTED. THE ADVANTAGE OF CLIMBING ARECA NUT TREES IS A VERY SMOOTH CLIMB WITHOUT DAMAGING THE TREE. AN UNSKILLED WORKER CAN OPERATE THE MACHINE SAFELY AND EFFICIENTLY. AN AVERAGE OF 15 TO 20 TREES CAN BE HARVESTED/SPRAYED WHILE CLIMBING ONE TREE. THIS PROJECT CONCLUDED THAT THE ARECA TREE CLIMBER IS SAFE, RELIABLE, EFFICIENT AND GREATLY REDUCES THE RISK OF CLIMBING ARECA NUTS.

REFERENCES

- [1] C Sathishkumar;G Dineshkumar;K S Karthikeyan;P Prasanna; (2021). Development of Areca Nut Climbing And Harvesting Machine With Pesticide . IOP Conference Series: Materials Science and Engineering, (), -. doi:10.1088/1757-899x/1059/1/012074.
- [2] Design and Fabrication of Areca Nut Climber and Harvesting R. Thirupathi1.