

Vision Based Smart Sorting Machine

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Abstract. In this paper, a research on improved image processing method and a prototype of a vision based sorting machine have been developed to segregate objects based on color, shape and size. In today's world, image processing is becoming popular technology and it grabs great attentions due to its capabilities of doing various applications in many field. The existing sorting system in industrial environment has to be improved by implementing the image processing method in the system. In some light industries, sorting process will be carried out by manually using human labour. However, this traditional method has brought some disadvantages such as human mistake, slow in work speed, inaccuracy and high cost due to the manpower. A vision based smart sorting machine is proposed to solve the aforementioned problems by segregating the workpieces based on their color, shape and size. It will be operated by a single-board mini-computer called Raspberry Pi to perform the operation. In the proposed system, Raspberry Pi camera is used to capture the image/stream video of the incoming workpieces through the conveyor. The image/video stream of the incoming workpiece will be captured and implemented with pre-processing that consists of image enhancement to reduce the effect of non-uniform illumination which results from the surrounding illumination. To detect the color of the workpiece, the pre-enhanced image will be decomposed into its respective channels and the dominant color channel will be regarded as the object color. The result will be then matched with the database which is pre-installed in the raspberry storage through features matching method. The results from the features matching will turn on the servo motor and separates the workpieces' color. For the purpose of shape segregation, the captured image will be first converted into black and white image before it is matched with the database based on certain coverage object properties. While for size segregation, the coverage object pixel area of the pre-processing image is extracted and matched with the database in the system. Tested results indicate that vision based automatic segregation system improves the accuracy and efficiency of the works and thus the production rate of the industry.

1 Introduction

Image processing is becoming popular technology in today's world and it grabs great attention as its capabilities of doing various applications in many fields. The use of image processing is to convert an image to digital form and perform the operations on

ject's texture so that the proposed system will become a multifunctional system based on market's demand. Meanwhile, the system is suggested to increase its scale so that it is capable to sort massive object in some heavy industries. Furthermore, as the detection may influence by the surrounding illumination once in a while and result in inaccuracy detection therefore the camera module is suggested to be replaced by a higher resolution camera which has higher quality of camera functions. This will minimize the probability of inaccuracy detection. Last but not least, the algorithm for color, shape and size might be integrated so that the system can segregate objects by various attributes such as color with shape or shape with size in a single detection.

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