BMS INSTITUTE OF TECHNOLOGY & MANAGEMENT

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING

FRUIT ESPY
-
A FLYING FARMER'S HAND

UNDER THE GUIDANCE OF
Dr. Raghunandan.G.H
Assistant Professor
ETE Department BMSIT & M

PRESENTED BY
Meghana A -1BY20ET035
S Varsha -1BY20ET048
Sharmila S -1BY20ET053

OUTLINE OF TALK

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INTRODUCTION

- Agriculture sector is the source of livelihood for about 54% of Indians
- Around 43% of land is used for farming in India
- Agricultural sector contributes around 18-19% of nation's GDP
- Most of the farmers in India don't have access to technology driven tools and modern agricultural practices
- Still many farmers rely heavily on manual labor for most of the agricultural procedures
- This project "**Fruit-Espy**" helps to mechanize the harvesting process
- Under the domain unmanned aerial vehicle with embedded systems and machine learning

LITERATURE SURVEY

1. ARECA-NUT HARVESTER-SPRAYER

This idea was proposed by – Mohammed Said U Y, Shillin K S, Anil D Koola, Dr. Rajesh Sathiyan M, DR. S Senthil Kumar, "Motorized areca-nut climber and pesticide sprayer"[1]

- Powered by petrol engine
- Operated using remote or controller
- Consists of one blade and two antenna like structures
- Antenna like structure holds areca nut

➢ **DRAWBACKS**: Doesn't distinguish ripe and unripe areca-nut

Time consuming

Needs someone to carry from tree to tree

Fig1.1 areca-nut harvester-sprayer

2. TRUNK SHAKER

This idea was proposed by - S H Futch and F M Roka, Trunk Shaker Mechanical Harvesting system,2005[2]

- Fruits are detached by giving vibration of particular frequency to the trunk of tree.

Fig 1.2 Trunk shaker

3. CANOPY SHAKER

This idea was proposed by - Susheel Kumar Gupta, Nam H Kim, Reza Ehsani ," Optimization of citrus canopy shaker harvesting system", ASABE, St.Joseph Michigan, January 2015[3]

- Consist of top and bottom shaking systems mounted on multiple rotating drums.
- Shakes top and bottom zones of tree canopy independently

Fig 1.3 Canopy Shaker

4. CITRUS FRUIT PICKER

This idea was proposed by - Christopher Aloisio, Ranjan Kumar Mishra, Chu-Yin Chang, James English Energid Technologies Corporation, "next generation image guided Citrus Fruit Picker ",Cambridge, USA [5]

- Two picking mechanisms are mounted on top of a goat truck with a modified arm with a central computing cluster and an accumulator tank.

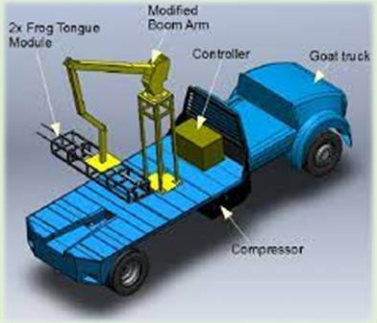

Fig 1.4 Citrus Fruit Picker

5. TOMATO HARVESTER

This idea was proposed by - Qingchun Feng, Xiaonan Wang,Guohua Wang, Zhen Li "Design and Test of Tomatoes Harvesting Robot", Lijiang, China, August 2015

- The machine can move on the rails to pick tomatoes on both of its sides.

Fig 1.5 Tomato Harvester

PROBLEM STATEMENT

“Time Consuming, Labour intensive, Inefficient, Manual, Inadequate seasonal fruit pickers, Delayed process Of Fruit Harvesting”

OBJECTIVES

- To collect data sets
- To classify ripe and unripe fruits
- To design robotic arm

METHODOLOGY

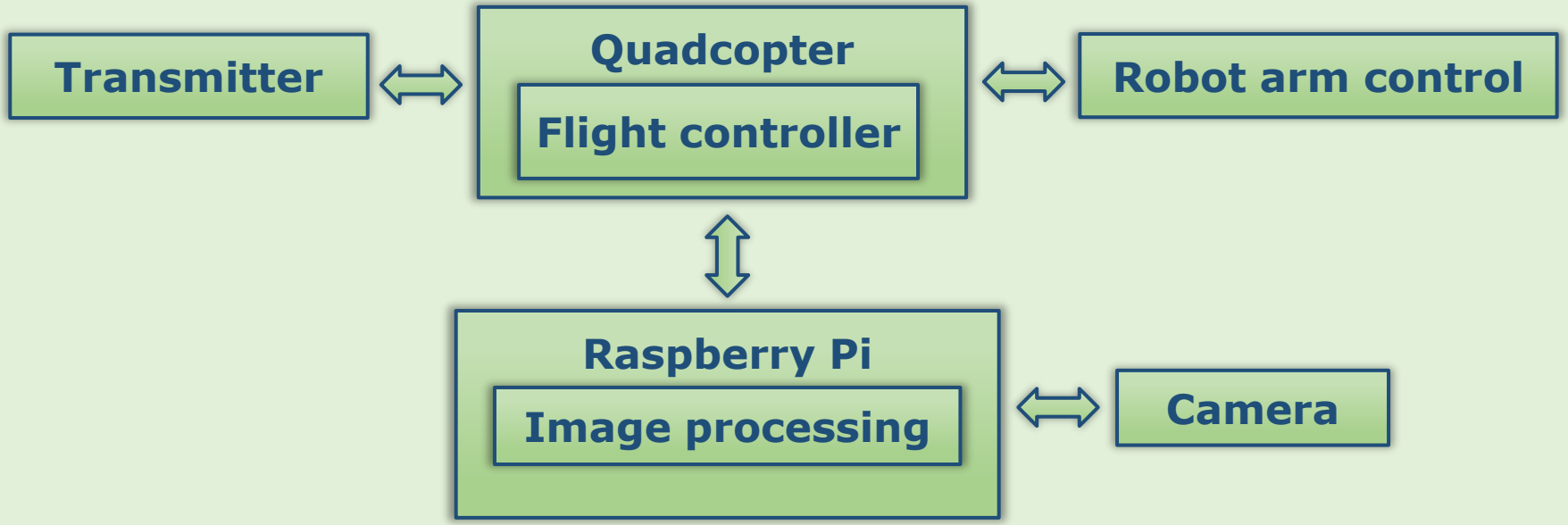

fig.2.1 BLOCK DIAGRAM OF THE PROPOSED SYSTEM

FLOW CHART OF HARVESTING

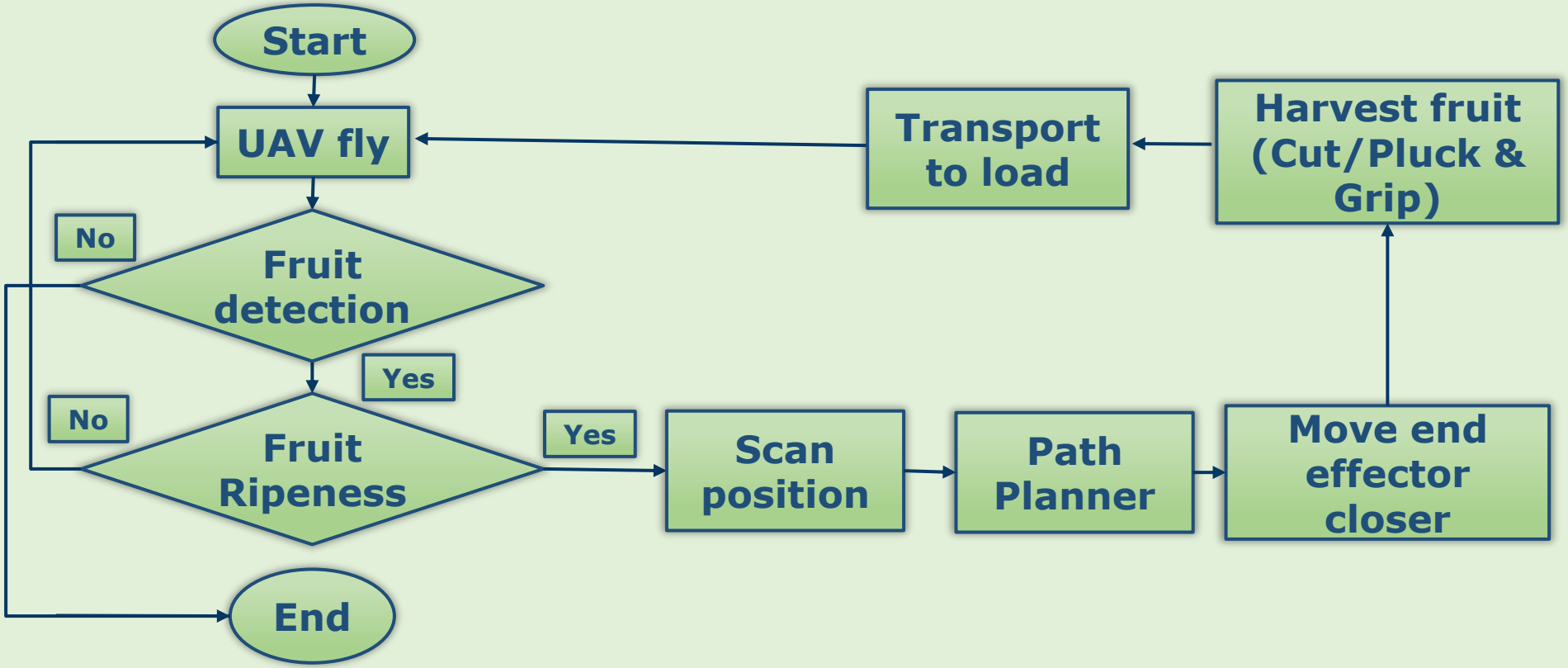

Fig.2.2 FLOW CHART OF PROPOSED SYSTEM

REQUIREMENT SPECIFICATIONS

HARDWARE:

1. F450 quadcopter frame
2. Lipo 2200 mAh battery
3. ESC 30 A
4. Motor 2212 920 KV
5. Transmitter and Receiver
6. Propeller
7. Flight controller
8. Camera
9. Raspberry pi
10. Robotic arm

SOFTWARE :

1. YOLO custom object detection with python

ROBOTIC ARM

HARDWARE:

1. SG90 Micro servo Motor
2. MG995 Servo Motor
3. Arduino UNO

SOFTWARE :

1. Arduino

ADVANTAGES

- Increases precision of harvesting process
- Time saving and lowers the operating cost
- Convenient in challenging terrains
- Increases yield quality and quantity
- Improves return on investment
- Minimizes the damage caused to the trees due to conventional old methods

APPLICATIONS

- Advanced crop scouting in less time
- It can be used to count the number of fruits
- Distinguish between ripe and unripe fruits
- Pesticide spraying
- Surveying and mapping

OUTCOMES

- Robotic arm was designed
- Drone was assembled

REFERENCES

1) MOHAMMED SAID U Y, SHILLIN K S, ANIL D KOOLA, DR.RAJESH SATHIYAN M, DR. S SENTHIL KUMAR, "Motorized areca-nut climber and pesticide sprayer", Thrissur, Kerala volume 2,Issue 7 July 2019

2) S H FUTCH, F M ROKA, "Trunk Shaker Mechanical Harvesting system", IFAS 2005.

3) SUSHEEL KUMAR GUPTA, NAM H KIM, REZA EHSANI, " Optimization of citrus canopy shaker harvesting system", ASABE, St. Joseph Michigan, January 2015

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5) CHISTOPHER ALOISIO, RANJAN KUMAR MISHRA, CHU-YIN CHAN, JAMES ENGLISH ENERGID TECGNOLOGIES CORPORATION, "Next Generation Image guided Citrus Fruit Picker ",Cambridge, USA IEEE 2012

6) JEONGEUN KIM , SEUNGWON KIM , CHANYOUNG JU , AND HYOUNG IL SON ,"Unmanned Aerial Vehicles in Agriculture: A Review of Perspective of Platform, Control, and Applications", South Korea IEEE Access Jan 2019.

THANK YOU