Sharif University of Technology
Mechanical Engineering Department
M. Sc. Thesis

Design and prototyping modules for rapid waste separation from fiber crops

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Abstract

The quality of agricultural products and medical plants is an important factor which affects the price and exportability of such products. Therefore, it is essential to pick and separate the waste and poor quality products from the marketable product . The properties such as size, shape, color, odor and etc. can be used as a measure to rate the quality of the participating substances in product. Sorting the product is usually done based on the mentioned factors by workers This leads to higher product costs, lower sorting quality and lower quality of product due to damage and pollution. Automatic sorting of agricultural products has been used for various grains such as wheat, rice, corn, lentil and other cereals. For non-granule products such as fiber like crops and dried leaf vegetables and flowers and medical plants, the challenge remains. Properties such as mechanical attachments, adhesion and variety in geometrical shapes and sizes add to the complexity of the problem.

In this research, an automatic system is designed and built that can separate the waste from the product threads. Machine vision methods have been applied to recognize the waste. Cartesian robot has been used for positioning the picking head and a PLC controller has been employed to control the robot. The system has been used to sort sample medical plant and flowers for performance evaluation.

Keywords*: Machine vision, controller, sorting, positioning, mechanical system*