

Fruit quality measurement and sorting using android based robot

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ABSTRACT

Fruit quality measurement and sorting is very important process for any industry and it requires a lot of labour work while doing manually and also requires a lot of time. To overcome this many system has been designed to do this work automatically in industry after plucking the fruits from tree. Our system will sort and measure the quality of fruits before plucking the fruits from tree by using android based robot. Automatic control robot will sense the fruits whether fruit is row or not, hanging on the tree, if fruit is row robot will not pluck it otherwise if it is not, robot will pluck the fruit. All the information regarding fruits like ripeness of fruits, age and quality will be displayed on the mobile phone or we can use a large screen for this displaying purpose for the industry. By using this system we would be able to detect quality of fruits before plucking from the tree.

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I. INTRODUCTION

The aim of this project is to measure the fruit quality, age detection and sorting based on colour and size. Basically fruits are used for many different purposes like juice making and medicines and so on. Generally the quality of fruits shape, size detect and age of fruits cannot be evaluated fast by traditional methods like naked observation of experts as it requires a lot of time and more number of labour required. Many systems has been designed to this process of sorting and measuring the quality of fruits but many of them are measuring quality after plucking the fruits from tree but this project measures the quality of fruits before plucking from the tree.

Here we are going to use a android based robot which will controlled by mobile phone by using bluetooth module, robot will sense the colour and size of fruits and based on the colour and size of fruits, robot will pluck the fruits. Here we are using arduino nano, colour sensor and motor drives as main components. Motor drives used here for robot motion, robot's arm movement by using this robot sense the colour and size of fruits and cutter for cutting the

fruits from tree. Means if fruits have not become able to make any product then robot will not pluck fruits otherwise robot will pluck the fruits, if fruits become ripe. Robot is connected to phone by using bluetooth module and an app used for controlling the robot movement means when we open the app, then many option will be displayed on screen like move robot motion, robot's arm motion and cutter motion and based on our click robot responses. Robot's arm have all the sensors attached so after touching the fruits all the information regarding colour, size and age(quality) of fruits will be displayed on screen.

II. LITERATUTE SURVEY

[1] Fruit quality management using image processing 2017 by Mr. Sumit.S.Telang, Prof.S.M.Shirsath. The detection is achieved by processing the image of fruit. The result obtained can be used for statistical analysis which further decreases the detection time.

[2] Fruits and vegetables quality evaluation using computer vision 2018 by Anuja Bhargava, Atul bansal. In this paper an attempt has been made to explore and compare the various methods proposed by researchers in each step.

[3] Computer vision based date fruit grading system 2011 by Yousef Al Ohali. In this paper the date and sorting system was built and conveyer belt and fruit placer are used.

[4] Geometry based mass grading of mango fruits using image processing 2017 by M.A. Momin, M.T. Rahman, M.S. Sultana, C.Igathinathane, A.T.M. Zaiuddin, T.E. Grift. Fluorescent lighting was efficient in providing the necessary illumination.

[5] Date Fruit Classification for Robotic Harvesting in a Natural Environment Using Deep Learning by HAMDI ALTAHERMANSOUR ALSULAIMANI, GHULAM MUHAMMED (2017)

fruit and relay driver used here for cutting the fruits or we can say plucking the fruits from the tree.

V. CONCLUSION

Hence this system is able to perform the task of measuring age(quality of fruits) based on colour and size before plucking the fruits from trees, so that only good quality of fruits are plucked and we are able to use fruits for different purposes like for making fruits juice in industry and medicines. Here robot is connected to bluetooth module so this system works for small range of area. For improving the area coverage we can use wi-fi module, GPS system but wi-fi module requires always internet connection then area should be under the internet coverage all the time.

VI. ACKNOWLEDGEMENT

It is my great pleasure in expressing sincere and deep gratitude towards my guide Dr. P.B. Mane, Principal of AISSMS IOIT for his valuable guidance and constant support throughout this work and help to pursue additional studies in automation based system.

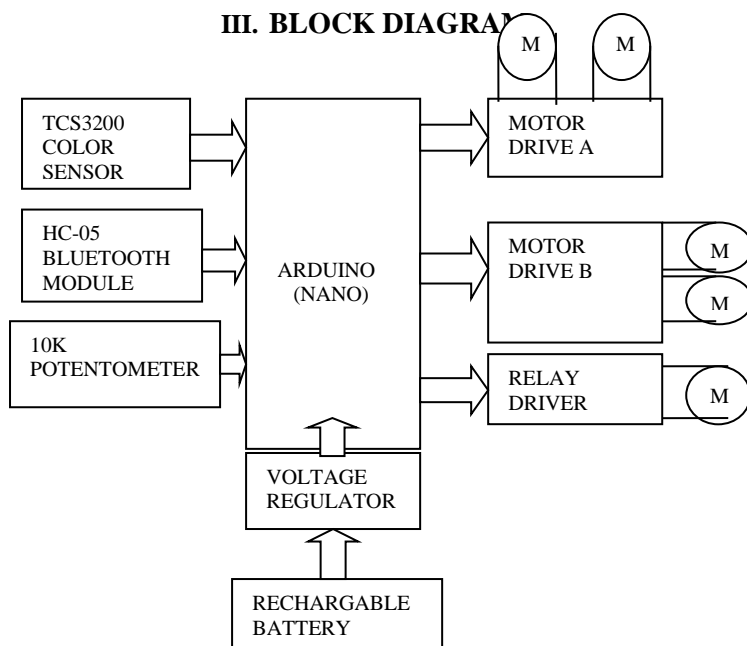
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- [1] Fruit quality measurement using image processing by Mr. Sumit.S.Telang, Prof.S.M. Shirsath [International conference on ideas, Impact and innovation in Mechanical Engineering (ICIIME 2017)]
- [2] Fruits and vegetables quality evaluation using computer vision: A Review by Anuja Bhargava, Atul bansal [Journal of King Saud University- Computer and Information Sciences (2018)]
- [3]Geometry-based mass grading of mango fruits using image processing by M.A. Momim, M.T. Rahman, M.S. Sultana, C. Igathinathane, A.T.M. Ziauddin, T.E. Grift [Information processing In Agriculture 4(2017)]

III. BLOCK DIAGRAM



IV. PROPOSED SYSTEM

Mainly the system that has been designed is used to sort and measure the quality of fruits by using image processing techniques and the quality measurement is done after plucking the fruits from tree. But this system is using different sensors for quality measurement based on colour and size and the process of quality measurement is done before plucking the fruits from tree. This helps to sort the fruits in short time by using android based robot and this system helps, not to pluck low quality of fruits from tree means those fruits which are raw or not able to use for making products. Here we are using arduino nano, colour sensor and motor drive as main components. Motor drive A used for motion of robot, motor drive B used for the arm movement of the robot to hold the fruit for checking the quality the

[4]Computer vision based date fruit grading system: design and implementation by Yousef Al Ohali [Journal of King Saud University- Computer and Information Sciences (2011)]

[5] Date Fruit Classification for Robotic Harvesting in a Natural Environment Using Deep Learning
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MANSOUR ALSULAIMAN^{1,2} (Member, IEEE),
GHULAM MUHAMMED^{1,2} (Member, IEEE(2017)]