ConUHack Project

- *What is DRW:*
  DRW is a **proprietary trading firm** that specializes in financial markets, leveraging technology and data-driven insights. While they primarily operate in finance, they are **heavily invested in technology, data science, and real-time analytics**—which makes them a potential client for solutions involving **predictive analytics, efficiency improvements, and risk management**. In our project, we focused on these three aspects. By training our web dashboard to conduct an incident pattern analysis and hence produce predictions about the metro's situation based on a given data set, we think our model will be useful in daily life.

- *What is our problem:*
  Delays and operational inefficiencies in urban transportation networks can disrupt employee commute times, impact productivity and affect trading performance.

- *What is our solution:*
  The STM Metro Incident Dashboard is enhanced into a **real-time predictive analytics tool** using multilayer perceptron that helps companies like DRW **optimize employee commute routes, avoid disruptions, and reduce lateness risk**.

- *How can our model help solve the problem:*
  By training our model to provide predictive risk analysis based on the data given to us by the Montreal Open Data site, we can allow metro users and the management of the Metro to predict possible crash outs, forecast peak incident hours, etc. On one hand, regular metro users would be able to take precautions like leaving early or taking an alternative route, and the metro's management will be able to hire more staff to fix the possible crash down of the system.

- Business Strategy:
  While our idea is essentially pitched to DRW's team, we also offer a sort of partnership with STM, since we recommend in our model that STM uses this model to analyze incident patterns and improve service reliability.

- *What is the main feature we implemented to make our model useful:*

  We tried to improve the simple dashboard by adding a predictive analytics model to forecast peak disruption hours in a given day.

  The MLP (Multi-Layer Perceptron) is a type of artificial neural network consisting of multiple layers of interconnected neurons, including an input layer (basically our data set/csv file of metro incidents), and an output layer (the predictive analysis), which allows it to learn complex patterns in data by processing information through these layers, making it suitable for our task: offering pertinent predictions to make metro's users' lives easier.

- *Why we think DRW should consider our project:*
  Our project aims to solve a common real-life problem, which is unpredictable metro incidents. Furthermore, it aligns with DRW's data-driven culture (by leveraging real-time analytics and predictive models).