**Embedded Data Acquisition**

**Fall 2020 Master’s Project Abstract**

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University curriculum emphasizes the theoretical aspects of a subject with homework drills to reinforce the lessons. The theory must be learned to earn the degree but a problem is that often graduates are lacking broader experience integrating complete working systems which do useful things above and beyond the isolated lessons.

The objective of this project is to present case studies in the deployment of data acquisition systems and to close the gap between theory and practice by deploying high-level Linux software to control low-level electronics hardware.

The approach will use an embedded Linux single board computer, the BeagleBone, as a data acquisition engine. Cases will be studied (TBD). Scripts will be written, preferably using Jupyter Notebook, to perform various tests and the results of these tests, the data, will be displayed or analyzed. The project will strive to make it intuitive to follow the flow and learn the basics of data acquisition.

The result will be a complete data acquisition system. Since lab gear access or availability can be a bottleneck, we will make our own data acquisition daughter-card, or a “cape”, which will include the necessary data conversion electronics to plug into the BeagleBone. Supporting documentation will cover the choice, usage and areas of optimization of the embedded platform.

Data acquisition is a very broad topic which involves many disciplines beyond the MSIT subject alone. Data wrangling, a hot topic these days, is only the end use of data which must be acquired somehow. This project will show how to deploy a data acquisition system thus opening the door to many other practical projects or possibly even a dedicated data acquisition class at UNHM.