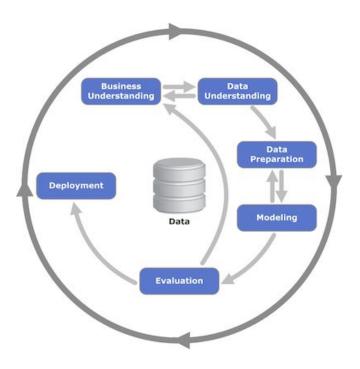
# Get loans with Home Credit

Kaggle competition (https://www.kaggle.com/c/home-credit-default-risk)

#### Workflow



### **Business Understanding**

#### **Target**

Ensure that clients capable of repayment are not rejected and that loans are given.

# Data Understanding

bureau.csv

Application data from previous

loans that client got from other

institutions and that were

reported to Credit Bureau

SK\_ID\_BUREAU

bureau balance.csv

Monthly balance of

credits in Credit

Behavioral data

Bureau

Credit Bureau

One row per client's loan in

#### application\_{train|test}.csv

Main tables – our train and test samples

· Monthly balance of

client's previous

Behavioral data

loans in Home Credit

- Target (binary)
- Info about loan and loan applicant at application time

#### -SK\_ID\_CURR SK\_ID\_CURRprevious\_application.csv Application data of client's previous loans in Home Credit Info about the previous loan parameters and client info at time of previous application SK ID CURR One row per previous application -SK\_ID\_PREV SK ID PREV POS CASH balance.csv credit card balance.csv instalments payments.csv

Past payment data for each

in our sample

Behavioral data

installments of previous credits

in Home Credit related to loans

Monthly balance of

credit card loans in

client's previous

Home Credit

Behavioral data



### **Data Preparation**

- Everything to one table.
- Summary rows (GROUP BY) for related tables.
- Aggregate functions (COUNT, MAX, MIN, AVG).

#### Training data frame:

Rows:307511 Cols:613

## Modeling

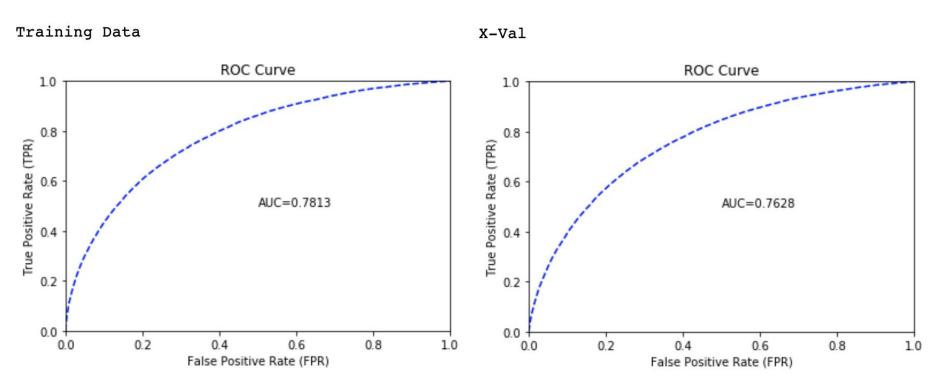
#### **Gradient Boosting**

Gradient boosting is a machine learning technique, which produces a prediction model in the form of an ensemble of weak prediction models, typically decision trees. It builds the model in a stage-wise fashion like other boosting methods do, and it generalizes them by allowing optimization of an arbitrary differentiable loss function.

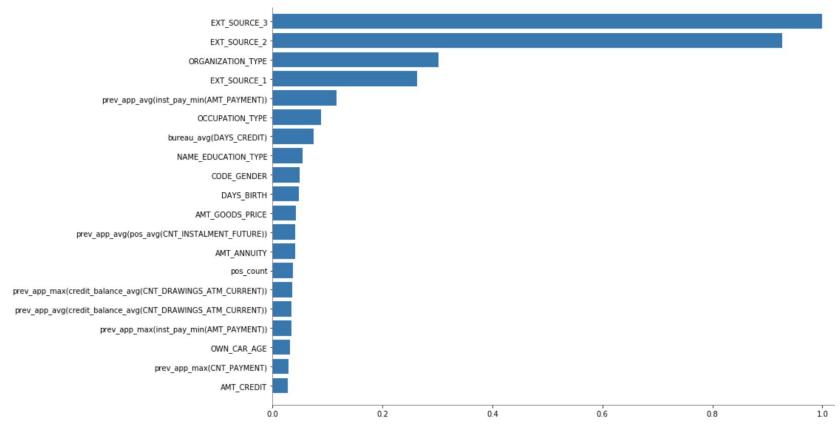
#### Auto ML

H20's AutoML can be used for automating the machine learning workflow, which includes automatic training and tuning of many models.

## **Evaluation - Gradient Boosting - AUC**



## Evaluation - Gradient Boosting - Variable Import.

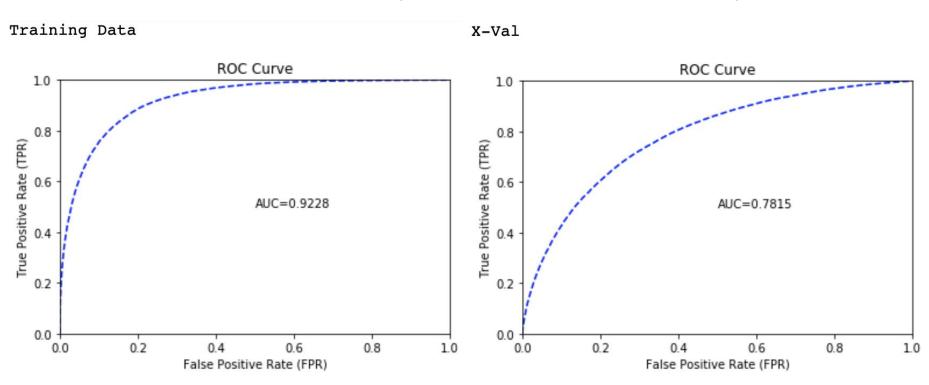


### Evaluation - Auto ML - Leaderboard

model_id	auc	logloss	aucpr	mean_per_class_error	rmse	mse
StackedEnsemble_AllModels_AutoML_20200415_174004	0.781499	0.244769	0.274235	0.331792	0.259405	0.0672908
StackedEnsemble_BestOfFamily_AutoML_20200415_174004	0.780312	0.245245	0.271549	0.329684	0.259658	0.0674224
XGBoost_3_AutoML_20200415_174004	0.774454	0.241502	0.262289	0.337221	0.258688	0.0669193
GBM_2_AutoML_20200415_174004	0.773784	0.242093	0.260099	0.328162	0.258919	0.0670391
GBM_1_AutoML_20200415_174004	0.773303	0.242656	0.255131	0.343667	0.259274	0.0672231
GLM_1_AutoML_20200415_174004	0.767817	0.244274	0.247271	0.339984	0.259776	0.0674837
XGBoost_1_AutoML_20200415_174004	0.747644	0.254152	0.227684	0.353298	0.264116	0.0697572
XGBoost_2_AutoML_20200415_174004	0.730124	0.265823	0.213109	0.357364	0.267463	0.0715362
DRF_1_AutoML_20200415_174004	0.727893	0.255445	0.201658	0.364662	0.264182	0.0697924

- Stacking uses a "meta learner" (not voting) to combine the predictions of "base learners."
- XGBoost is an implementation of gradient boosted decision trees.
- Gradient boosting is a machine learning technique for regression and classification problems.
- Generalized Linear Models (GLM), a statistical technique for linear modeling.

# Evaluation - Auto ML (stacked all models) - AUC





# Deployment

Submission and Description	Private Score	Public Score
model_DRF_1_AutoML_20200415_174004.csv 6) DRF	0.64859	0.64591
model_GLM_1_AutoML_20200415_174004.csv 5) GLM	0.64859	0.64591
model_GBM_2_AutoML_20200415_174004.csv 4) GBM 2	0.64859	0.64591
model_XGBoost_3_AutoML_20200415_174004.csv 3) XGBoost 3	0.64859	0.64591
model_StackedEnsemble_BestOfFamily_AutoML_20200415_174004.csv 2) Stacked - best of family	0.64859	0.64591
model_StackedEnsemble_AllModels_AutoML_20200415_174004.csv 1) Stacked - all models	0.64859	0.64591
model_gbm.csv 0) GBM	0.62484	0.61508