**Capstone project ideas**

**Project idea 1:** Predict vehicle testing time with different safety features for Mercedes Benz.

***Context:***  
Since the first automobile, the Benz Patent Motor Car in 1886, Mercedes-Benz has stood for important automotive innovations. These include the passenger safety cell with a crumple zone, the airbag, and intelligent assistance systems. Mercedes-Benz applies for nearly 2000 patents per year, making the brand the European leader among premium carmakers. Mercedes-Benz is the leader in the premium car industry. With a huge selection of features and options, customers can choose the customized Mercedes-Benz of their dreams.

To ensure the safety and reliability of every unique car configuration before they hit the road, the company’s engineers have developed a robust testing system. As one of the world’s biggest manufacturers of premium cars, safety and efficiency are paramount on Mercedes-Benz’s production lines. However, optimizing the speed of their testing system for many possible feature combinations is complex and time-consuming without a powerful algorithmic approach.

It is required to reduce the time that cars spend on the test bench. By working with a dataset representing different permutations of features in a Mercedes-Benz car, predict the time it takes to pass testing. Optimal algorithms will contribute to faster testing, resulting in lower carbon dioxide emissions without reducing Mercedes-Benz’s standards.

Dataset source:  
[Mercedes-Benz Greener Manufacturing | Kaggle](https://www.kaggle.com/datasets/philanipro/mercedesbenz-greener-manufacturing)

**Project idea 2:** Food demand forecasting (predicting number of orders) for a food delivery company for the next 10 weeks.

***Context:***There is a meal delivery company that operates in multiple cities. It has various fulfillment centers in these cities for dispatching food orders to their customers. The client needs help with demand forecasting for upcoming weeks for these centers to plan for the raw materials stocking accordingly. The replenishment of most raw materials is done on a weekly basis and since the raw material is perishable, the procurement planning is of utmost importance. Secondly, staffing of the centers is also one area wherein accurate demand forecasts are very helpful. Given the following dataset, the task is to predict the demand for the next 10 weeks (Weeks: 146-155) for the center-food combinations in the test set.

Dataset source:  
[Food Demand Forecasting | Kaggle](https://www.kaggle.com/datasets/kannanaikkal/food-demand-forecasting)

**Project idea 3:** Determine the key performance indexes for improving yield of a semiconductor manufacturing process.

***Context:***A complex modern semiconductor manufacturing process is normally under constant surveillance via the monitoring of signals/variables collected from sensors and or process measurement points. However, not all these signals are equally valuable in a specific monitoring system. The measured signals contain a combination of useful information, irrelevant information as well as noise. It is often the case that useful information is buried in the latter two. Engineers typically have a much larger number of signals than are required. If we consider each type of signal as a feature, then feature selection may be applied to identify the most relevant signals. The Process Engineers may then use these signals to determine key factors contributing to yield excursions downstream in the process. This will enable an increase in process throughput, decreased time for learning and reduce the per unit production costs.

Dataset source:  
[UCI SECOM Dataset | Kaggle](https://www.kaggle.com/datasets/paresh2047/uci-semcom)