# EFFICIENT SPRAYING MACHINE FOR OPTIMISING ARECANUT ORCHARD MANAGEMENT

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**Keywords:**

Wireless communication, cost-effective

**Introduction:**

Nowadays Lack of labour has become one of farming's biggest issues. The arecanut is one crop that has been particularly impacted by this. The inhabitants in rural parts of south India like Karnataka and Kerala mostly depend on agriculture for their livelihood.

Skilled workers must manually climb the tree in order to harvest, spray, and apply pesticides to the crown. Although this procedure appears simple, it is a difficult and risky undertaking. Areca nut trees grow to be between 40 and 50 feet tall.

They have to use their strength to climb the trees. A laborer must climb at least 100 to 150 trees in an acre with 550 trees. Because of the extreme physical strain involved, younger laborers are becoming withdrawn in this, which might have a detrimental impact on the production of areca nuts. A product that addresses effectiveness, safety, and affordability must be created

**Objectives:**

- The goal of this project is to design a most suitable, low cost yet efficient machine for spraying pesticide to the arecanut.
- The machine can attach and remove from the tree easily. It should operate on battery and climbs the required height quickly.

A solenoid valve is used to stop or resume the flow of pesticide. After spraying is done it should smoothly descend the tree. Most of the functions of the machine are going to controlled by remote.

**Methodology**:

The basic climbing mechanism consists of the wheels which are arranged on V shape chassis. Where two wheels are driven by a dc motor, and the third wheel is placed to maintain the grip on the surface. The chassis is used to mount the spraying and climbing assembly. The spraying assembly consist of solenoid and nozzle mounted on the spraying arm.

ESP-WROOM-32 module is used for remote controlling purpose which is used to control the Drive wheel motors, braking assembly. A local server is created where the mobile sends the signal to the esp32 module relay. The communication link can be established with a range of 50-150m using ESP32.

A pressure pump is connected to the solenoid which sends the fluid up the tree. The wheel can be turned in clockwise and anticlockwise direction which can be controlled using a mobile web application. The controller sends a command, that controls the nozzle, the pesticide flows through the pressure pump and solenoid, starting the spraying mechanism. The arecanut is treated with the sufficient quantity of pesticide.

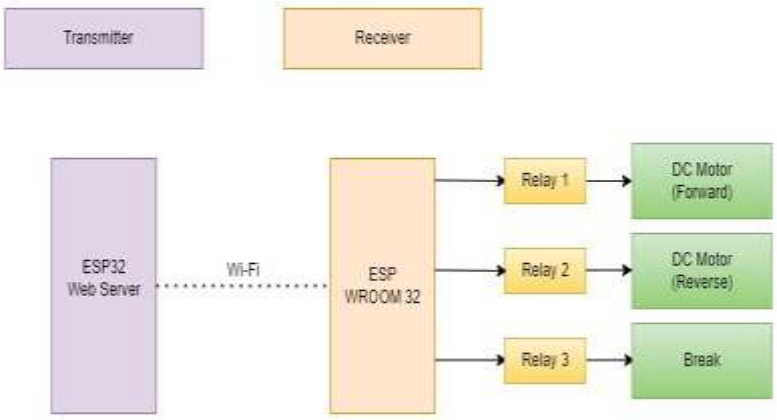


Fig.1. Remote Controlling

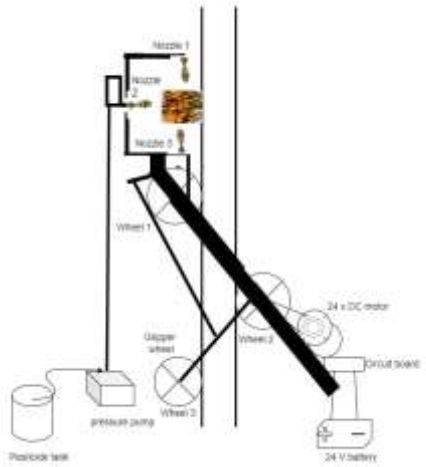


Fig.2. Overview of Arecanut Machine

**Conclusion:**

The goal of this project is to design a most suitable, low cost yet efficient machine for spraying pesticide to the arecanut. The labor-intensive technique of gathering arecanuts was made easier with the invention of the arecanut tree climbing machine. For farmers, scaling these tall trees has always presented serious difficulties and dangers. With this machine's adjustable grips and straps, farmers can easily climb and descend arecanut trees

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**Scope for future work:**

1. Flight through narrow gaps: Previous works addressing quadrotor flight through narrow gaps have shown at an aggressive maneuver is required to align the vehicle with the gaps orientation to avoid collisions. Flight through arbitrarily shaped gaps using monocular vision has also been shown. In all those works, the gap has be large enough to let the vehicle pass through
2. Close proximity surface Inspection: The supplementary images shows the results of an experiment highlighting the benefits of the T configuration against X morphology for surface inspection
3. Object Grasping and Transportation: The drone can close its arms around objects to grasp and transport them. Although this strategy cannot replace specialized and effector.