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Intelligent Oilpalm Harvesting Sickle

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Abstract:

In palm oil fruit detection, size and color are one of the major factors classification of fruit bunches.

As of now, farmers used their eyes to test the ripening of the fruit.

This classification is done physically and there is a chance for more loss.

Here for this project, we have chosen palm oil fruit for detection. The identification of fruit (i.e. ripen or un ripen) is identified using image processing and raspberry pi.

The system will detect and by using Iot embedded sickle it will pluck the frui

Introduction:

In recent times, image processing techniques have been developed effectively helpful in the fruit industry, most importantly in ripening of fruits. These image processing techniques are helpful for the people, who are habituated to the traditional evaluation techniques. The process of testing the fruit maturity and plucking the fruit from the tree in traditional method is tiring and time consuming. Therefore, this project will give a concept of idea to find the maturity and whether to pluck or not to pluck from the tree. .There are rules and guidelines for plucking the palm oil fruits from the trees. The farmers will cut the fruit bunch within 10 to 14 days from harvesting time. The harvested fruit bunches will be collected and transported to the palm oil mill for oil extraction. It need to be sent to palm oil mill in 24 hours for high extraction of oil . Since last decade, various methods are developed to find the maturity of the palm oil fruit.There are two types to describe the ripeness of Fruit Bunches. . It need to be sent to palm oil mill in 24 hours for high extraction of oil . Since last decade, various methods are developed to find the maturity of the palm oil fruit.There are two types to describe the ripeness of Fruit Bunches.As the natural traditional process is tired and time taking so we need more man power in this technique. Intelligent oil palm harvesting sickle will take less time and use man power. Till now , a farmer is less unskilled to pluck the fruit .Now, anyone can unskilled to pluck the fruits from the tree by using these techniques. Visibly, the most popular approach was to use colour-based image analysis. Also others have explored by using near-infrared 70 (NIR) spectroscopy multispectral analysis fluorescence sensing, and laser light backscattering.

In this paper,using deep learning we developed to CNN algorithm to detect the ripe fruit bunches. In our project, the main objective is to develop a system to automatically detect ripeness, un ripeness fruit bunches in real-time using a combination of computer vision and Iot objects First, a web camera will take the picture of palm oil tree and will send the data to a Raspberry pi that is loaded with the trained data of fresh fruit bunches. The trained algorithm is CNN algorithm it would identify the target object and sends the information to the raspberry pi. Then a servo motor is connected to a raspberry pi. A sickle is connected to a servo motor. If the detected image is ripen then it will cut the fruit. Ithe given image is unripen then it just give the motion and it will not cut the fruit.

EXISTING SYSTEM:

- Currently, we are using traditional methods for plucking the palm oil fruits from the trees.
- farmers used to see the fruits and check whether they are ripe or unripe and if they are ripen they will cut the fruits.

DISADVANTAGES:

- Time consuming

- Delay
- Less accuracy

PROPOSED SYSTEM:

- In this proposed system we will capture the images of the fruits through iot based cameras and we detect the fruit ripen or unripen through the dataset having in the web application. A fruit detection system has been proposed, which combines three features analysis methods:
- color
- shape
- size
- The collection palm oil photographs.
- The dataset trained in the raspberry pi will detect the ripen and unripen palm oil fruits.
- The detection is done through image processing.

DATA ACQUISITION

The palm oil trees selected for capturing the data is 8 to 13 years old because this is when the trees produce the most fresh fruit bunches. From november to december the sample data is recorded. we will capture the images of the fruits through iot based cameras and we detect the fruit ripen or unripen through the dataset having in the web application. The generation of a data set suitable for training and designing AI solutions specifically used for the identification of oil palm fruit bunches.the detection is done through image processing. The images captured will have a resolution of 1920 to 1080 pixels which will be stored in a raspberry pi which is connected to laptop via a USB-C cable. First the web camera will take the picture of palm oil fruit , the camera is lifted at the same height and the distance would be 3 meters away from the targeted fruit bunch. The image data will be extracted from palmoil trees. From the samples of different palm oil trees some of the fruits will be ripen and some of them will be unripe.

DATA PREPARATION AND TRAINING

For data preparation the training data the Images captured of oilpalm trees are categorized into two types ripen and unripen images. Ripen images are the images which are detected as ripen from the palm oil trees. And the Unripen images are those which are detected as unripen. Raspberry pi is trained to the dataset which has the ripen and unripen images. These images which are kept before the camera with different angles, different backgrounds and lights. These features make a big difference to identify the images as ripen and unripen with the help of CNN Algorithm. The positive and negative images are divided into training and testing dataset. The images extracted from each tree are unique, which means that the images from the same tree would not be included.

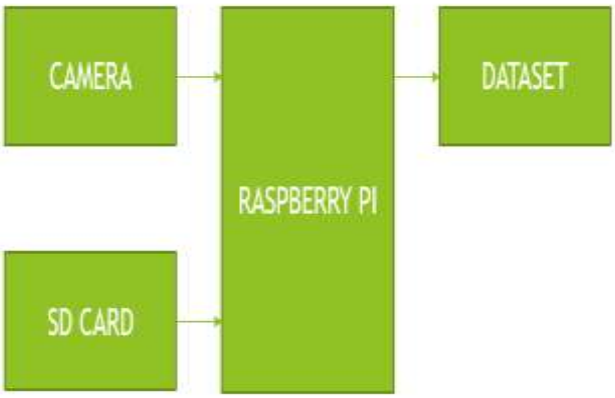
Dataset	Training	Testing
Positive	10	10
Negative	15	10

Table 1. Seperation of training and testing

CNN Algorithm: A convolutional neural network (CNN or convnet). It is one of a part of machine learning. It is the type of artificial neural networks which are used for different applications and different data types. A CNN is a type of a network architecture for deep learning algorithms and is mainly used in image recognition .

There are different types of neural networks in deep learning, used for identifying objects and recognizing objects, CNNs are the network architecture of choice. This makes them very suitable for computer vision (CV) tasks and for applications where recognition of the object is essential, such as self-driving cars and facial recognition. The image processing technique had been utilized to automatically detect and predict fruit detection. In this work, image processing technique was used to remove unwanted pixels and classify the type of fruit. To detect palm oil fruit, we use a Convolution neural network of different models in the proposed framework.

SYSTEM ARCHITECTURE:



SYSTEM REQUIRMEMTS:

Hardware Requirements:

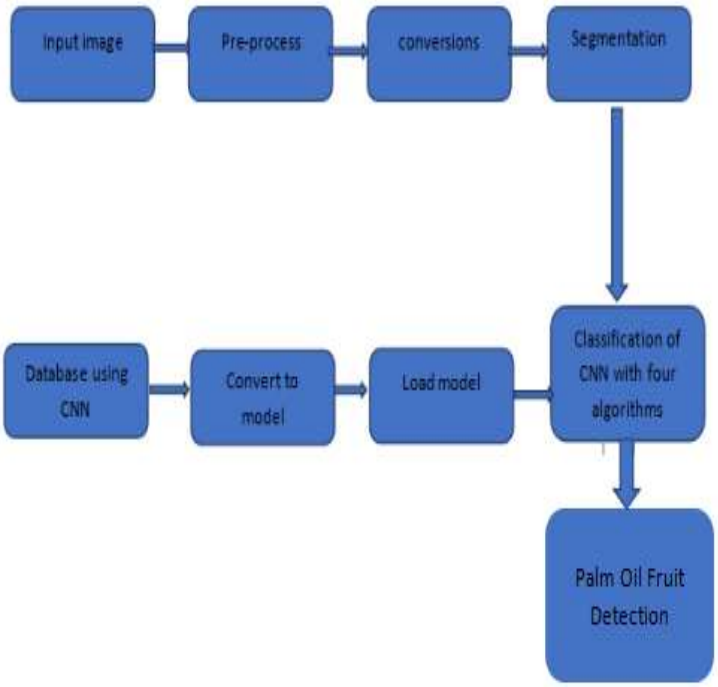
- IOT based camera
- Servo motors
- Raspberry pi
- Sickle

Software Requirements:

➢Python

➢Open-CV

FLOWCHART:



RESULT:

Input:

OUTPUT:

INPUT:

OUTPUT:

CONCLUSION

- In conclusion, fruit detection using image processing and automatically plucking from tree has been studied.
- Next, The Raspberry pi works seamlessly using python for Iot based cameras.

- By using the Iot embedded motors we will be plucking the palm fruit automatically from the tree.

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