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Ignition Implementation

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Abstract

Industrial grade Supervisory Control and Data Acquisition (SCADA) systems for monitoring process data and visualizations are becoming more powerful and user friendly. Creating these visualizations can now be streamlined and the learning curve has been significantly lowered due to more intuitive designer programs. Ignition is one of these programs and allows for individuals to quickly create powerful and intuitive Human Machine Interface (HMI) screens to observe and control industrial processes. Using the Ignition program, along with supporting hardware, devices can be brought into educational settings cheaply and effectively. In collaboration with team members, labs will be created that walk students through the setup of Ignition to control existing robotic armatures found in the Osburn Automation lab at Millersville University. Prior to this project, there were minimal labs and equipment that utilized HMI hardware and software. The hope is that students will graduate with a better understanding of setting up HMI screens and using the industry standard program Ignition.

The world of automation is constantly growing and changing to implement more devices and sensors for industrial control. We are now able to automate processes so that they are faster and self-reliant; some are even becoming adaptable with the inclusion of Artificial Intelligence. These sensors and devices provide a way for operators and upper management to have a constant view of a process. The visual program Ignition from Inductive Automation allows engineers to develop screens that will show statuses and even allow for device control. Currently, Millersville has very limited HMI capabilities due to the cost of the HMI units themselves and the software that controls them. The average cost of an HMI screen is $1,800 for a decent unit. The software to control it, Factory Talk View, a competitor to Ignition, is $35,000 per year (Rockwell, 2013). Ignition provides a way for students to learn HMI software and come away with a better understanding of visually displaying a process.

Methods

Tutorials were made to assist in teaching students, copies were passed to peers that are in the AEST degree that had never worked with Ignition nor connected to the robots with Input/Output control. The tutorials walked students through Ignition from downloading the program itself to setting up a first screen and using simulation values to test logic.

They were asked to take down notes and commentate on where the tutorials fell short or areas that were not as easy to follow.

Robotic Integration

I spent my time trying to use all of the materials available in the lab while also tying in elements that students will find in the field. During this process, various manuals and previous knowledge was used that was acquired using Ignition for internships and full-time positions. Since the Automation Lab located in Osburn Hall hosts 12 RV-2F-D Mitsubishi robotic armatures with CR750-D controllers, the controllers were used as the devices to be controlled by Ignition. Besides the introduction and screen setup tutorials that were made, a tutorial was made for connecting to the robots themselves. Reading through the manuals that are available online, it was found that the CR750-D controllers had available I/O ports that can be accessed via a molded cable with flying leads. This would allow for robot status to be displayed on the Ignition screen as well as basic control. The flying leads connected to an Allen Bradley MicroLogix 1100 PLC which is available to each desk in the lab. This PLC is important due to its Ethernet capabilities which will allow for communication between the PLC and Ignition hosted on the lab desktops. Once this task was completed, the tutorial was then created for connecting and establishing control of the robot.

Tutorials

The finalized tutorials consisted of setting up Ignition, downloading and setting it up on the local machines. For the lab machines, lab assistants went around and downloaded all of the software on the computers, therefore the students wouldn't have to do it each time a class started. The next tutorial created was for designing and laying out screens for operator control on the HMIs. This walked the students through placing interactive elements on the screen and what operators might look for using simulated situations. The last tutorial created was for tagging the individual elements, meaning linking the buttons and visuals to inputs and outputs on the PLC.

Conclusion

The tutorials helped my peers get started with Ignition and aided in the completion of their research projects. The areas where the tutorials fell short were altered so that they were explained further or worded in a way that could be easily understood. This research project will aid in future students in HMI and SCADA system integration and will give them the mindset of connecting devices together. Having Ignition as a known tool will aid in career opportunities and grow their knowledge of the field.

References

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