

# Failure Prediction in Semiconductor Manufacturing

- ❖ Finds critical parameters that have high impact on failure
- ❖ Identify the value range for critical parameters for real-time monitoring in production
- ❖ Finds critical conditions that lead to failure

Rules	Lift	Confidence
$V22 > 0.4998335, V512 > 1.168714, V527 \leq 1.30043 \rightarrow$ Fail	2	0.97
$V22 \leq 0.4998335, V23 \leq -0.53650, V286 \leq 0.7725662, V441 > -0.617767 \rightarrow$ Fail	2	0.966
$V42 \leq -0.1351485, V441 > -0.5314914, V527 \leq 0.1197254, V572 > 1.007129 \rightarrow$ Fail	1.9	0.96
$V42 \leq 0.3976235, V64 > 0.624203, V521 > -0.01903021, V523 \leq -0.3313859 \rightarrow$ Fail	1.9	0.96
$V22 > 0.4998335, V42 > -0.4502337, V121 \leq -0.8006536 \rightarrow$ Fail	1.9	0.952
$V11 > 0.5702185, V28 \leq 0.5971413, V39 \leq -0.3845876, V42 \leq -0.1351485, V60 > -0.0733163 \rightarrow$ Fail	1.9	0.94

Classifier	Recall	Accuracy	Precision	F1-Score	AUC
Random Forest	97	95	97	95	95
SVM	98	96	98	96	96
Xgboost	93	94	93	94	94
Decision Tree	88	87	88	86	87
KNN	99	98	99	98	98
Naive Bayes	51	69	51	61	68
Logistic Regression	76	74	76	74	74

## Tools and Technology

- Python, NumPy, Pandas
- R

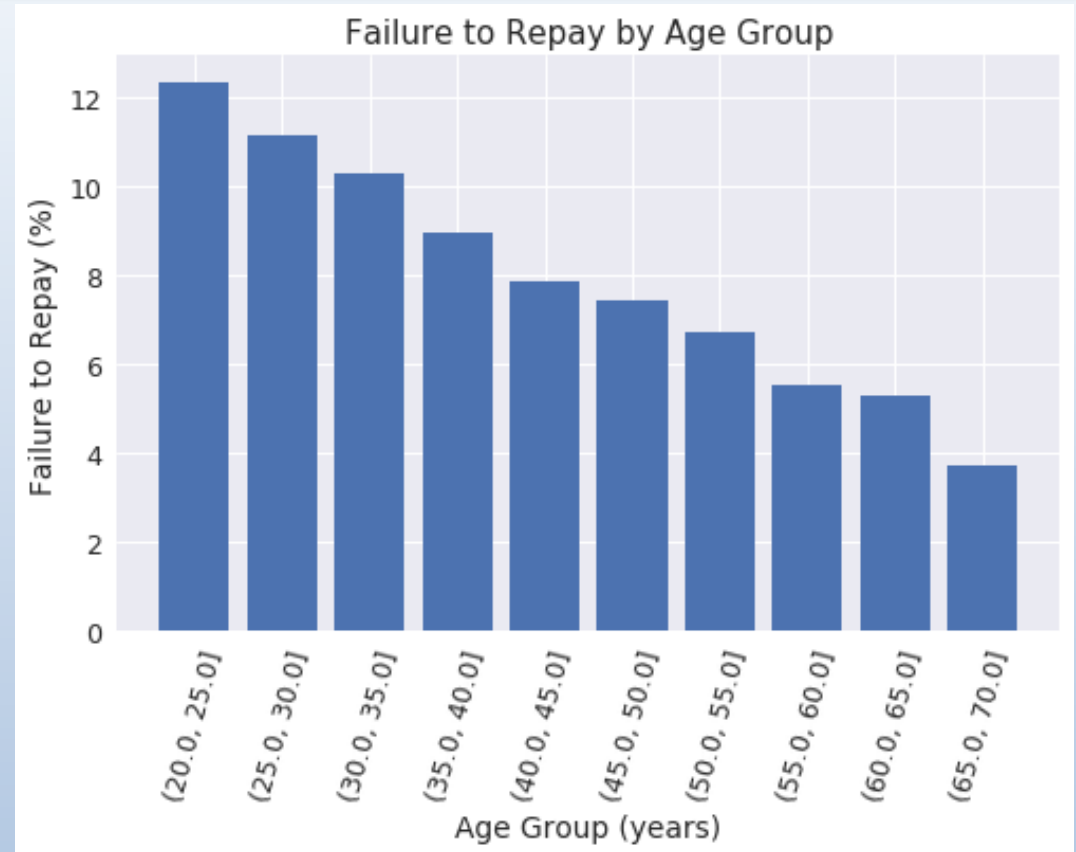
## Algorithms

- Random Forest
- Logistic Regression
- Support Vector Machine
- Association Rule Mining
- Apriori Algorithm

# Home Credit Default Risk Prediction

- ❖ Evaluate credit risk for new customers who do not have credit history with the bank
- ❖ Ensure customers capable of repayment are not rejected

Default with respect to days employed



## Tools and Technology

- Python (NumPy, Pandas, scikit-learn )
- Seaborn, Matplotlib

## Algorithms

- Light Gradient Boosting
- Regularization(L1 & L2)

## Model Performance (in %)

AUC 80

# Wine Quality Prediction Using Sensor Data

## Overview

- ❖ Predict quality of wine rated 1 to 10
- ❖ Converted quality rating to binary class good (1) or bad(0)

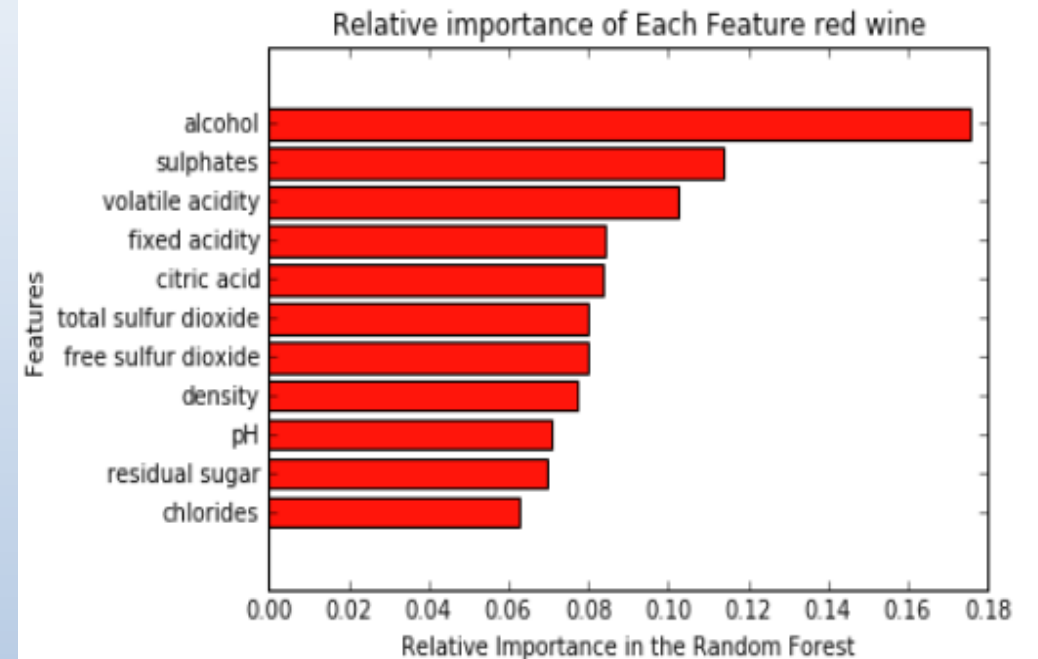
## Red Wine : Performance of different classifiers

Models	Precision	Recall	F1 Score	Accuracy
Random forest	0.80	0.80	0.80	0.79
SVM	0.69	0.69	0.69	0.69
Logistic regression	0.75	0.75	0.75	0.75

## White Wine : Performance of different classifiers

Models	Precision	Recall	F1 Score	Accuracy
Random forest	0.81	0.81	0.86	0.81
SVM	0.74	0.75	0.75	0.74
Logistic regression	0.74	0.75	0.73	0.74

## Feature Importance



## Tools and Technology

- Python (NumPy, Pandas, scikit-learn )
- D3.JS