**Industrial Manufacturing Robots**

**(*IoT/ML Example*)**

Last Revision: 8/30/18

**Customer Summary:** Strategic Automation

This customer specializes in Industrial robots that perform specific tasks as part of a factory line.

**Challenge:**

This customer was concerned about the performance of their Industrial robots, which carry out a repetitive task on their manufacturing floor. The customer wanted a solution that would seamlessly interface in the existing hardware packaging of their robots that would give them the ability to know when a robot was not performing its task and why this was happening.

**Solution:**

In order to deliver on the client’s goals for this project, our team had to design specific hardware-interfacing chips to be able to access the control system of the robots. The solution also published this data to the cloud by incorporating custom-configured wireless cards. The entire hardware package needed to fit in the control panel of the robot's serial port without hindering the performance of the robot.

Our software tool provides push notifications for operators to alert them to any issues. They are shown data such as errors with the drivetrain mechanisms of the robot, the pneumatic controls with which the robot performs its given task, and other useful data about the operability of the robot

After collecting and publishing this data, we mine the data and provide an analytics-driven model relying on Machine Learning to help determine root cause of problems with machine’s hardware and/or the flow of operation.

**Accomplishments and Results:**

Our solution was able to provide the customer with real time production statistics, remote monitoring, and alarm signals for the performance of their robots. We built it to be accessed by the operators from their computers and mobile devices to be able to take corrective action in the event of an issue in real time. Using our machine learning algorithm, the customer is able to gain insight and proactively correct potential issues that lead to downtime, improving the effectiveness of their robots and affecting their bottom line. We have helped them improve a core capability in their offering and the pilot program will be extended to their various portfolio of robots

**Technologies Used:**

- Machine Learning (Python, Tensor Flow), custom protocols for interface with electrical controls of hardware

- Integration of hardware and chipsets (PCB chip with COTS components), Adafruit wireless SIM card, programming for microcontroller

**Cost/Schedule:**

4 month - $50k pilot project