

Fruit Harvesting Robot Using 4DOF ARM

Due to the increasing demand for agricultural products and labor shortage, there is a strong need for automation in agriculture. This project reviews the various techniques and recent developments in the field of fruit harvesting. But due to various challenges like a lot of variation in the work environment and limitation of sensing capabilities, it isn't easy to commercialize the use of such robots. There are various solutions like human-robot collaboration and modifying production methods that need to be implemented to increase such robots' productivity.

The Fruit Harvesting Robot is an automated system designed for harvesting fruits in orchards. It features a 4-degree-of-freedom (4DOF) robotic arm controlled by a Raspberry Pi. The robot navigates through the orchard using a combination of line following with IR sensors and a Raspberry Pi Camera for precise movement and fruit detection. Machine learning algorithms are used to identify ripe fruits and plan the arm's harvesting actions. This system aims to increase harvesting efficiency and reduce manual labor in fruit orchards.

The major features of this project are:

- pi camera and Machine Learning based automatic fruit detection.
- Automatic line following using IR sensors.
- Automatic tree detection using IR sensor.
- To achieve this task using Raspberry pi3 processor.

The major building blocks of this project are:

1. Li-ion battery Power Supply.
2. Raspberry pi3.
3. Pi camera.
4. IR sensors.
5. SD card.

6. DC motor with L293d motor driver.
7. Robot body along with ARM.

Software's used:

- Raspbian OS.
- Python Language.
- Machine learning algorithm.

Block Diagram of the project

