# Sales Decline Forecasting

Nikolae Pavlenko, Anastasia Luzinsan, Almaz Khannanov, Alexander Miasnikov

**Proposal Idea**

In our AML project, we aim to develop a system to predict sustained six-month sales declines in distribution stores using the Iowa Liquor Sales dataset. We will implement a Long Short-Term Memory (LSTM) network with attention mechanisms to capture temporal dependencies in the sales data. The LSTM architecture will include multiple layers with a specified number of hidden units, and the attention mechanism will help the model focus on relevant time steps. Our target variable is the sales volume, and we will frame the problem as a regression task to forecast future sales. To evaluate the model's performance, we will use metrics such as Mean Absolute Error (MAE) and Root Mean Squared Error (RMSE), which are standard for time-series forecasting. Additionally, we will explore the use of Transformer models, specifically the Temporal Fusion Transformer (TFT), which is designed for time-series forecasting and can handle multiple input variables. If the LSTM model does not achieve satisfactory results, we will implement the TFT as an alternative approach. The system will be trained on historical sales data, and its predictive accuracy will be validated using cross-validation techniques. This approach aims to provide actionable insights for business decision-making regarding inventory management and distribution strategies.