HSR
HOCHSCHULE FÜR TECHNIK
RAPPERSWIL

FHO Fachhochschule Ostschweiz

INSTITUTE FOR LAB AUTOMATION
AND MECHATRONICS

Project Outline

Connect Four - realization of a customized robot using standard components

Introduction

The HSR Hochschule für Technik Rapperswil is a well renowned institution for technical development and academic education. To give people an impression of the work of its students an automated version of the popular table game "4 gewinnt" (Connect Four) was developed and realized. This interactive game is to be used on fairs and exhibitions. Usage of standard robotic components wherever possible enabled a cost-effective realization.

Aims of the project

The project aimed at the cost optimized realization of a large scale automated "Connect Four" game that can be used on fairs and exhibitions.
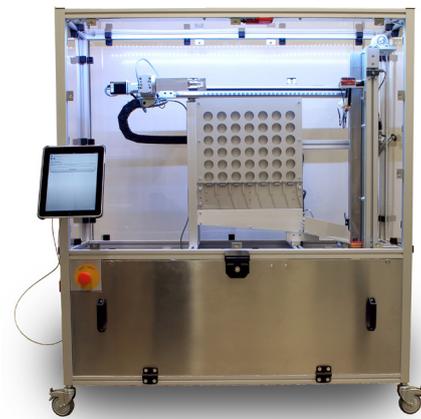
Approach

Based on the original table game „Connect Four" the system has a board with seven columns and six lines. The tokens are two-sided, one side being yellow-coloured while the other one is red. Moves are carried out by a robot that comprises the board, a handling unit and a lift for transportation of the tokens. The handling unit encloses a gear belt axis, a rotary module and a customized gripper for handling of the tokens. System control is executed by PLC. The user interface allows intuitive operation via an Apple ipad or any other WLAN capability device. A lift is integrated for the storage of the tokens and the movement of single tokens into the starting position. Rolls attached to the bottom of the casing allow easy transportation of the complete system. Most mechanical parts are standard components that are commercially available and allowed for a cost-effective realization of the project.

This is a good example of mechatronical development that can be transfered to other robotic systems like lab instruments and customized robots.

This knowledge about standard robotic components can now be transferred to other robotic systems like lab instruments, liquid handling modules, customized picking and placement robots etc.

Characteristics of the automated game Connect Four:

- suitable for fairs and exhibitions
- game can be played either by two people or vs. the computer
- different game levels
- production costs were minimized by the use of standard robotic components
- state-of-the-art user interface

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