

# The Basketball Robot Design Based on Image Recognition

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## Abstract

Based on image recognition, this paper discusses the design issue for a basketball robot, which is a functional robot with leisure-auxiliary objective. In basketball robot, the RST mobile platform with two 150(W) DC servo motor is equipped with a higher order embedded controller (NI Single-Board RIO, sb-RIO) made by the National Instruments (NI), a webcam, a wireless network base station, a 2 liters of  $CO_2$  gas cylinder, some pipelines and solenoid valves. Furthermore, in this paper, a forklift structure with pneumatic cylinder is designed for doing a simple high-pushing action. The purposes of the design basketball robot are: (1) to attain the image return with actual photography by wireless network communication for looking around, (2) to achieve the real-time control of servo motors with the help of sb-RIO operating system and the high-speed I/O control of FPGA, (3) to improve the robot's autonomy and to increase the convince of it's application due to the control program design with

both manual and automatic modes, (4) to hit the basket ball to specific staff successfully with the aid of image recognition under the operations of both manual and automatic mode. The function of robot has an excellent extendibility, and in the future it can be developed for home, leisure auxiliary, security, and etc.

**Keywords: Functional Robot, Single-Board RIO, Webcam, Wireless Network Base Station, FPGA.**

