Intelligent Robot Solutions

FANUC Robotics

Application: Assembly

The R-2000*i*A/125L robot uses vision to locate and pick random parts.

Industry: **Automotive**

Products Used: **FANUC Robotics' R-2000*i*A/125L Robot**
HandlingTool Software
End-of-arm Tooling
FANUC's V-500*i*A/3DL Vision System

Challenges:

A large automotive powertrain manufacturer had been producing automotive transmissions the same way for many years. Although it already utilized robotic technology, the company was searching for a more efficient means of production to improve their assembly process.

The manufacturer had been using a robot to unload parts from its assembly line when production was backed up downstream. The robot's job was to gather parts from the line for storage and place them into a temporary bin. The overall process, however, was not fully automated, because once the assembly line was back in full motion, plant workers had to manually place the parts back onto the line. The company decided that a fully automated process would help improve productivity.

Solution:

In an effort to use the current robotic system to its full potential, the manufacturer sought help from FANUC Robotics. The robot was already being used to remove parts from the assembly line during back ups. The goal was to robotically put the parts back on the line once it was back in motion. The challenge was part placement – once the parts were removed from the line they were sitting loosely in a bin. Parts in the bin shifted as it was transported away during line backups, and again when the bin was returned to the line as production resumed. To make the new process a success, the robot would be required to accurately locate each part, pick it up and put it back on the line.

To increase the new functionality, FANUC Robotics reprogrammed its customer's R-2000*i*A/125L robot, adding FANUC's HandlingTool software and V-500*i*A/3DL three-dimensional vision system. The three-dimensional vision system was mounted on the robot's end-of-arm-tooling (EOAT), and the HandlingTool software program was installed. Together, these tools enable the robot to determine part location and orientation in the bin so that the parts can be robotically picked up and properly placed back on the line. The software also prevents the robot's EOAT from colliding with the bin wall. If the system determines that a collision is likely, the robot will pull the part away from the wall and move it to a more favorable position. Once the part is correctly repositioned, the robot picks up the part and places it back on the assembly line for further processing. After all parts from a layer have been put back on the line, the robot picks up the "slip sheet" from the parts bin and places it in a predetermined location. The robot then repeats the vision picking process on the next layer of parts and continues until all layers are emptied.

FANUC Robotics' engineering team was able to address the application challenges by reprogramming the existing robot and installing technology that allowed it to place parts back onto the assembly line. By installing this system, the customer no longer needs manual labor to load parts individually onto the assembly line, ultimately saving the company time and money by increasing efficiency and reducing labor costs.