ST. CLAIR COLLEGE
RESEARCH AND INNOVATION

AT A GLANCE

Researchers collaborated on the programming and implementation of the robotic system. Industry Expert provided industry-specific knowledge and requirements to ensure the system met operational standards. Technical Support Team supported the integration of hardware and software, ensuring seamless operation of the robotic system.

Manufacturing Automated Residual Stress Measurement Project

Project Overview

Industry leaders partnered with researchers to develop a robotic system capable of performing automated residual stress measurements. The system used computer-assisted design (CAD) drawings to guide the robot's movements, ensuring precise positioning of the measurement head at various points on complex geometries without manual intervention.

Purpose/ Objective

The project aimed to automate the process of residual stress measurement in manufacturing components using a robotic arm. The goal was to increase measurement precision and efficiency, reduce training requirements for personnel, and integrate advanced robotic and sensor technologies to enhance the overall measurement process.

Company Information

St. Clair College partnered with industry leaders known for its expertise in precision manufacturing and advanced measurement techniques. The company specializes in utilizing innovative technologies to enhance the quality and accuracy of its manufacturing processes. The partnership between the two, has allowed for boundaries to be pushed further within robotics.

Deliverables

- **Automated Robotic Measurement System:** Developed a robotic system programmed to perform stress measurements autonomously at designated points on manufactured parts.
- **CAD Integration for Automated Guidance:** Implemented CAD integration to automate the positioning of the robot's measurement head, enhancing accuracy and efficiency.
- **Advanced Sensor Implementation:** Utilized high-precision sensors, including the Keyence Laser IL-100 and X-Ray heads, to measure residual stress with high accuracy.
- **Robotic Flexibility:** Enabled the robot to rotate at +/- 45-degree angles at each measurement point to accommodate parts with complex geometries.

Technologies

- **Robot Programming:** Utilized advanced programming techniques to control the robotic arm's movement and measurements processes.
- **Sensor Technology:** Integrated precision sensors to accurately detect and measure residual stress within the manufacturing components.
- **CAD Software:** Employed CAD software to guide the robotic system in identifying and reaching measurement points accurately.