

ABSTRACT

With increasing emphasis on automated manufacturing, there has been a growing interest in interpreting images of two dimensional objects. A major use of machine vision is in the detection of object (target) position and orientation.

This project implement a high level control loop for a robot system by visual control of a robot manipulator for objects sorting process in a multi-object scene. The objects are flat, isolated, size independent, and randomly positioned and oriented in the camera scene. The objects that the system will recognize and the paths that the manipulator will follow for those objects out of the camera scene are predetermined through the learning stage of the system.

The robot should support the following tasks :

- Object recognition, (identification of the object class).
- Determination of the position and orientation of the object.
- Pickup and place the object to the desired position according to a predetermined path.

To carry out the above tasks requirements in real time, the robot system was assembled from the following main blocks :

- Articulated manipulator.
- Low level control, to control the robot joints motion.
- High level control, to receive information from the vision system and calculate the proper path for the manipulator to follow.
- Microprocessor based vision system, to update the high level control with data of the incoming objects (class, position, and orientation).

The proposed system was tested and proved to be successful to be used for many manufacturing activities where it is required to locate and identify randomly positioned and oriented parts.