Magneto-Active Composites LabVIEW Integrated Control System

Overview
Our sponsor, Dr. Paris vonLockette, performs research in origami engineering by magnetically altering the physical shapes of elastomers. Producing these elastomers requires a significant amount of manual control over an electromagnet. Our project was to create a LabVIEW based feedback control system that will allow for the production of these materials without significant manual intervention.

Objectives
Over the course of the semester, the PSU Magneto-Active Composites LabVIEW team’s goal was to design a feedback control loop in order to monitor and control a super magnet.

Approach
- Meet with sponsor to determine project requirements.
- Brainstorm various methods in which requirements could be met.
- Break up the requirements into distinct code segments.
- Use LabVIEW VI examples, containing information regarding VISA, GPIB, and DAQmx drivers, from National Instruments.
- Use myDAQ to simulate thermocouple’s data to verify the VI’s ability to acquire the magnet’s temperatures and ensure proper operation of the temperature monitoring code segment.
- Use test .txt files and random number generators to determine and verify the VI’s ability to read from and write to .txt files.
- Experimentally determined the relationship between the current supplied by the power supply and the magnetic field strength of the magnet.

Outcomes
- The sponsor will save money as the project reduces the chance of damage to equipment.
- Operation became automated, allowing for more time to be spent with the testing of the devices.
- Recorded history of actual magnetic field strengths along with their respective time stamps allows for further data analysis and research development.