**Introduction**

Customer churn refers to when a customer (player, subscriber, user, etc.) ceases his or her relationship with a company. Online businesses typically treat a customer as churned once a particular amount of time has elapsed since the customer’s last interaction with the site or service. The full cost of customer churn includes both lost revenue and the marketing costs involved with replacing those customers with new ones. Reducing customer churn is a key business goal of every online business.

The ability to predict that a particular customer is at a high risk of churning, while there is still time to do something about it, represents a huge additional potential revenue source for every online business. Besides the direct loss of revenue that results from a customer abandoning the business, the costs of initially acquiring that customer may not have already been covered by the customer’s spending to date. (In other words, acquiring that customer may have actually been a losing investment.) Furthermore, it is always more difficult and expensive to acquire a new customer than it is to retain a current paying customer.

**Data**

The dataset used in this project is from Kaggle.com(<https://www.kaggle.com/shrutimechlearn/churn-modelling>), which contains details of a bank's customers and the target variable is a binary variable reflecting the fact whether the customer left the bank (closed his account) or he continues to be a customer.

**Methods**

Customer churn is a binary variable, which has two levels exit or retained. Thus it’s appropriate to apply classification algorithms to solve this problem. Attempted machine learning approaches are:

* Logistic regression
* Support Vector Machine
* Random Forest
* Gradient boosting

**References**

* [An extended support vector machine forecasting framework for customer churn in e-commerce](https://www.sciencedirect.com/science/article/pii/S0957417410006779)
* [E-commerce customer churn prediction based on improved SMOTE and AdaBoost](https://ieeexplore.ieee.org/abstract/document/7538581)
* [A comparison of machine learning techniques for customer churn prediction](https://www.sciencedirect.com/science/article/pii/S1569190X15000386)
* [Bagging and Boosting Classification Trees to Predict Churn](https://journals.sagepub.com/doi/abs/10.1509/jmkr.43.2.276)