**Capstone Project Ideas**

**Estimating the energy performance of a building through design**

Energy use of buildings can create a large strain on the electrical grid and essentially our global environment.  That's why it is important to create buildings with a great focus on energy efficiency. The design of the building contributes greatly to the Heating Load (HL) and Cooling Load (CL) and it is possible to predict the HL and CL by utilizing specific parameters such as relative compactness, surface area, wall area, roof area, overall height, orientation, glazing area, and glazing area distribution. By analyzing these specific parameters we can find their correlation to the HL and CL which will lead to an improved building design as well as a reduced strain on our environment.

*Dataset: http://archive.ics.uci.edu/ml/datasets/Energy+efficiency*

**Recognizing the quality of weight lifting exercises**

Weight lifting is a challenging and greatly beneficial form of exercise. However, it can also lead to injuries if performed with a poor form as the forces involved can become overwhelming and lead to muscle or joint strain. This dataset aims to identify proper execution, detect mistakes, and provide feedback to the user.  To obtain the data, six healthy male adults were tasked with performing a dumbbell bicep curl using a relatively light weight. The weight was lifted in five different fashions one of which was considered  to be the correct form and the other four were identified as being common mistakes.

*Dataset and publication: http://groupware.les.inf.puc-rio.br/har#weight\_lifting\_exercises*

**Predicting Cost and Production of a Photovoltaic Installation**

Solar energy is underutilized and perhaps misunderstood by the general public in the United States. It can provide us with clean and stable production of energy should we choose to embrace its pursuit. To enable greater understanding of solar energy's potential , we can use data to predict cost and energy production of photovoltaic installations. However, the cost and sizing can be a great deterrence for most potential clients; therefore, they should be appropriately educated before making this important decision.

*Dataset: https://openpv.nrel.gov/search*