**Assignment**

Use our saved churn data from week 2 with machine learning to predict if customers will churn or not, similar to what we did in the FTE:

- break up data into features and targets

- split data into train and test sets

- use at least one ML model to fit to the training data

- evaluate performance on the train and test sets: at least evaluate accuracy and compare it with the "no information rate"

- plot a confusion matrix

- write something describing how the ML algorithm could be used in a business setting

- Write a short summary of what you did with the overall process - describe any important EDA findings, data cleaning and preparation, modeling, and evaluation in your summary.

**Optional: For an addition challenge, try the following:**

- fit more ML models and compare their scores

- optimize the hyperparameters of your models

- examine more metrics such as the classification report and ROC/AUC

- plot the distribution of the probability predictions (from the `predict\_proba()` function from our model) for each class (1s and 0s)

Integrating the churn prediction model into the company's customer management system can be achieved using several techniques:

API Integration: The model can be deployed as an API (Application Programming Interface), allowing seamless communication between the customer management system and the predictive model. APIs enable real-time predictions by sending customer data to the model and receiving churn probability scores back from the model.

Microservices Architecture: The model can be containerized as a microservice, allowing it to be independently deployed and scaled. Microservices architecture promotes modularity and flexibility, enabling the model to be integrated into the customer management system without disrupting other functionalities.

Webhooks: By setting up webhooks, the customer management system can trigger the model to make predictions whenever relevant events occur, such as a customer interaction or subscription renewal. This ensures that predictions are made in a timely manner and align with the system's workflow.

Data Pipelines: Establishing data pipelines can facilitate the flow of data between the customer management system and the model. Data pipelines ensure that relevant customer data is collected, preprocessed, and sent to the model for prediction, allowing for efficient utilization of the predictive insights.

Authentication and Authorization: Implementing secure authentication and authorization mechanisms ensures that only authorized users or systems can access the model's predictions. This protects sensitive customer data and maintains the integrity of the predictive system.

By employing these techniques, the churn prediction model can seamlessly integrate into the company's existing customer management system, enabling proactive decision-making and effective customer retention strategies.