

GRAIN SORTING AND CLEANING SYSTEM USING RASPBERRY PI.

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Abstract : Grain sorting and cleaning system is a process of sorting two or more object. In India agriculture production is important for income of people because more than 50% population depend on agriculture field. If grain sorting and cleaning process did properly, it will increase quality and productivity of grains. This paper describes a working of system using image processing technique, Raspberry PI with color based separation on matplotlib platform. System segregates wheat and waste separately, which is used for day to day life in low cost. The testing parameter of grain is color, shape and defect etc.

Key Words: Image processing, Raspberry PI, Matplotlib

1. INTRODUCTION

Machine can perform highly repeated tasks better than humans. The purpose of this model is design and implements system which properly separates grains based on their colours. System consists of three parts conveyor belt, CV camera and DC motor. The output and input of this part was interfaced using raspberry pi.

To reduce human efforts on mechanical manoeuvring different types of sorting machine are being developed. Grain sorting and cleaning machine can be used in different packaging industries or glossary shop as well as home appliances. System help to reduce efforts and avoid back pain problems.

1.1 OBJECTIVES

In our project, we are going to research feature requirement of grains sorting cleaning system for day to day life. Instead of traditional method of sorting or large scale machinery used for sorting we use, grains sorting and cleaning system which can be used at domestic level.

2. BLOCK DIAGRAM

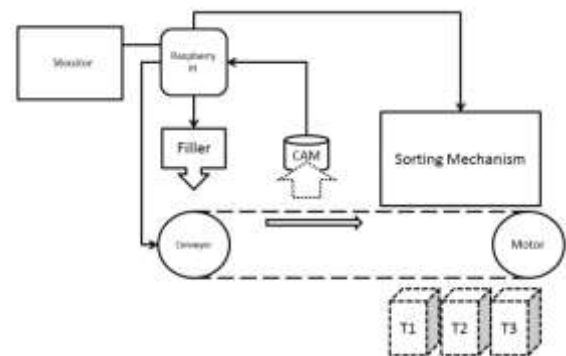


Fig.1 Block diagram

3. BLOCK DIAGRAM DESCRIPTION

System initialization:

At this step, the entire component will be start. Initially system will check the status of all components. If any of component fails, then system correct that error or notify the user about component failure if there is no such failure, then system goes online and start working. Operation done then conveyor starts running in forward motion.

Capture frame:

At this stage camera takes the snapshots of the grains which moves over the conveyor belt. Camera takes a snapshot and transmitted to system for further process.

Perform preprocessing:

To get more information about grains preprocessing is done.

In this step compare last capture image.

Detect grains:

After preprocessing detection of grain done. Information of detected clean grain is displayed. From which output efficiency of system can be measure.

Sorting:

Sorting of grain and waste carried here. After above process once again camera takes the image and the algorithm also stars once again to sort the grains to specified range of

bucket like grains bucket, waste grains bucket, defected grain bucket.

3.1 HARDWARE COMPONENTS

Raspberry pi-3b+:



Fig.2 Raspberry pi

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in developing countries.

Pi camera:



Fig.3 Pi camera

The Raspberry Pi Camera Board v2 is a high quality 8 megapixel Sony IMX219 image sensor custom designed add-on board for Raspberry Pi, featuring a fixed focus lens. It's capable of 3280 x 2464 pixel static images, and also supports 1080p30, 720p60, and 640x480p90 video.

Conveyor Belt:



Fig.4 Conveyor belt

A conveyor belt is the carrying medium of a belt conveyor system. A belt conveyor system is one of many types of conveyor systems. A belt conveyor system consists of two or more pulleys, with an endless loop of carrying medium—the conveyor belt—that rotates about them.

DC motor:



Fig.5 DC motor

A DC motor is any of a class of rotary electric motor that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic; to periodically change the direction of current in part of the motor.

Flowchart:

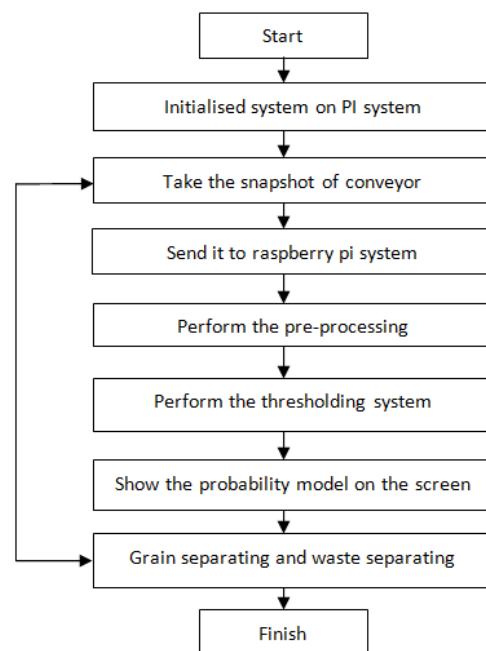


Fig.6 Flowchart

Future scope

We can implement same process for all types of grains only considering parameters are going to change so we can have mode selection for different types of grains.

CONCLUSION

By using grain cleaning and sorting system one can segregate wheat and waste at low cost. System will be beneficial for daily house work, grocery shop, small food industry due to the system reduces the human efforts.

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