A robotic arm to sort different types of ball bearings from the knowledge discovered by size measurements of image regions and RFID support

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Abstract- In this paper, the authors present a mechatronics system consisting of an intelligent robotic arm able to sort ball bearings having the same colour and shape drawing advantage from vision. After acquiring and processing an image from a camera, two almost concentric and circular regions are extracted from the image and their areas are calculated as number of pixels belonging to them. The center of these regions provides the point that the end-effector has to reach in order to grip a cylindrical transport structure where the bearing is placed. Since the size measurements of image regions are very repeatable and the depth between the camera and the object is known, the bearing is recognized from the area. For the sake of automatically appreciating the effectiveness of the proposed approach, a RFID (Radio-Frequency Identification) tag is attached to the transport structure that supports the object. The tag contains stored information on the specific bearing for verifying the success in recognition making use of a reader device. Several experimental tests confirmed that the suggested strategy may be applied to track spare parts in assembly lines.

Index terms*:* Planning of trajectories, Image processing, Pattern recognition, RFID technology.