Project „Flexible Assembly Processes for the Car of the Third Millennium (MyCar)"

Problem Description (High Level)
Vision System (for monitoring) integrated in
RLW joining operations

Problem Definition

▪Robotic Welding Process Control

One of the big issues in modern production of automotive vehicles, and their subassemblies, is the control of the process in real time.

By "control of the process", one means to make sure that the process is performed as pre-programmed, and in case of errors/ applying correcting actions to the process.

Such error is the placement of the welding stitches with respect to the welding flange which can be offset from their nominal position due to a number of errors:

• errors from production of the elements;
• errors/defects in the fixturing devices;
• bad tolerances management;
• induced tensions from previous assembly operations; and
• induced tensions from stamping processes..

Problem Definition

■Requirements

The challenge of this exploitable result is to develop a vision system, that will permit the correction in real time of the welding path, during the welding process.

The pursued functionalities involve:
- flexible and fast reconfigurable manufacturing solution;
- 100% in-line product quality guarantee;
- Reduction of production costs.

The desired characteristics involve:
- Cost effective (max 30-40 k€)
- Compatibility with cycle time:
  - Rapid reading
  - Rapid data elaborating/analyzing
- Accurate reading – needed resolution is of the order of 0.5÷1mm;
- Fast and easy conversion to existing applications/machines;
- User-friendly;
- Low impact on process;
- Built to work in harsh environment such as body shop, metal fabrication factory etc.

Problem Definition

▪Required Functionalities

The functionalities of the vision system will involve:

- locating the door and its components to be weld (real components);
- evaluating their absolute and relative position (real position vs nominal);
- locating the areas to be weld
- returning an indication for correcting welding path of the Robot.

MyCar Vision System

Path Correction

Nominal Position

Actual Position