### HHt2C

### **Advanced Analytics**

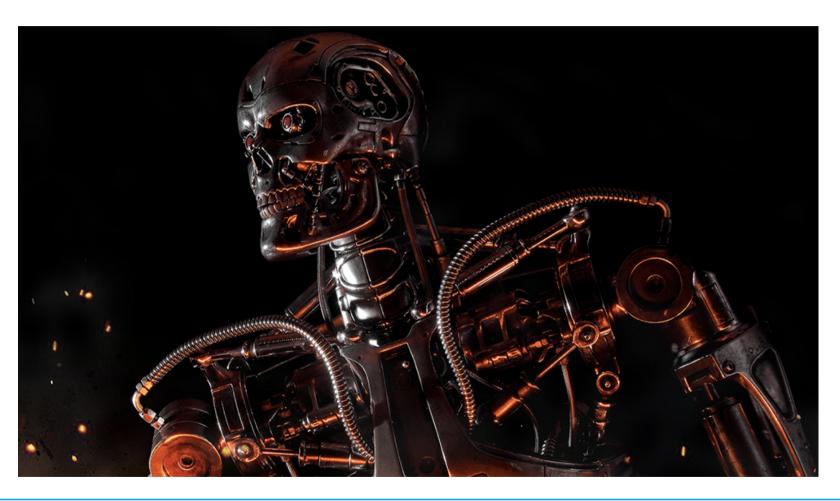
**Most Changes Are About Learning** 





#### **Introduction to Machine Learning**

### What is Machine Learning?

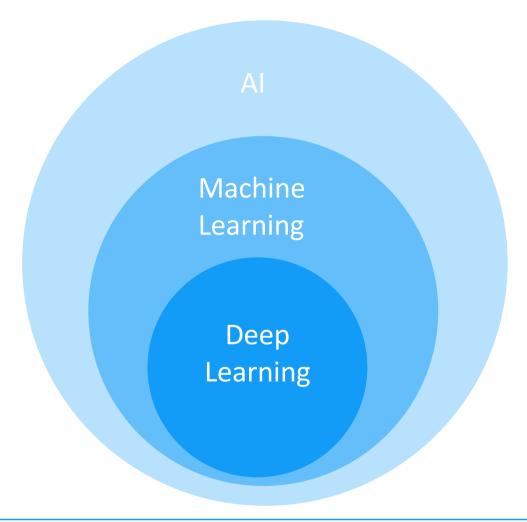






#### **Introduction to Machine Learning**

### **Fields**





## Introduction to Machine Learning Simplifying

### Discovers patterns on high amounts of data





### In 1959 professor Arthur Samuel defined Machine Learning as:

'Field of study that gives computers the ability to learn without being explicitly programmed.'

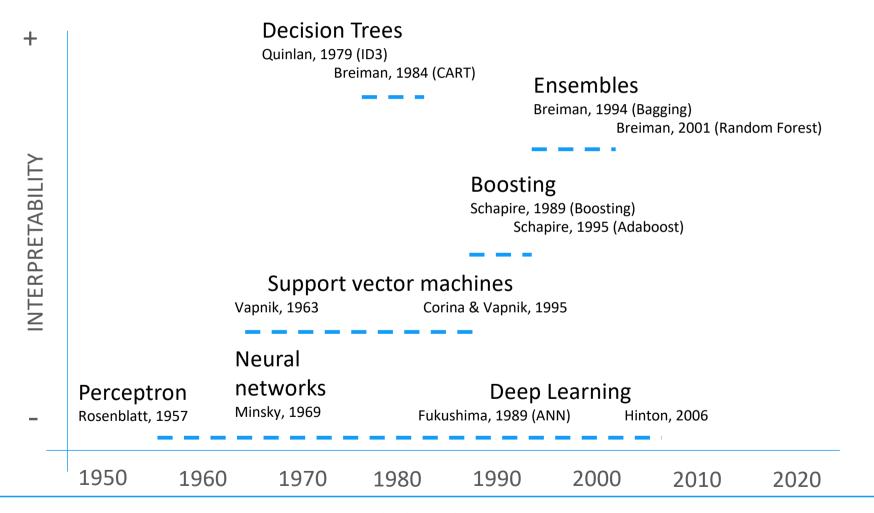


Psychological Review Vol. 65, No. 6, 1958 THE PERCEPTRON: A PROBABILISTIC MODEL FOR INFORMATION STORAGE AND ORGANIZATION IN THE BRAIN 1 COGNITIVE SCIENCE 9, 147-169 (1985) F. ROSENBLATT Cornell Aeronautical Laboratory A Learning Algorithm for Boltzmann Machines\* DAVID H. ACKLEY GEOFFREY E. HINTON NATURE VOL. 323 9 OCTOBER 1986 LETTERSTONATURE Computer Science Department Carnegie-Mellon University Learning representations more difficult when we TERRENCE J. SEJNOWSKI by back-propagating errors desired states are not there are 'feature analys Biophysics Department The Johns Hopkins University are not true hidden un David E. Rumelhart\*, Geoffrey E. Hinton† fixed by hand, so their st input vector: they do no & Ronald J. Williams\* procedure must decide under what circumstances the hidden \* Institute for Cognitive Science, C-015, University of California, San Diego, La Jolla, California 92093, USA † Department of Computer Science, Carnegie-Mellon University, Pittsburgh, Philadelphia 15213, USA units should be active in order to help achieve the desired input-output behaviour. This amounts to deciding what these units should represent. We demonstrate that a general purpose and relatively simple procedure is powerful enough to construct appropriate internal representations.

The simplest form of the learning procedure is for layered

#### **Introduction to Machine Learning**

### **Algorithm History**





# Introduction to Machine Learning Why now?

#### Enabling tech

IBM is already creating the first commercial use quantum computing system.

IBM newsroom, Jan 2019

#### Data availability

Data generated in the last two years alone is equivalent to 90% of all the data ever produced.

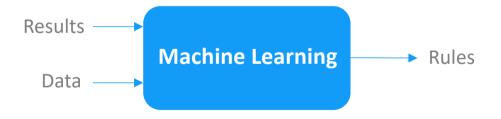
Forbes, May 2018



#### **Introduction to Machine Learning**

### **Traditional programming vs. Machine Learning**







## Use cases Rossmann Store Sales



- Rossmann is Germany's second-largest drug store chain with over 3.790 stores in Europe.
- Our objective is to predict daily sales for one of its stores. Sales are influenced by a lot of factors including promotions, competition, seasonality or holidays.



Use cases

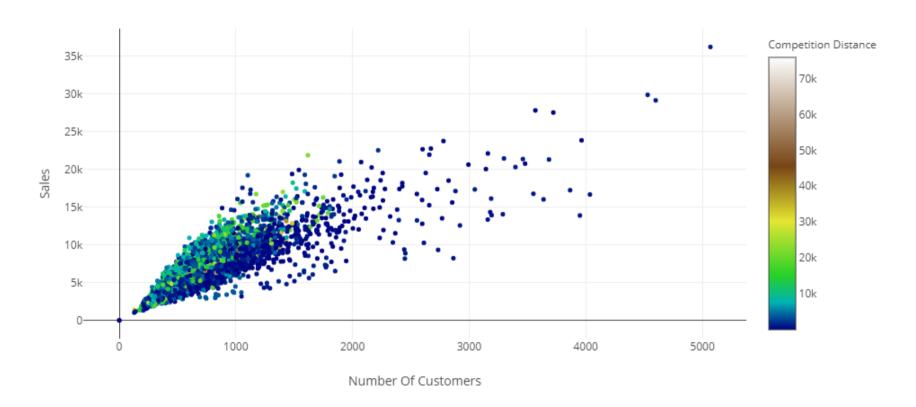
#### **Available data: Rossmann Store Sales / Features**







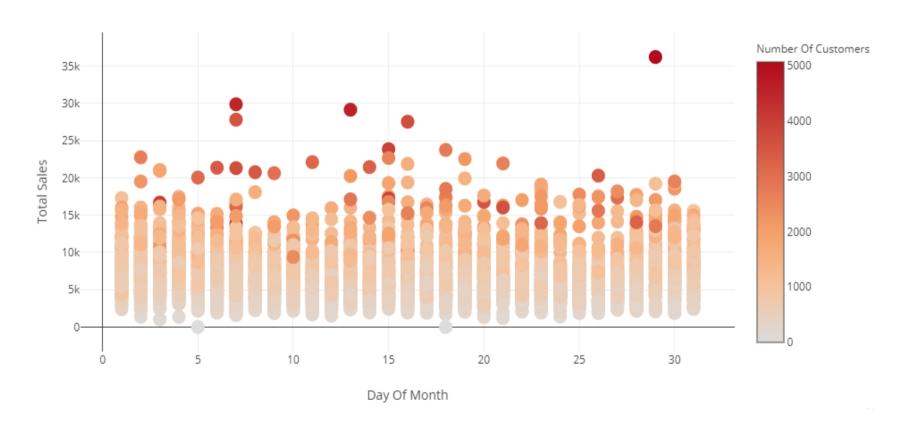
#### Sales vs. Number Of Customers





## Use cases EDA

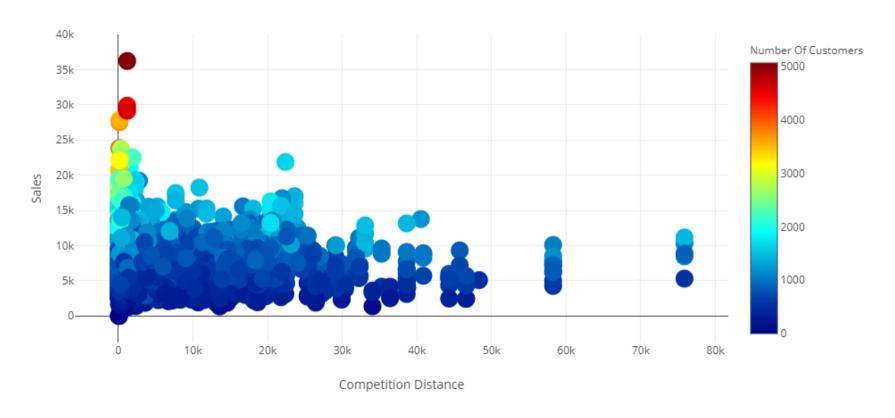
#### Sales Over Days Of A Month







Sales vs. Competition Distance





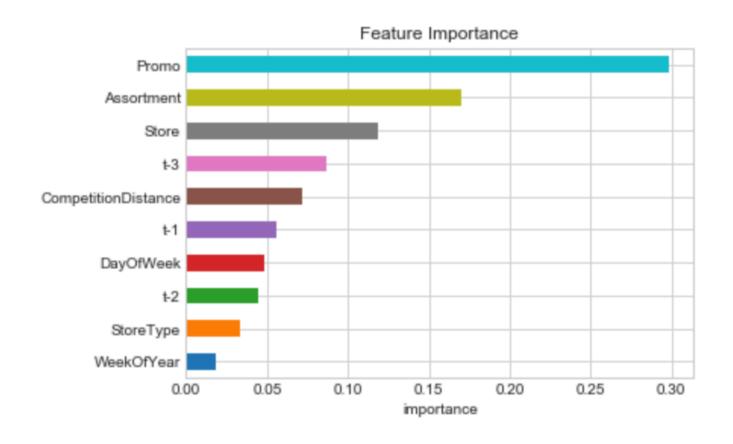
Use cases

Available data: Rossmann Store Sales / Cleaning & Creating Features



#### Use cases

#### **Feature selection**

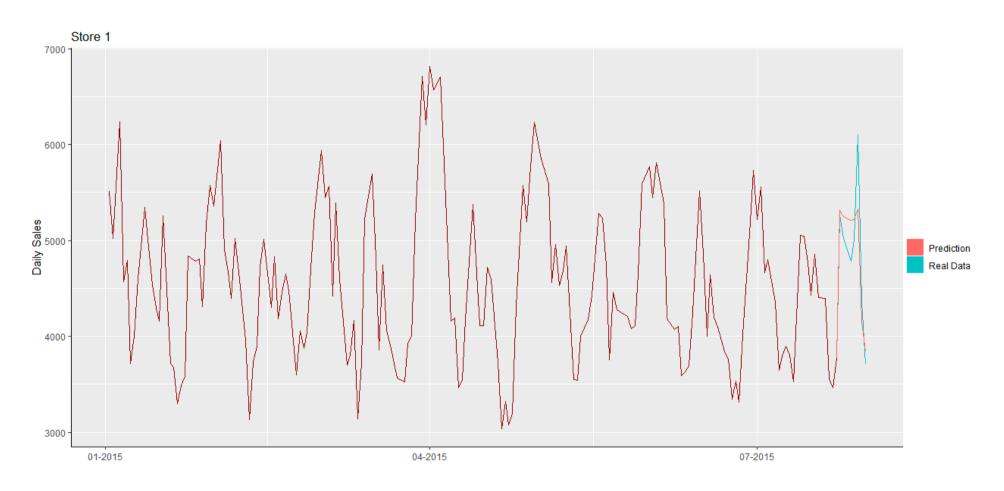




# Use cases Available data: Rossmann Store Sales / Modeling Features

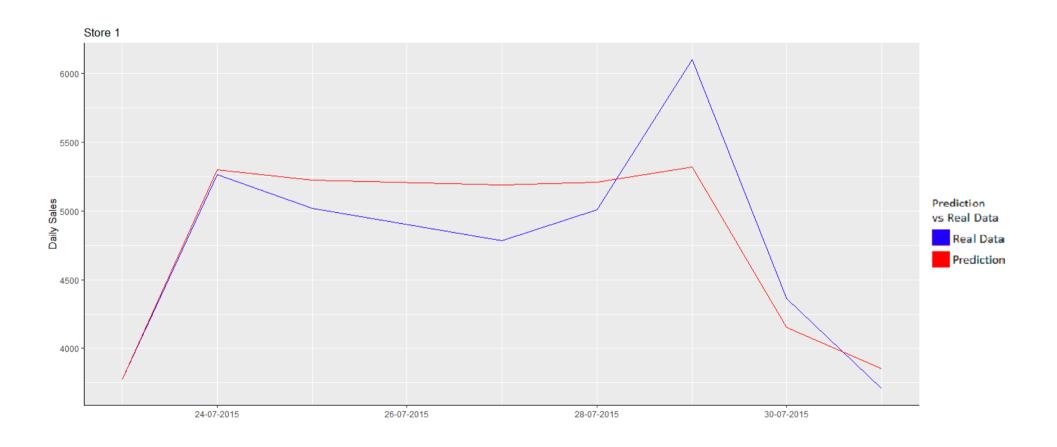


### Use cases Weekly prediction





## Use cases Weekly prediction detail







### **THANK YOU**

chernandez@t2client.com

Technology 2 Client S.L.