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AUTOMATIC FRUIT SORTING MACHINE

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ABSTRACT:

The objectives of this study involve the optimize process of sorting machine for a spherical fruits .fruits are today sorted with low efficiency in any country. Thus we innovative fruit sorting machine. With the help of gravity this fruits fall downward in machine. The main objective of this machine is help to farmer for minimize time of fruit sorting and reach market at proper time.

INTRODUCTION:

In India fruits are sorted manually.

If 10000 ton production of fruit then 2000 ton is waste due to sorting time So we innovate " Automatic Fruit Sorting Machine" for avoid waste of time and cost on manpower. India is an agricultural nation with large agricultural produce Various types of fruits are produced throughout year in that Many fruits are spherical in shape this fruits are we sorted manually but for that we innovative this new machine which Sort this fruit automatically with their shape. this is an machine which work with fruit size. in that the diameter is considered for sort the fruits. The color of the conveyer system needs to be of specific color for easy segmentation of the particular fruit from its background, a high performance of machine. The two main factors are considered in that machine which are shape and size of fruits. Fruit size sorting is an important factor for fresh fruit marketing and also to help to farmer for sort fruit and also reduce efforts of farmers in that machine the fruits are move in one direction the rollers are provided for the move fruits and in between two rollers the gap is adjusted in that buy using or help of gravity this fruits are falls downward. And we get fruits with different size easily.

MATERIALS:

Materials used for the fruit sorting machine are rollers, motor, frame etc. in that roller material are steel or either pipes which help to move fruits. And another factor is 1HP motor or as per requirement and also as per requirement of speed. In this project many factors include in material topic because of more parts. For rotation of roller either chain is used or either belt is we use. In between them for belt the v belt is used.

LITERATURE REVIEW:

We know that a lot of research is done on fruit sorting machine which save the time and money from last ten years many research is done on this topic in that earlier research and technology to study on fruit at kuleuven (Belgium).

1. Developing a fruit sort using fuzzy logic. The image captured was converted to binary and boundary was extracted to determine the fruit size.
2. By Using coupled device to capture view of the fruit. Four different filters were used to acquiring the red, green, blue and the infrared regions.
3. Developed a size and color sorting using fuzziness. The image was analyze with RGB color model.

4. By Using developed model to determine the maturity level of any fruit. Blue background in the conveyer was used for spherical fruit.

SIMULATION AND EXPERIMENTAL RESULTS:

The proposed control and measuring system examined by Proteus is implemented in experimental machine. The maximum probable weight for the examined apples considers as 500 (gram) which produces 2.5 (mV) at the output port. This voltage level is so low to be processed by microcontroller on which drives the valves correctly.

Amplifying the output signal of load cell is done by using ultra-low-noise amplifier. As the load cell output signal is a DC one with constant value for each fruit, the added noise to the desired signal could be easily removed. As stated previously, gravity conveyor, measuring and control system and actuators (pneumatic cylinders) are the main parts of the mechanical system. At the step of the controlling and measuring systems are implemented in the same chassis as transferring system. The experimental results show that the control system only drives the three latest pneumatic cylinders. In other words, the apples with weights in range of 80 (gram) pass through the duct and fall in the end of it. The only parameter which could act the performance of the machine seems to be noises. To evaluate impact of this unwanted parameter on the machine performance, PSNR criterion is implemented. It is noteworthy that the PSNR is calculated between the real amplitude signal and the desired one which is a load cell output signal multiplied at the amplification gain. It could be clearly seen that there is a significant decrease in the for the low output signals. This means that in the low level of voltages related to the lower weights, the noise signal becomes dominant in compare with the load cell desired signals. In the amplifying stage the employed equipments are the accurate and ultra low noise ones on which introduce negligible noises in the system. Therefore, it seems that the vibration give rises from pneumatic cylinders reaction affect the system performance. Therefore, the chassis divided into two parts, one as controlling and measuring system and the other as transferring duct. demonstrates the comparison between for the system with one and two chassis. It could be clearly seen that significantly improved in the lower weights range. Experimental results also prove the PSNR results.

Evaluation of the machine for fruit

Reduction of fruit damage is an important issue and could be explained as the bottleneck of grading machine design. Damage occurs as a result of machinery roughness and the susceptibility inherent of fruit during fruit transferring in the duct. A visible bruise threshold of 100 is a typical value used in industry for determining which fruits should be discarded due to damage Therefore, several considerations should be made in designing transfer duct as it significantly affects the fruit damage. As the sorting machine is general purposes and designed for spherical objects, the duct angle can be adjusted according to fruit defect characteristics. The duct height adjusted by an adjustable screw mounted on the machine frame depends on fruit damage susceptibility. After machine fabrication and optimization, its performance is studied for apple fruit. Theoretical and practical evaluation is performed to determine the incline angle and machine performance during the summer of using a very common apple variety. To protect fruit bruising, the fruits were harvested carefully by hand. The established decision rules for the microcontroller are illustrated in Table. To determine the best angle with respect to fruit damage, the duct angle was optimized. The classified apples were inspected with respect to bruising, which is most common result of impact force on apple fruit. After 24 hours the fruit damaged was inspected with naked eye Increasing duct angle results rising fruit velocity. At the last gate the fruit speed is more than the others. The experimental data were analyzed using a variance analysis to determine the fruit bruising based on bruising damage after the process on apple different region The means of the treatments (damage) were compared with multiple range tests at a one percent level of significance for the machine. It is noteworthy that, the statistical analyses and initial region in damage inspect experiments, which are done to modify the sorting machine, are not remarked here. Only the results and design procedure is discussed. Fruit damage analyzing during the sorting process demonstrated that the machine has no injury on apple fruit. Machine capacity is the fruits weight which is graded per hour by the machine. It was determined that two seconds is needed to receive a fruit from the load cell to the last gates

RESULTS:

Result of fruit sorting machine is depend on the fruit shape if fruit spherical in nature then this fruit sorted easily. The fruit and vegetable was successfully sorted. The different fruits and vegetable that was successfully identified were: tomato, orange, lemon, green apple etc. The success rate depended on the fruit shape condition. If fruits are spherical in nature then this machine is very effective for that spherical fruits.

CONCLUSION:

The current system can identify different fruits or Vegetable of spherical in shape at one possible time. To increase the number of fruits identified the features extracted should be more and relationship between these features need to be created. One way of achieving this is through genetic algorithm and learning techniques that would enable it to learn a particular fruit.. This would greatly reduce the need to extract further features as every fruit and vegetable expels different chemicals and hence can be used for the identification of the fruit and this also reduces the storage space for the processing the features. Combining these two parameters of we can develop fruit sorting or vegetable sorting machine..

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