SIMON PICARD

CREDIT DEFAULT PREDICTION

Advanced Analytics and Artificial Intelligence

November 2017

PROJECT SCOPE

THE GOAL: REDUCE NUMBER OF CREDIT DEFAULT

Predict which customers are likely to default on their loan payments after receiving their loan approval

► **Predict the risk level of a loan before approval**

Machine learning will be used in order to detect patterns that leads to payment default

Historical data from previous loans will be the foundation of our prediction

The approach taken is **data driven**, meaning that the conclusion will be drawn only from the data

LOAN CLASSIFICATION

SAFE

The loan is categorized as safe when it has been fully paid by the customer

RISKY

A loan will be presented as risky when its features are comparable to ones where the customer has been late for its payment or in grace period

DANGEROUS

A dangerous loan is a loan that is likely to default status or to be charged off.

AVAILABLE DATA

LOAN

Information on the loan itself such as its total amount, its interest rate, its term, its purpose, etc.

DEMOGRAPHIC

Information on the customer contracting the loan such as his home state, his employment length, etc.

PAYMENT

Information on the payments of a loan such as the total current balance of all accounts, the debt-to-income ratios, etc.

PREDICTION ALGORITHM

CLASSIFICATION

We want to partition our entries in different categories

RANDOM FOREST

We will classify our loans in different risk levels using its different features using a random forest classifier

PREDICT

We will predict the risk level of new loans based on the model

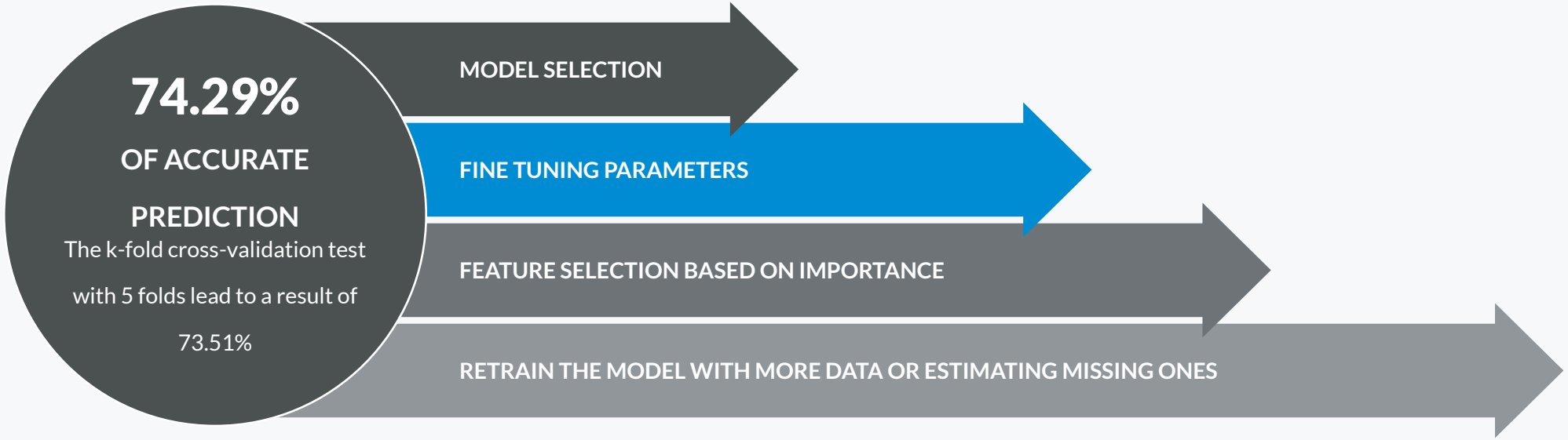
SUPERVISED LEARNING

We know what output we are looking for

MODEL TRAINING

We will train our predictive model based on historical loans

PREDICTION ACCURACY



The model lead to the accuracy of 74,29%, which means that once the model was trained, it was tested on the data and predicted correctly the risk level three times out of four. In order to achieve this result, an exploration of the different decision point has been made.

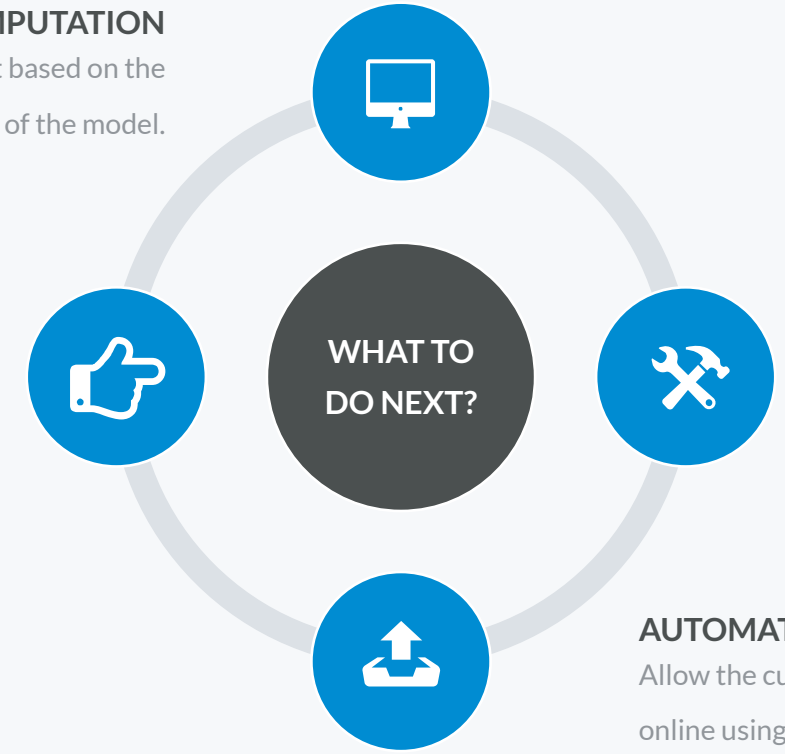
APPLICATION EXAMPLE

RISK PREMIUM COMPUTATION

Adjust the risk premium of a credit based on the prediction of the model.

CUSTOMER SELECTION

Select customers that are the less likely to default on their payment based on the prediction of the model.



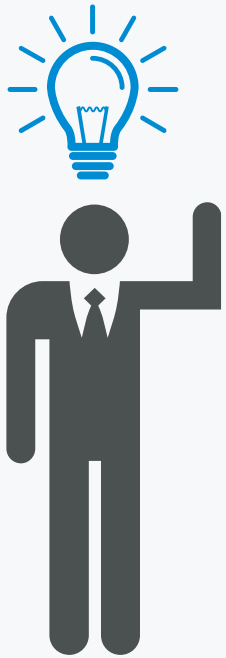
FEATURE ANALYSIS

Identify the feature that has a strong impact on the risk level of a credit and adjust the feature of a credit, according to them.

AUTOMATED CREDIT APPROVAL

Allow the customer to ask for a credit approval online using the prediction of the model.

FUTURE WORK



01

DATA MANAGEMENT

Feed the model with more data using clever data extraction and cleansing technics

02

FEATURE EXTENSION

Include new features in the model to make it more accurate

03

ONLINE MONITORING

Develop online monitoring system based on a predictive model to detect risky behaviour after the loan approval

04

DATA INDUSTRIALIZATION

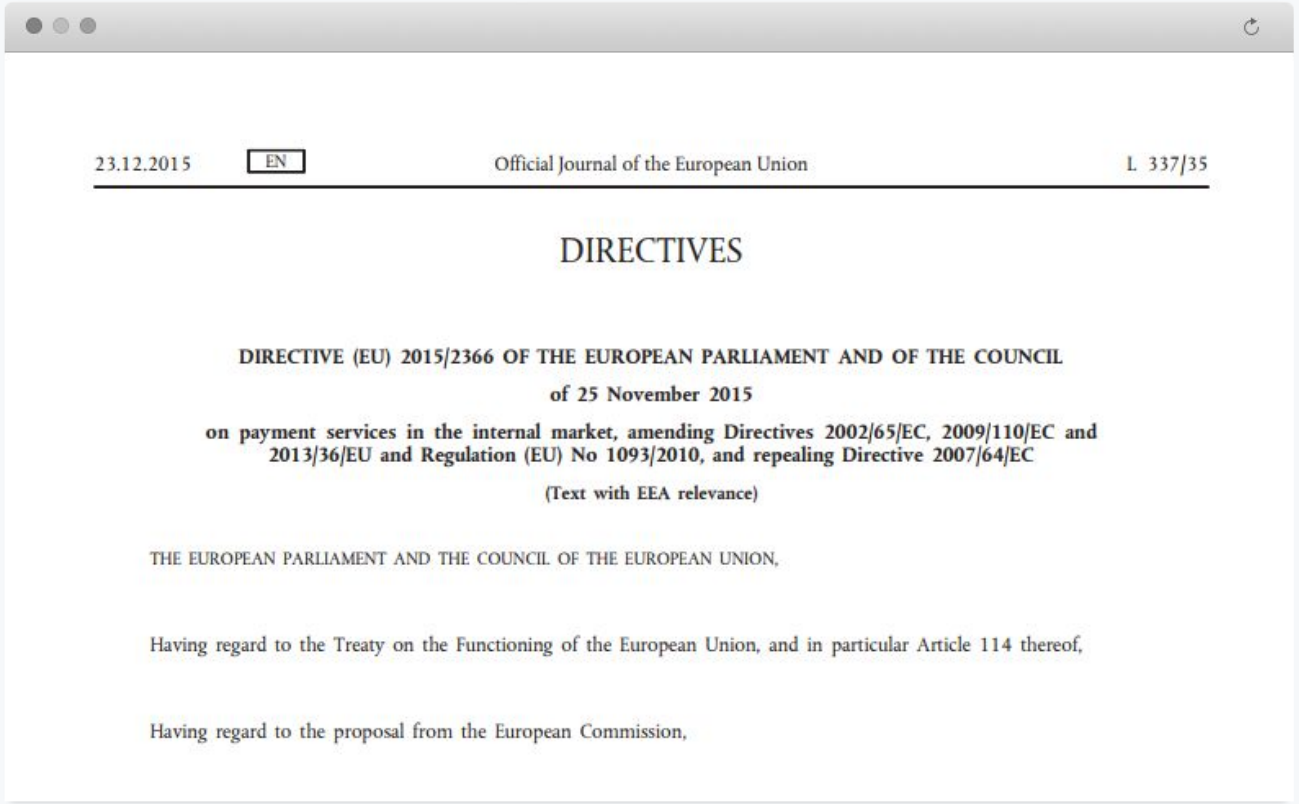
Industrialise the data storage in order to facilitate further predictive analytics

PSD2 AN OPPORTUNITY

NEW REGULATION

With PSD2, banks' monopoly on their customer's account information and payment services is about to disappear. The banks will have to give the information related to a customer if he asks for it

Thus, it will allow you to apply your model on clients from other banks as they will be able to ask for their information. With those, it will be possible to apply the risk level predictive model



23.12.2015 EN Official Journal of the European Union L 337/35

DIRECTIVES

DIRECTIVE (EU) 2015/2366 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 25 November 2015

on payment services in the internal market, amending Directives 2002/65/EC, 2009/110/EC and 2013/36/EU and Regulation (EU) No 1093/2010, and repealing Directive 2007/64/EC

(Text with EEA relevance)

THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty on the Functioning of the European Union, and in particular Article 114 thereof,

Having regard to the proposal from the European Commission,

THANKS FOR LISTENING!

Don’t hesitate to ask if you have any questions.