

Title:

Harnessing Analog Electrical Signals to Control Manufacturing Processes

Abstract:

Analog electrical signals are critical to today's manufacturing, and knowledge of how to capture, use, and analyze these signals would be very beneficial to IET graduates entering the workforce. Prior to our research, this capability did not exist at MSSU, and we undertook the challenge to bring this powerful technology into the IET program curriculum.

The goal of our research project was to learn how to wire and program a Programmable Logic Controller (PLC) using analog inputs and outputs (I/O) and apply that knowledge to build analog capability into a simulated manufacturing station. PLC programming has been taught in the IET program for several years, but only discrete I/O have been used. Discrete I/O are either on or off, like a standard light switch. Analog I/O use an infinite range of data, like a thermometer or a scale. We were given an analog-capable PLC, a rheostat, and a variable-speed DC electric motor for the project, and we used the PLC manufacturer's user manual and other online resources to learn industry best practices for wiring and programming these components to work together. We then used that knowledge, along with the troubleshooting principles taught in the MET 330 class, to successfully set up and debug our simulated manufacturing station. The end result of the project was a permanent addition to our simulator system that will allow MSSU to instruct future IET students on a new and valuable type of PLC programming in the years to come.