

INTELLIGENT PNP ROBOT

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ABSTRACT

Intelligent PnP Robot presents a pick and place operation with color sensing and counting functions. This robot is designed to process 6 axis pick and place operation as well as a color sensing system to identify colors. The robot picks colored object from input system and detects its color using sensor and delivers to the respective dedicated locations.

In this system, robotic arm, rotatable chassis, input system, color sensor, servo motor controller, and counters are the important parts that interact with each other. The robotic arm structure was designed and built with the combination of servo motors, servo holders, U-joints and robot gripper. All the hardware parts were mounted on a 725mm X 450mm acrylic platform.

The embedded system design for this project included servo motor controller, color sensor and counters. On-board programming also included to the design as well for convenience purpose. PWM is the implemented techniques for the robotic arm control. The PWM signal is generated by PIC microcontroller (PIC18F4331) and sent to servo motor through signal wire to actuate the servo motors. For the color sensor, voltage divider circuit and ADC were used. PIC microcontroller reads the analogue output of color sensor; convert it to digital and transmits it to computer through UART. Each obtained data was tested in different room environment for few days to ensure the sensor provides the best result. Besides, stress test also been applied to the whole robot system to ensure all the obtained results were reliable.

This project design has been carried out successfully to fulfill the objectives. The Intelligent PnP robot is now performing its operations in good condition and the color sensor gave the satisfaction result.

Keyword: Color sensor, robotic arm, servo motor controller, on-board programming, UART, PWM, PIC microcontroller, ADC