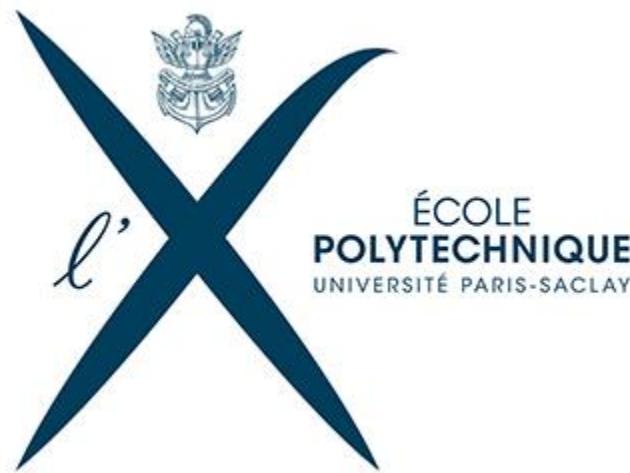


eleven

strategy consultants

HEC
PARIS



eleven is the **first ever European strategy firm** specifically founded to address the **challenges of the digital revolution**



- Founded in 2008 in Paris, eleven has built up a fast-growing **team** comprising of over **fifty strategy consultants**



- Our team notably consists of **senior consultants** who cut their professional teeth in some of the world's leading strategy consulting firms (such as McKinsey, AT Kearney, Booz.Allen & Hamilton, LEK, Simon Kucher & Partners ...)

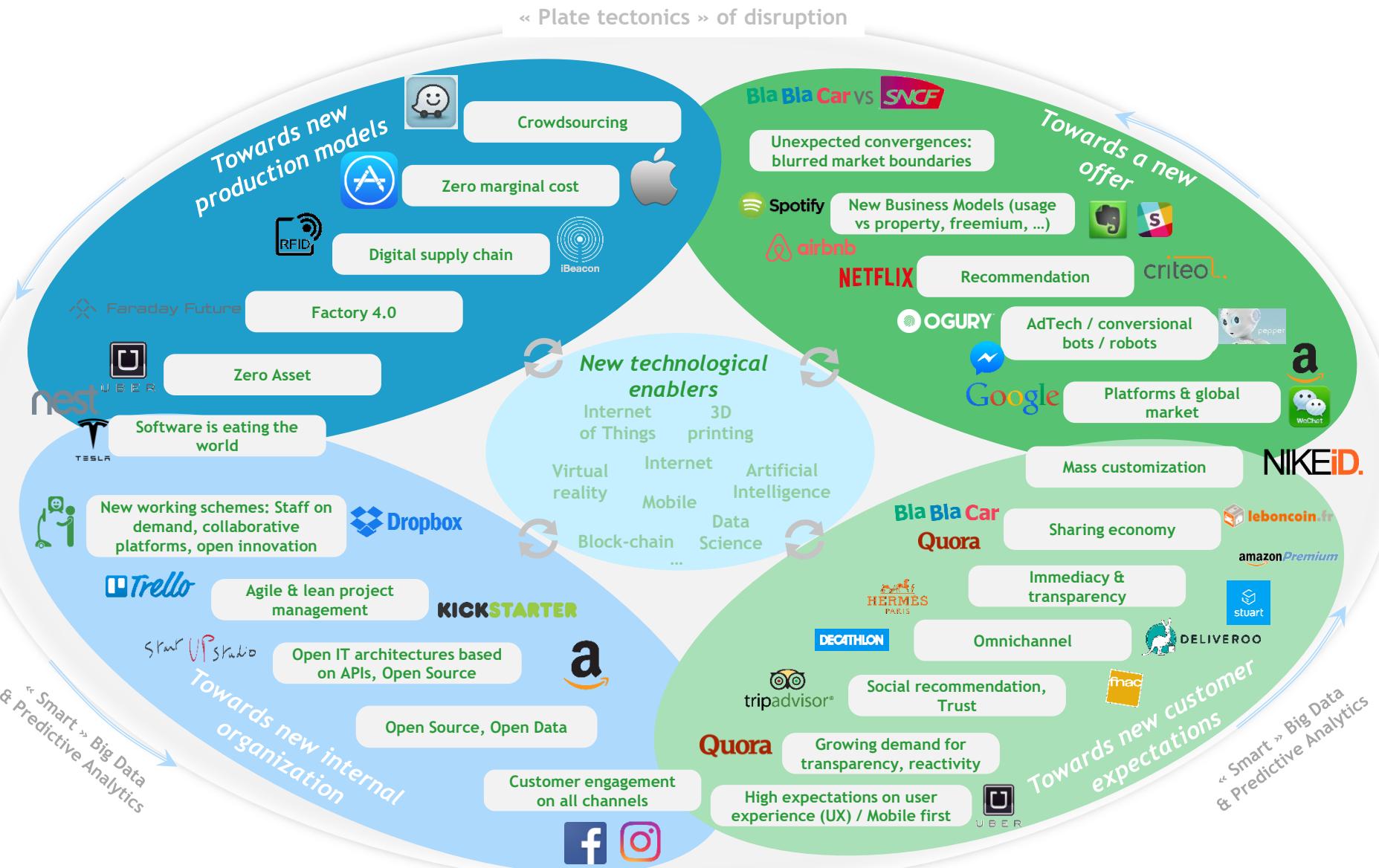


- Our professional commitment is underpinned by a **set of core values**: intellectual honesty, enthusiasm, exacting standards, excellence



- eleven teams link consultants from a **business background** with **engineers and data scientists** who have built a high level of expertise on all dimensions of the digital transformation: Internet of Things, Artificial Intelligence, new Business Models in the digital era, data driven company...

Our projects are built around ongoing major disruptions, including new modes of production, consumption and collaboration, which represent major challenges for existing players



Our managers are able to deploy **end-to-end** solutions, turning a strategic vision as quickly as possible into a “Digital Footprint”



That is why our data scientist consultants combine both unique technical and functional skills



Data Science

Eleven's consultants are able to quickly identify data challenges of companies in order to implement tools for **visualization, prediction** and **recommendation** aiming at **generating value through data**.



Hacking

Mastering the majority of Data Science and Big Data (R, Python, Hadoop ...) techniques and tools on the market allows eleven consultants to **quickly adapt to the data environments** of each customer.



Business

Eleven's consultants are able to **understand their clients' core business**, to focus on the highest stakes and to frame the problem optimally.



Change Management

Eleven's consultants are able to adapt to various interlocutors and to demonstrate the value of the implemented initiatives in order to generate the **cultural changes necessary to make the transformation sustainable over the long term**.

We are capable of devising and implementing strategies that fully leverage the range of opportunities the digital revolution brings, focusing on **four complementary fields**

Disruptive business models and digital strategy

Forecast the impacts of ongoing disruptions on the value chain in order to define upstream suitable responses

Disruption of the value chain?

Entrance of digital players?

(Dis)intermediation?

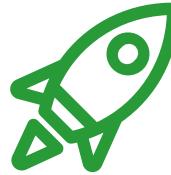


Start UP Studio

Manage disruptive innovation with agile start-up methodologies

Carve out disruptive projects from the corporate value network (processes, organizations and resources)

Leverage start-up frameworks (Minimum Viable Product and agile developments)



Artificial Intelligence

Assess AI opportunities and risks to define a strategic AI roadmap and operate the company's data-driven transformation through high-value use cases implementation

Address the key moments of a company's AI transformation:

- AI ideation & strategy
- Data driven transformation
- Specific use-cases roll-out



Private Equity

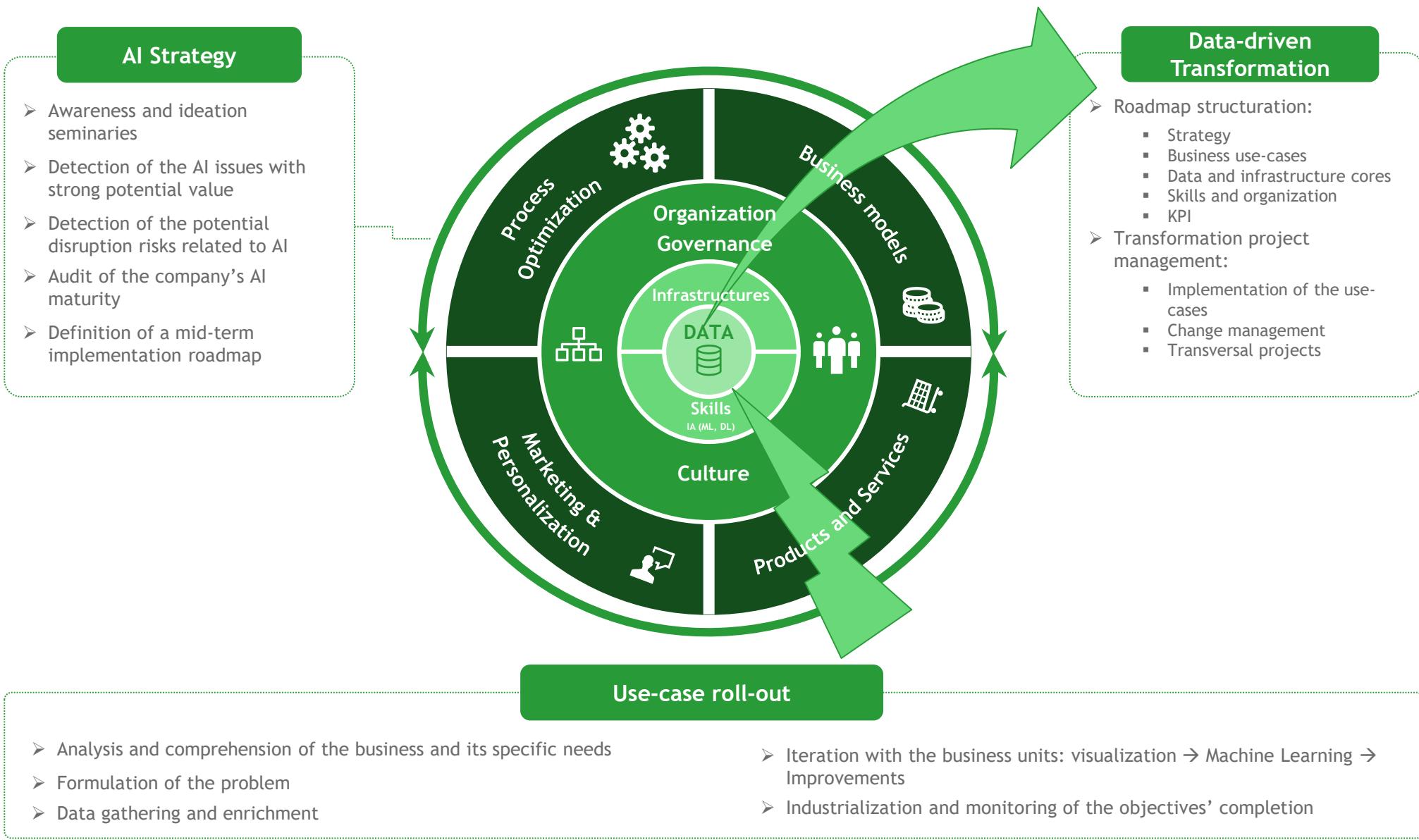
Leverage digital to transform portfolios companies



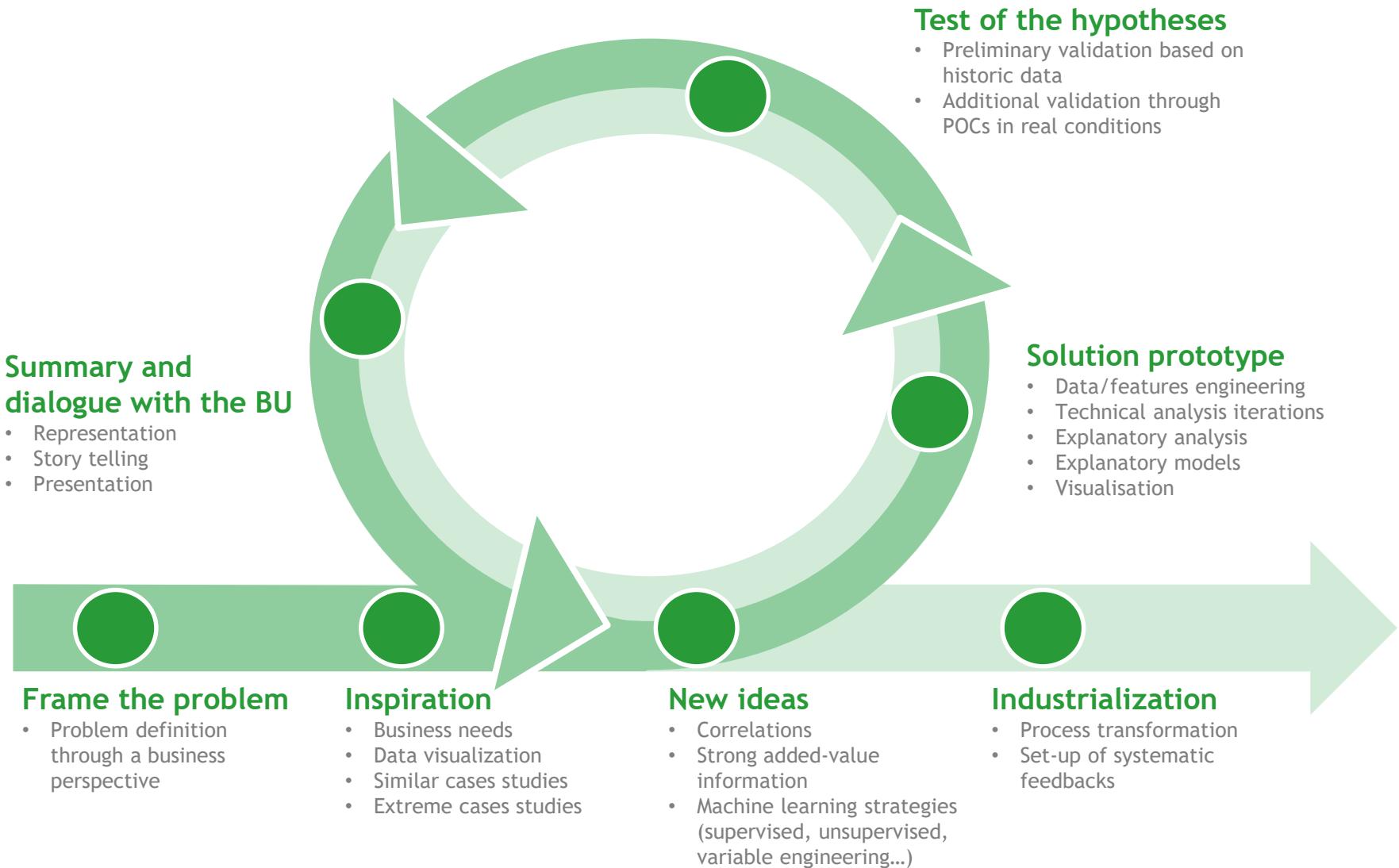
Strategic due diligence (buy side & sell side)

Digital strategy and implementation of associated roadmap and organization

From defining an upstream AI strategy and its data-driven implementation, to the roll-out of specific use-cases, eleven's offers address the key moments of the AI transformation



In particular, eleven designed the **Agile Data Thinking** ® method to conduct each project **iteratively**, with a strong emphasis on **problem framing** and in **constant collaboration with the client company teams**



eleven has built a strong **ecosystem of partners** to immediately access a **high level of expertise** on a wide range of digital issues



Our partners bring a complementary range of expertise to the table, ensuring that the growth challenges each organization faces are addressed in the best possible way



AMBROISE HURET

- Ambroise began his career as a strategy consultant within Booz Allen & Hamilton's Telecommunication Media and Technology practice. He co-founded several start-ups with successful exits to Monster.com, Dassault Systems and Bearing Point. Ambroise also teaches strategy at both the HEC Paris MBA and the HEC Paris MSc Strategic Management and is a professor on Coursera.
- Academics: HEC Paris, Singularity University



BERTRAND SEMAILLE

- Bertrand began his career in the Media and Entertainment field before joining the strategy practice of Bossard Consultants in Paris. He then founded and led the consulting team of the Cap Gemini affiliate dedicated to digital strategy. Bertrand also teaches digital strategy at the HEC Paris MBA.
- Academics: Sciences Po Paris, Pantheon Sorbonne - MSc Econometry



MORAND STUDER

- Morand has been working as a consultant for over a decade and boasts specific expertise in the Artificial Intelligence field... gained through several cutting-edge projects he has been leading for global industry majors. Morand leads eleven's R&D effort and teaches at the HEC Paris MSc Strategic Management.
- Academics: Ecole Polytechnique Paris, ENSAE, Sciences Po Paris, Singularity University



STEVAN URIEN

- Stevan previously worked for several private equity investors in new technologies, where he led due diligences each time a high level of technical expertise was required. He is involved in numerous assignments alongside innovation divisions of corporate companies, accelerating time-to-market of innovations.
- Academics: Ecole Polytechnique Paris, ENSTA



MAXIME CARO

- Maxime began his career in the internal consulting team of Saint-Gobain in Boston before he joined eleven. At eleven, Maxime has been working on projects related to software, Big Data, and to the launch of new businesses.
- Academics: Mines de Paris, National University of Singapore



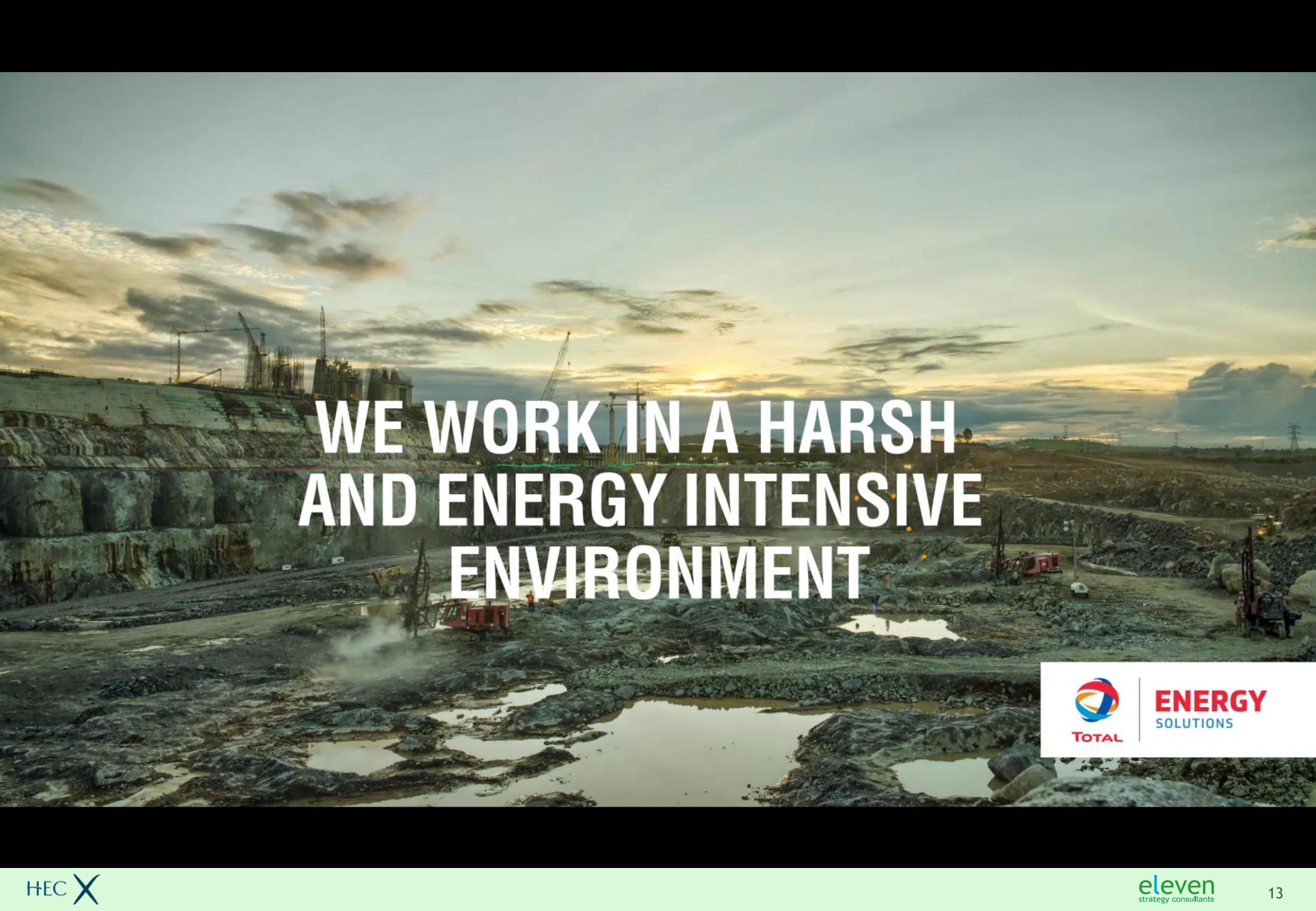
CHRISTOPHER RISCHARD

- Christopher has 12 years experience in strategy and management consulting for shareholders and c-suite executives across a range of industries, in Europe, the United States and South America
- Academics: ESSEC Paris, INSEAD MBA Singapore/Fontainebleau

Our clients are major organizations that are willing to **reinvent their operating model** as a result of the digital revolution



Supercase 1



**WE WORK IN A HARSH
AND ENERGY INTENSIVE
ENVIRONMENT**

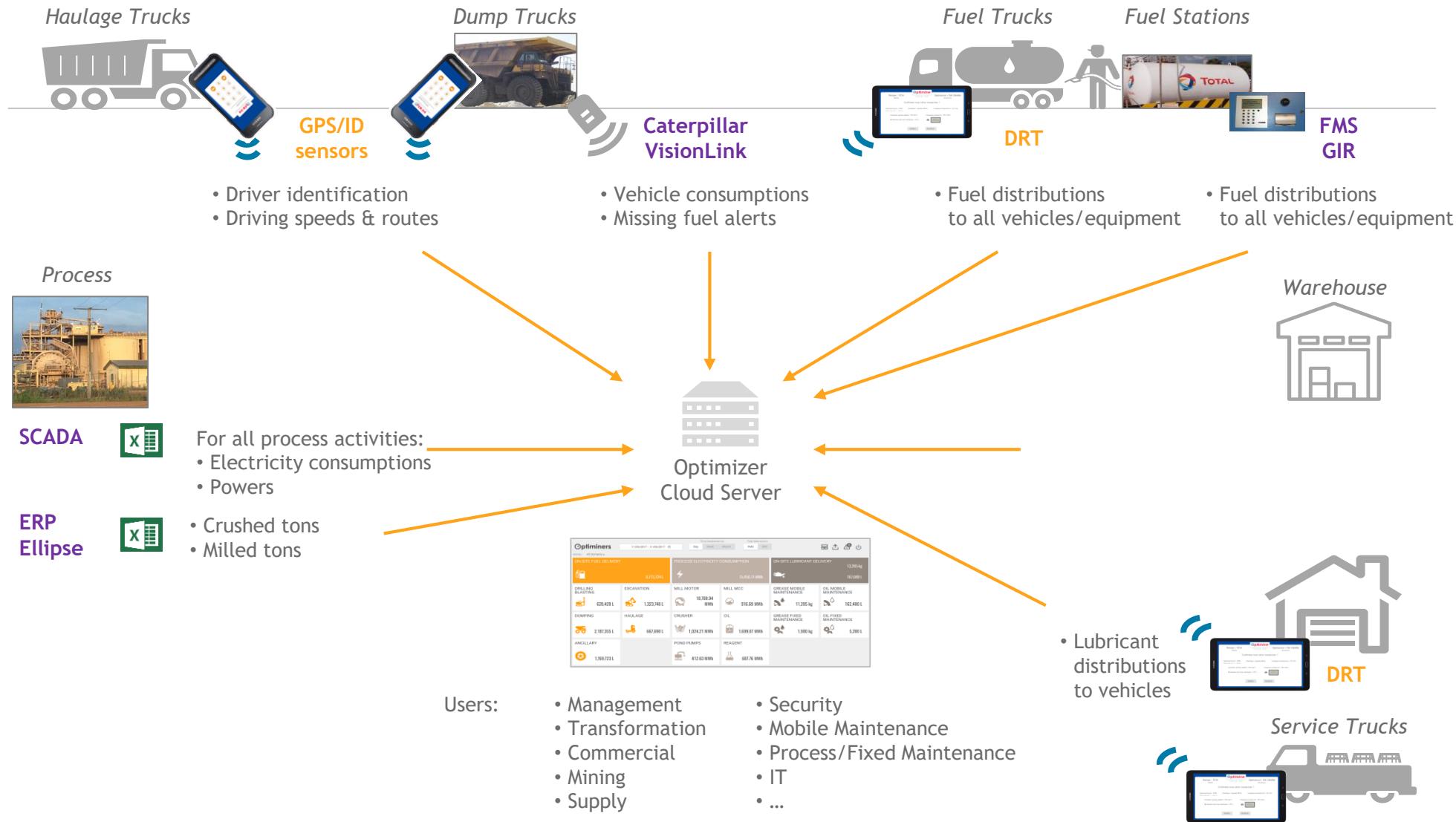


**ENERGY
SOLUTIONS**

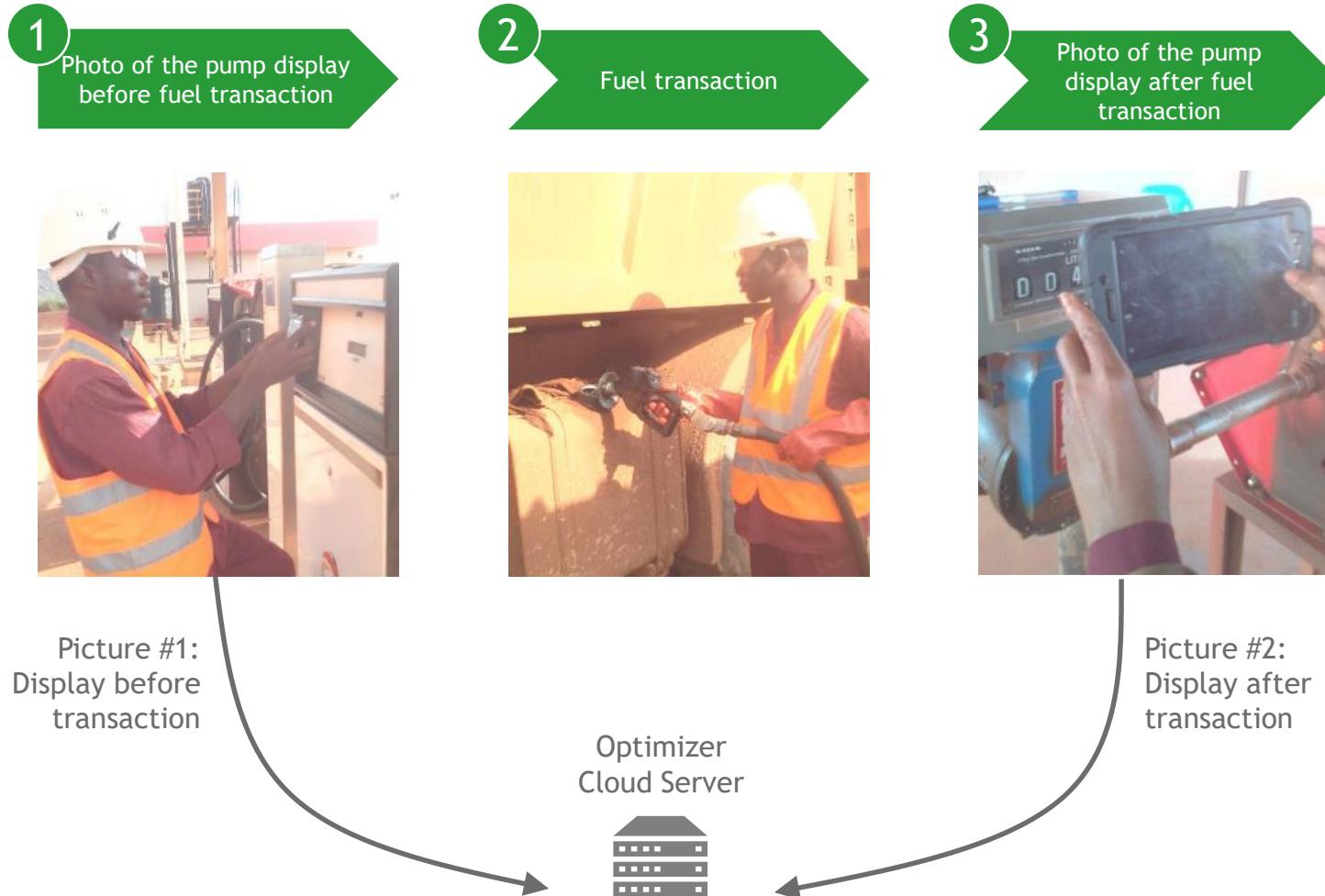
Optimizer Image Recognition - Ready for (data) mining?



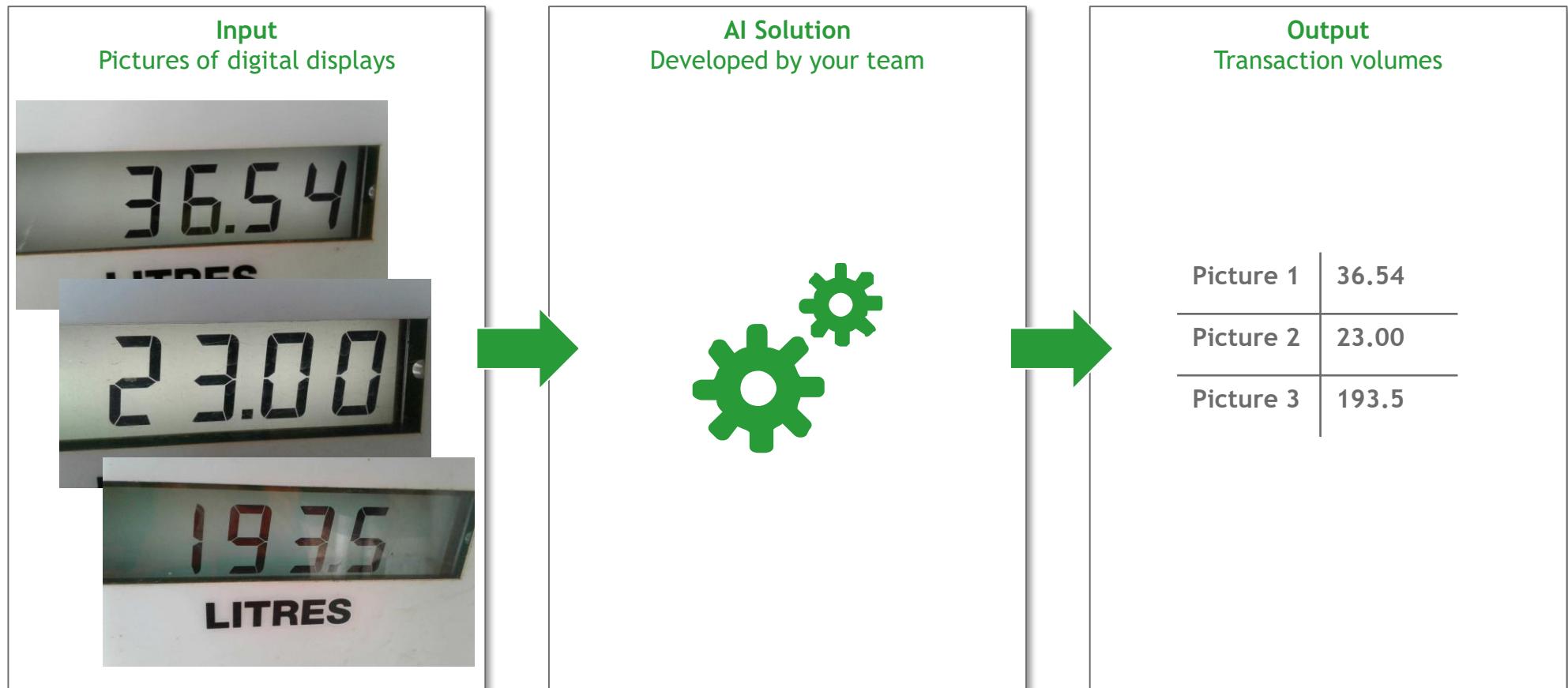
Your consulting team developed a dashboard used to monitor fuel and lubricant consumption in mining sites by **connecting to various data sources**



In an effort to automate fuel transaction data input, pictures of the pump displays before and after each transaction are sent to Optimizer's Cloud Server



Main challenge: to finalize the automation pipeline, your team is asked to **develop an AI solution** that can extract transaction volumes from pictures of **digital displays**



Going further: following your first success, the client is asking you to adapt your AI solution to another mine, where **analog (instead of digital) displays** are in use

Mine #1: ✓AI solution ready



Digital displays



Mine #2: New challenge



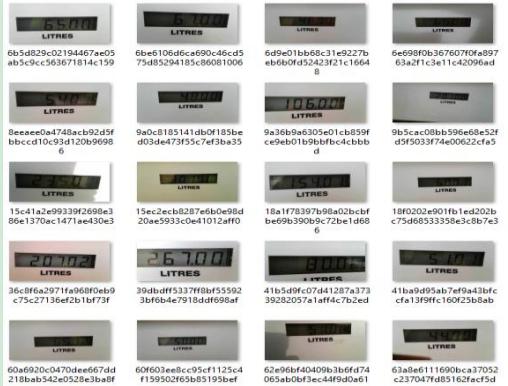
Analog displays



Data available : You have at your disposal **five annotated pictures datasets** with **increasing levels of difficulty**

Digital Numbers

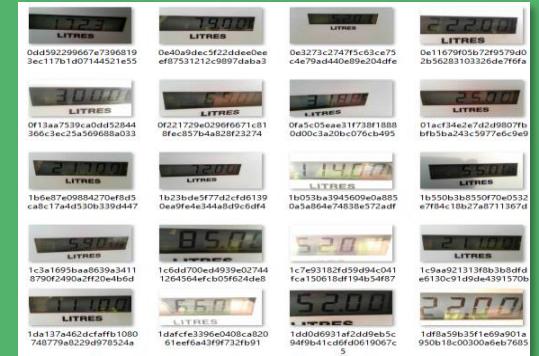
High quality pictures
Nb : 240



Medium quality pictures
Nb : 250

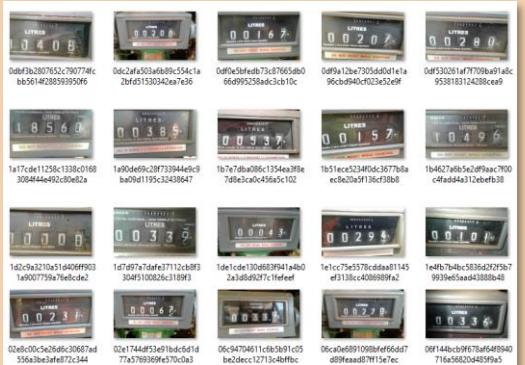


Low quality pictures
Nb : 360



Analog Numbers

High quality pictures
Nb : 170



Low quality pictures
Nb : 990



Each dataset is linked to a .csv file with the correspondance table between the image ID to the display value

Used_liter	Image
33	5232b54dc19f6402ddde07b3d3f3b7b868162352.jpg
230	9e111802446b62b86aeffe911415ad28227cab7.jpg
81	2b648113ed176928dbfeef117fb10b56b49d517.jpg

Resources : You are free to **use any resources** you want, here are some recommendations to help you get started

Languages



We recommend you to use either R or Python

Bunch of useful libraries



Scikit Learn for Machine Learning :
cluster, svm, grid_search



Imutils and/or PIL can be useful for
image processing



Have a look at the sift algorithm
available on cv2 library



Pytesseract is an OCR python library

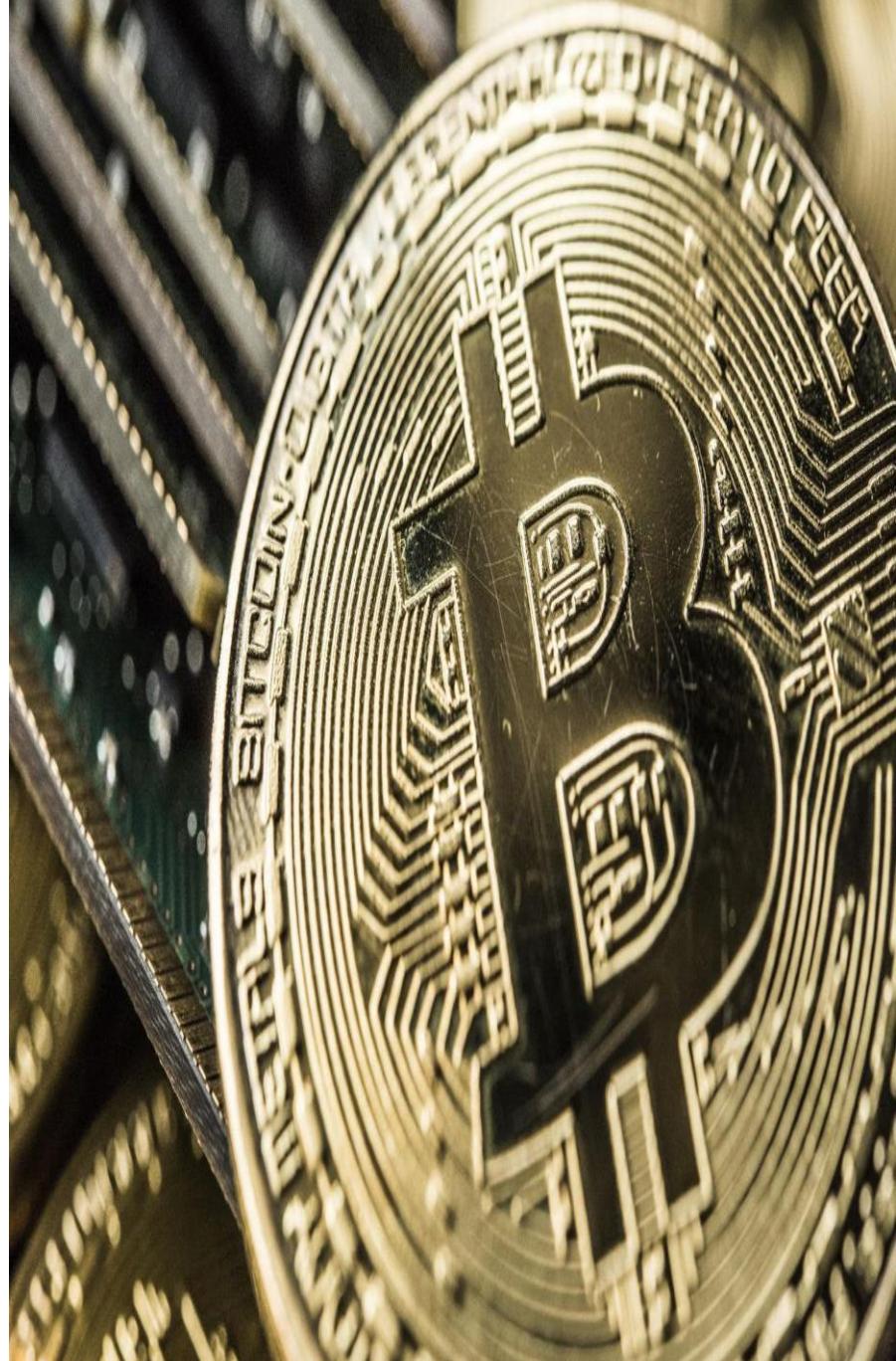
Supercase 2

MSc Data Science for Business

Super Case Eleven 2018

NLP for cryptocurrency predictive model

Monday 17th, 2018



+ GOLDMAN SACHS



Natacha Valla, une ex-économiste de Goldman Sachs



Standard Chartered s'envole en Bourse malgré une chute des profits



+
Infos

f
t
in

e-mail

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Partager

Imprimer

marchés financiers

Quand les traders sont remplacés par des robots

ETIENNE COMBIER | LE 09/02/17 À 18H10

Chez Goldman Sachs, les traders actions étaient 600 en 2000. Aujourd'hui, il ne sont plus que deux.

C'est l'une des conséquences de plus en plus visible de la révolution numérique : les robots remplacent des emplois, parfois très qualifiés. Dans l'une des banques d'affaires les plus puissantes au monde, Goldman Sachs, c'est déjà une réalité pour les traders actions (equity traders). En 2000, 600 personnes faisaient ce métier chez Goldman Sachs. En 2017, ils ne sont plus que deux.

LIRE AUSSI
Nouvelle baisse en vue pour les bonus des banquiers en 2016

Cette évolution, [c'est Marty Chavez](#), le directeur financier adjoint de Goldman Sachs, qui l'a raconté dans un colloque organisé par l'université Harvard, fin janvier. Comme le rapporte [le MIT Technology Review](#), l'ancien chef du digital dans l'entreprise a initié ce transfert de l'humain vers l'algorithme [il y a de cela des années](#). Aujourd'hui, les 598 traders mis au chômage ont été remplacés par 200 ingénieurs informatiques.

LesEchos

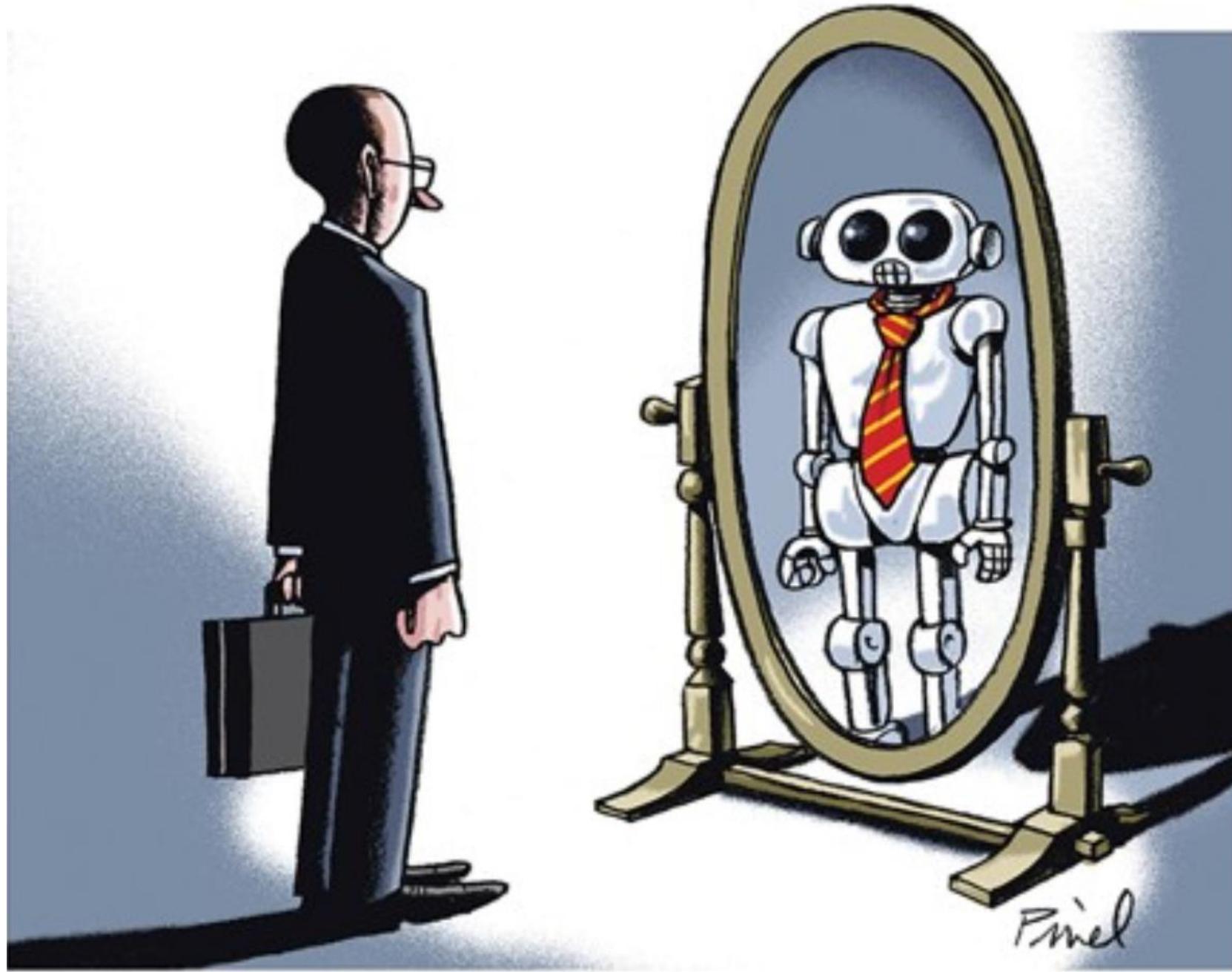
DOSSIER :

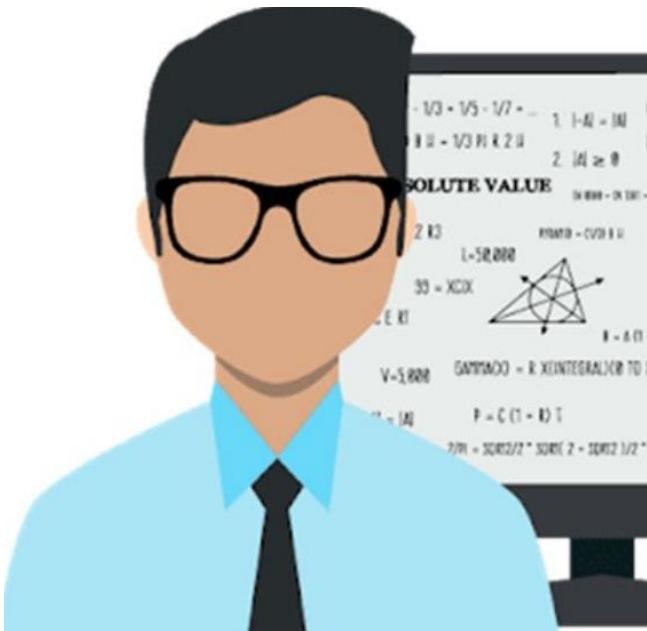
Energie :
sur les chemins de la transition



Pour retrouver tous les détails de ce dossier

CLIQUEZ ICI





```
import sys
from pySageDecoder import PySageDecoder, PySageDecodable
import tensorflow_wrapper as tf_wp

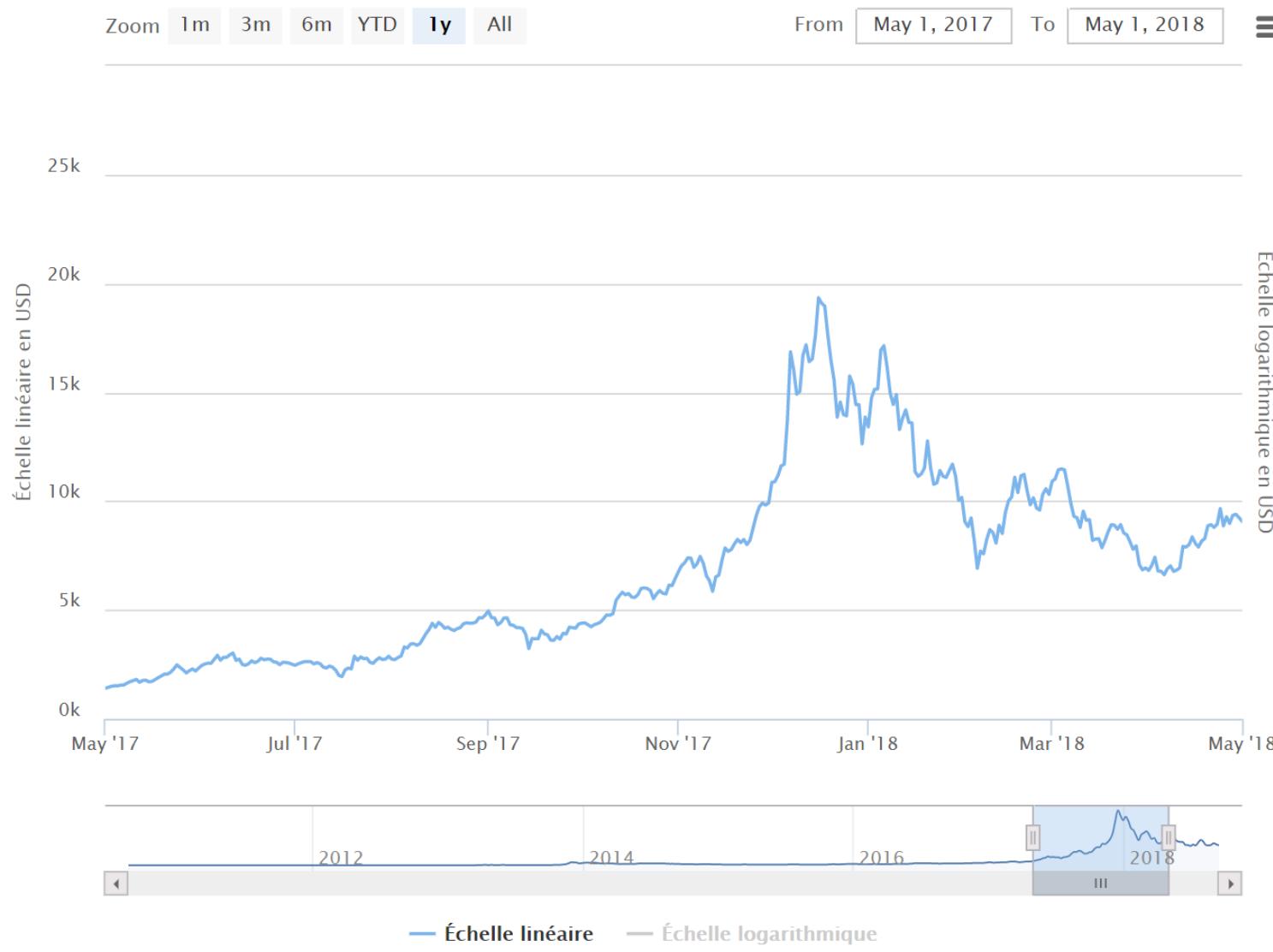
if __name__ == '__main__':
    if len(sys.argv) < 2:
        sys.exit("expected arguments: bbn-decoder-args tf_model_file")

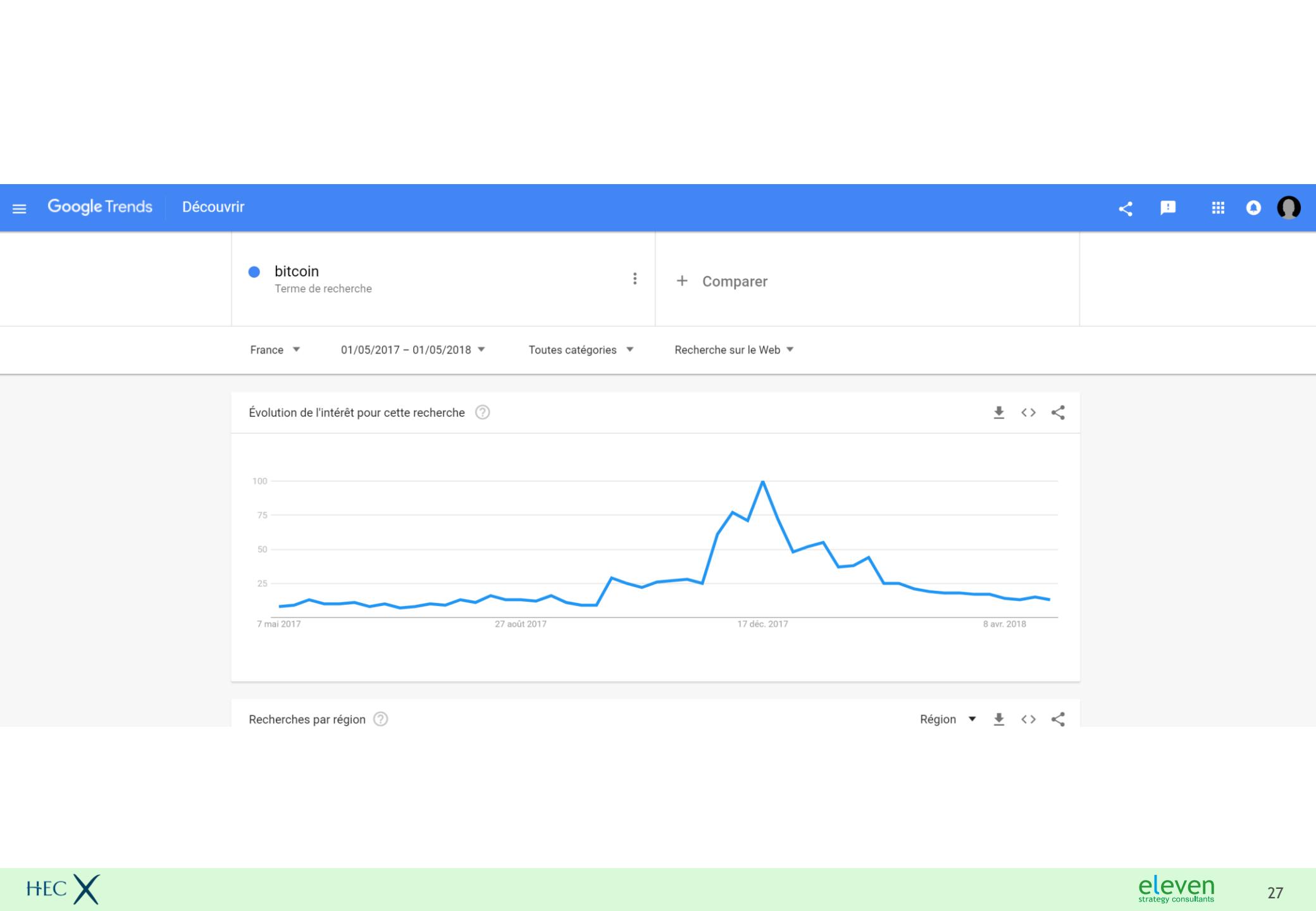
    tf_model_file = sys.argv.pop()
    tf_model_op = tf_wp.load_model(tf_model_file)
    decoder = PySageDecoder()
    decoder.setup(sys.argv)

    while not decoder.done():
        features = decoder.get_features()
        log_posterior = tf_wp.get_log_posterior(features, tf_model_op)
        decodable = decoder.get_matrix_decodable(log_posterior)
        decoder.decode(decodable)
        decoder.next()

    decoder.finalize()
```

Graphique du cours du bitcoin





Overview of the context and of the associated challenge



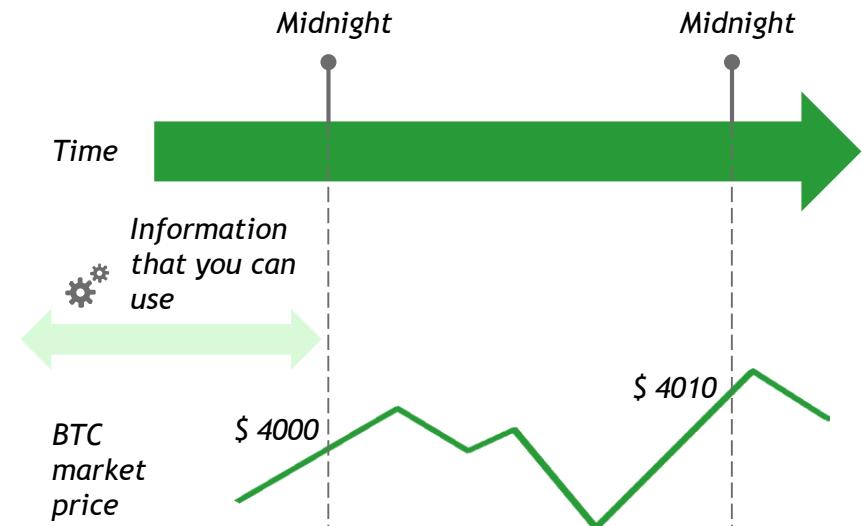
CONTEXT

- Unlike traditional currencies, **cryptocurrencies** are **not based** on a **central coercive system** (e.g., Central Bank) that controls currency issuance
- Given this fact, the only thing that guided **Cryptocurrencies** and more specifically Bitcoin (BTC) **valuation** is **its perceived value**
- The **perceived value** is itself a complex function of BTC's **intrinsic value** (derived from its use as a medium of exchange and as a store value) combined with **speculative interest**
- To predict the market price of BTC, one could thus try to **directly measure the perceived value**, by analyzing, among other things, opinions left on forums



CHALLENGE

- As an **asset manager**, you have clients that wish to invest in cryptocurrencies and ask you for advice regarding this topic
- Each day at **midnight UTC**, you have to tell them if the price of Bitcoin (BTC) will **go up or down**
- For instance, if at midnight the price is \$4000 (close price) and the next day at midnight it is \$4010 (close price), you should have anticipated "up", **no matter what happened during the trading day**



The project is itself divided into two main challenges and a bonus one



How this is going to work

TASK

DESCRIPTION

CRITERIA ON WHICH YOU WILL BE ASSESSED

1

Data Retrieval/
Web Scrapping

You will need to go through at least one forum dedicated to crypto-currencies to scrape the information that you could need for the challenge. This data can be enriched by other means You will also need to get market prices of Bitcoin

- The relevance of data collection : there exists a trade off between cost of collection and exhaustivity of data
- The technical implementation of the data mining process

2

Binary outcome
Model building

Your aim is to predict a binary variable (“up” or “down”) using dependent variables extracted from data you retrieved

- The performance of the model , considering a hinge loss, however, you are not expected to come up with a very complex financial model
- The creativity and relevance of the model you choose to build, regarding the data that you have

3

BONUS CHALLENGE:
Market price prediction

The task is similar to the previous one, but with a more ambitious objective. Instead of predicting a binary variable, we try to predict a continuous variable: the price of Bitcoin at midnight (close price)

- We do not expect each group to be able to come up with a fully functioning market price prediction model. The idea is to see how you are able to generalize binary outcome model to a more complex task

What you need to know about this project is that it is mostly a research type project. Nothing is set in stone when it comes to NLP and cryptocurrencies, so have fun with it and see it more as an opportunity to learn new things

You will have to collect at least two types of data that can be enriched

Type of data	Detail	Useful websites
1 Dedicated forum data	Scrape a dedicated technical forum to collect the posts related to BTC	<ul style="list-style-type: none">• We chose bitcointalk.org (forum named “Bitcoin discussion”)• https://bitcointalk.org/index.php?board=1.0• https://cryptoheresy.com/• https://forum.bitcoin.com/bitcoin-discussion/• https://bitcoingarden.org/forum/
2 Bitcoin market price	Get historical daily average of BTC market price. We used close price, corresponding to the last transaction of the day (UTC time)	<ul style="list-style-type: none">• https://coinmarketcap.com/currencies/bitcoin/historical-data/
3 Extra data	Enrich the data previously mentioned with other variables, if relevant	<ul style="list-style-type: none">• ?

Supercase 3

Cross-channel attribution & *Client segmentation*

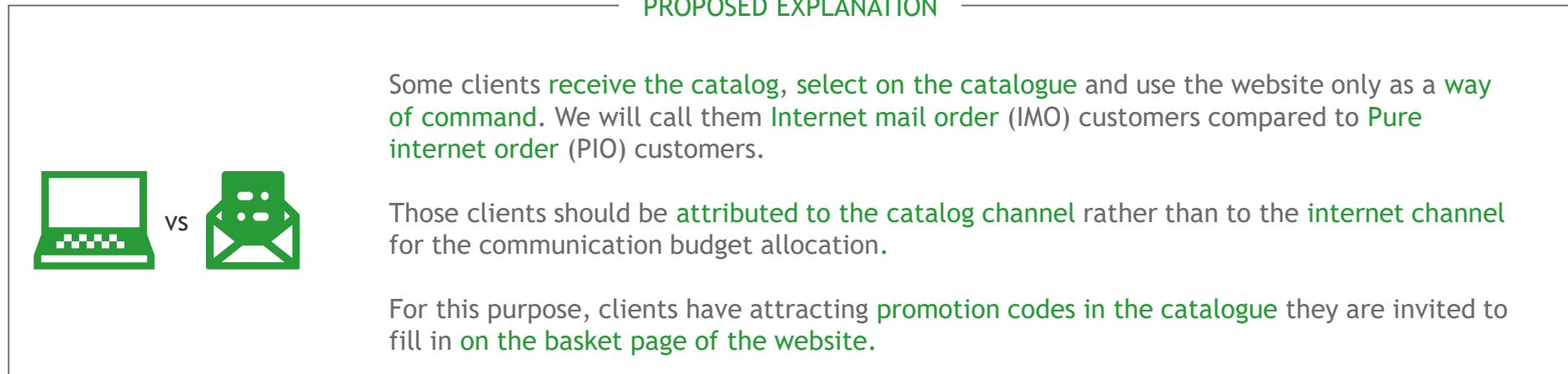
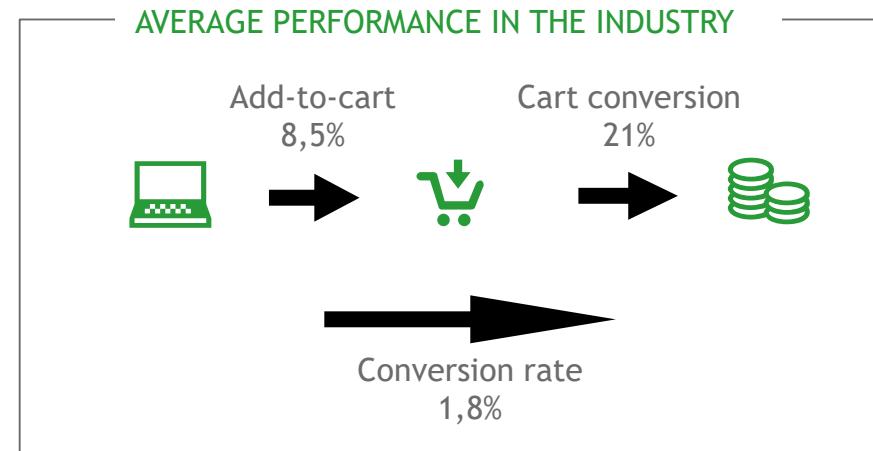
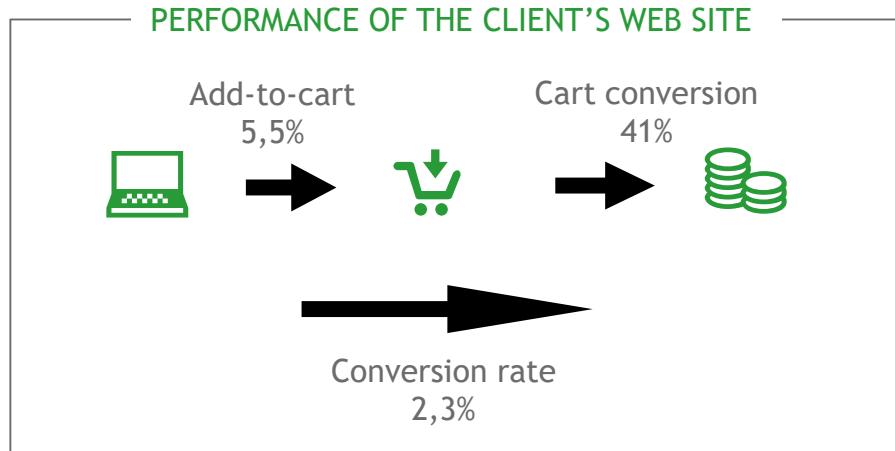
Monday 17th, 2018



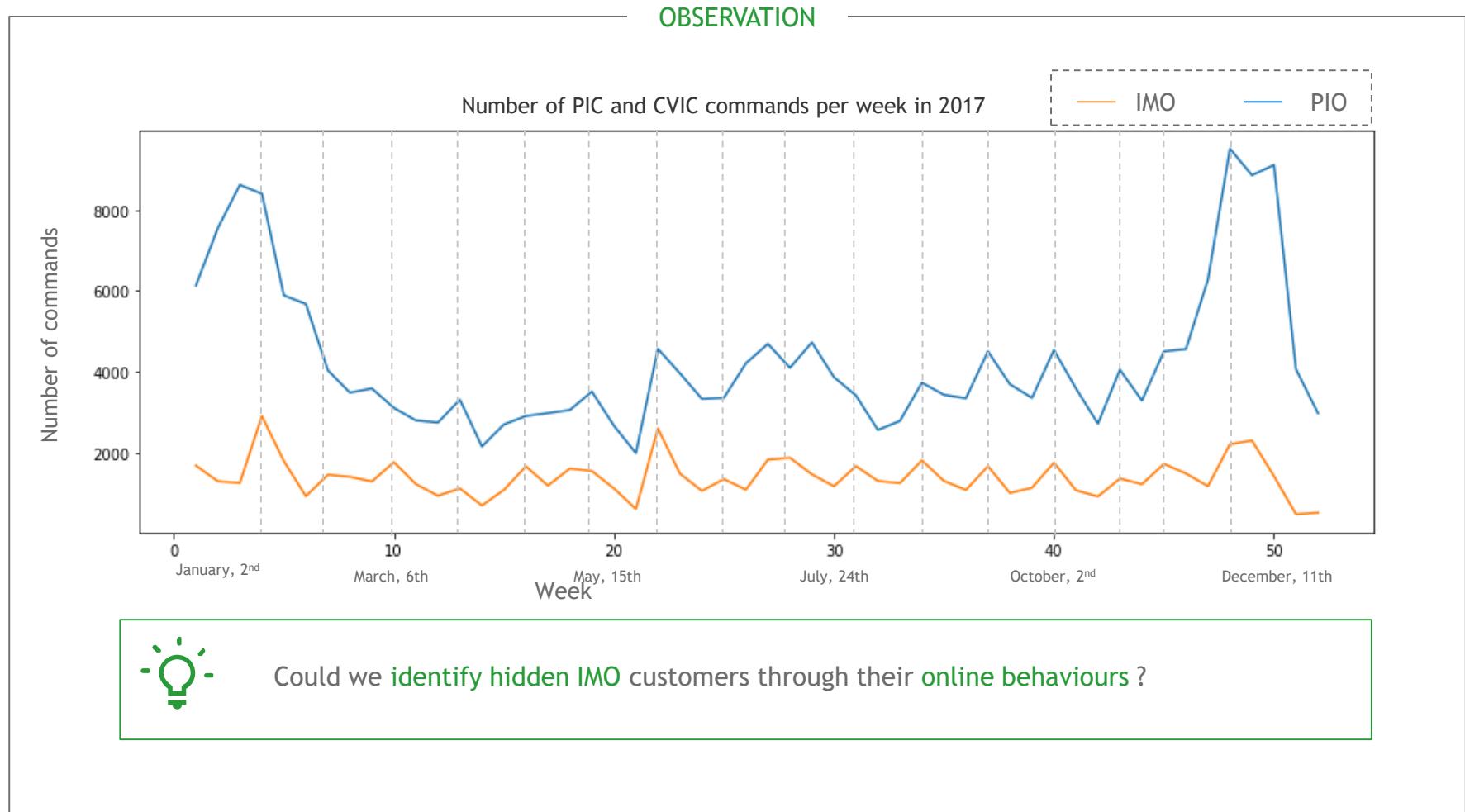
Our client is a **cross-channel player** in the **textile industry**. Originally selling by **catalogue** and over **the phone** it is now distributing through its own website and has a few dozens of stores



The conversion rate of the client's web site is a far above the average conversion rate in the industry whereas its web site doesn't even reach the standards, how is this possible ?



Identifying the IMO from the PIO is a key attribution problem that affects strategic budget decisions. The PIO commands curve seems to be related to the 17 yearly mail which would mean that some IMO are hidden among the PIO.



Define a new segmentation model and a coherent mailing program to each segment

ASSIGNMENTS



Analyse the web site performance from the web logs



Identify « internet mail order » from « pure internet order » using the web logs and the customers database



Define a new segmentation model

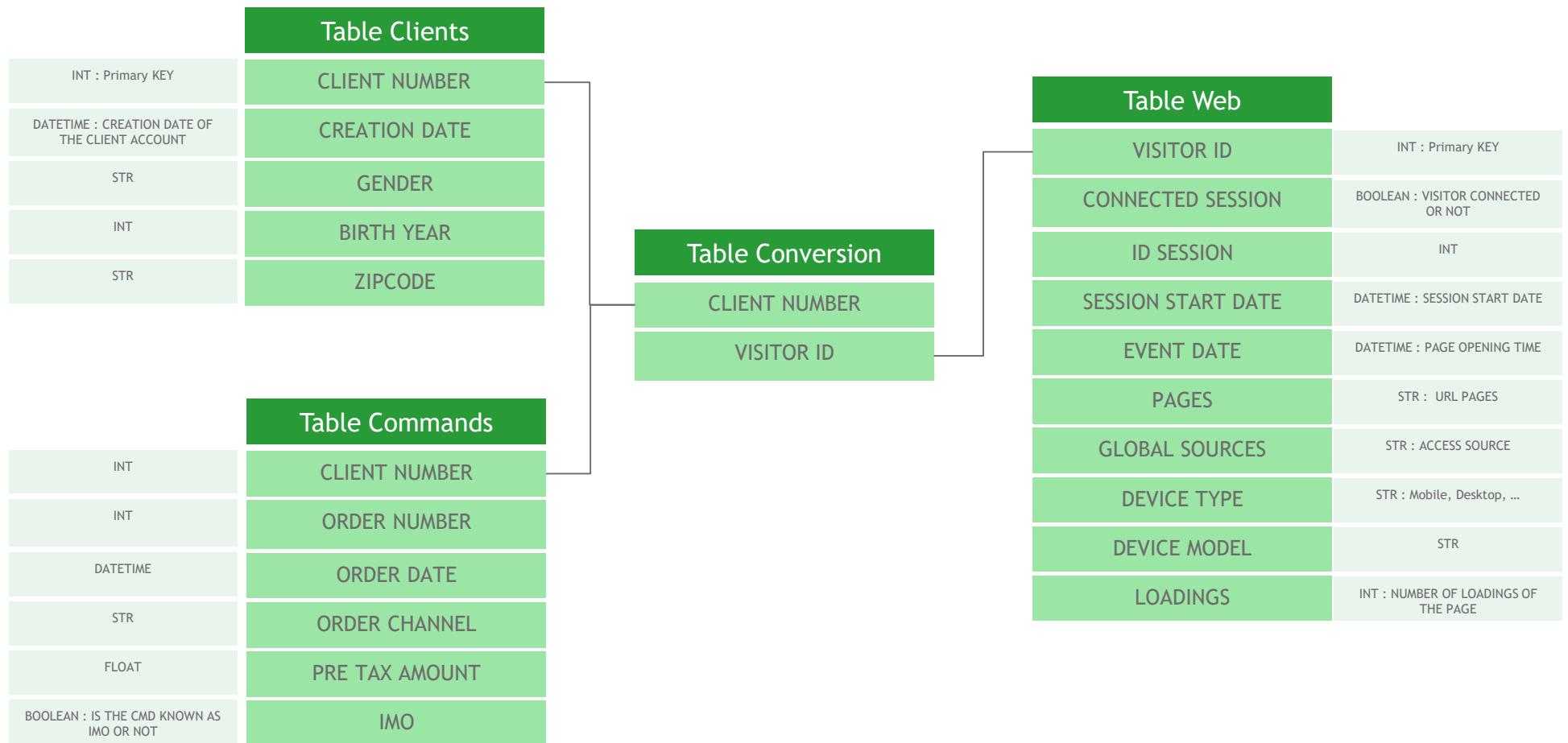


Analyse the impact of the new segmentation model on strategic budget decisions and propose changes to the marketing strategy

This project is a business oriented problem with no unique good solution.

ANNEXES - Super Case 3

Data model of provided data:



Feel free to enrich your analyses with Open Data !

Complementary information

Expected output

By the end of the week you are expected to deliver the following:

- Due Thursday 20th 8p.m.:** The file with your **code** (for this assignment we highly recommend using Python and/or R)
- Due Friday 21th:** A **PowerPoint presentation** of your work (including your experiment process, your train of thoughts, the hardships you had to overcome...)

PRESENTATION



CODE

```
# Set parameters of vehicles to consider for the selected customer
engine = create_engine('mysql://root:123456@192.168.1.244:3306/?parse=client')
query = 'select id, equipment_plant_number, vehicle_to_consider, startdate, enddate, log_date, log_data from `vehicle` where vehicle_to_consider like %s and `equipment_plant_number` = %s'
vehicle_to_consider = str(tuple(list(set(vehicle_to_consider[equipment_plant_number]))) )
if percent != 100:
    query = 'select id, equipment_plant_number, vehicle_to_consider, startdate, enddate, log_date, log_data from `vehicle` where vehicle_to_consider like %s and `equipment_plant_number` = %s and percent = %s'
    engine = create_engine('mysql://root:123456@192.168.1.244:3306/?parse=client')
    vehicle_to_consider = str(tuple(list(set(vehicle_to_consider[equipment_plant_number]))) )
    print("Vehicle to consider for the customer "+str(params["context_id"]))*
    print(str(vehicle_to_consider["equipment_plant_number"]))
    print(str(vehicle_to_consider["context_id"]))*
    print(str(vehicle_to_consider["equipment_plant_number"]))

# Import selected LOGS from HOD logs with INPUT = (vehicle_to_consider, startdate, enddate)
if percent == 100:
    engine = create_engine('mysql://root:123456@192.168.1.244:3306/?parse=client')
    query = 'select id, equipment_plant_number, vehicle_to_consider, startdate, enddate, log_date, log_data from `vehicle` where vehicle_to_consider like %s and `equipment_plant_number` = %s and percent = %s'
    drivers_data = pd.read_sql(query,query,params) # DataFrame with "id", "equipment_plant_number", "action", "date"
    drivers_data['action'] = drivers_data['action'].apply(lambda x: int(x))
    drivers_data = drivers_data[(drivers_data["equipment_plant_number"]>1)&(vehicle_to_consider["equipment_plant_number"]>1)]&&(drivers_data["date"]>startdate)&&(drivers_data["date"]<enddate)]
    drivers_data = drivers_data[(drivers_data["date"]>startdate)&&(drivers_data["date"]<enddate)]
    drivers_data['date'] = pd.to_datetime(drivers_data['date'])
    drivers_data['log_date'] = pd.to_datetime(drivers_data['log_date'])

    id_no_consider = str(tuple(list(set(drivers_data['driver_id']))))
    query = 'SELECT name ,consumption ,refill ,driver_name id = %s_to_consider'
    driver_name = pd.read_sql(query,query,params) # DataFrame with "name", "consumption", "refill", "driver_name"
    driver_name['id'] = str(vehicle_to_consider["equipment_plant_number"])
    print(driver_name)
    print(drivers_data["date"])
    print(drivers_data["log_date"])
    print(drivers_data["action"])
    print(drivers_data["vehicle_to_consider"])
    print(str(len(drivers_data["equipment_plant_number"])))
    print(str(len(drivers_data["log_date"])))
    print(str(len(drivers_data["date"])))
    print(str(len(drivers_data["consumption"])))
    print(str(len(drivers_data["refill"])))
    print(str(len(drivers_data["name"])))

    if params["id_log"] == "refill":
        df_refills["last_refill_date"] = df_refills["date"]
        df_refills["date"] = df_refills["date"][-1]
        df_refills["vehicle_to_consider"] = v
        df_refills["consumption"] = c
        df_refills["refill"] = r

        for i in range(1, len(df_refills)):
            dt_refills.loc[i-1] = df_refills.loc[i-1]-df_refills.loc[i-1].date
            diff = dt_refills.loc[i-1].date - df_refills.loc[i-1].last_refill_date
            days, seconds = diff.days, diff.seconds
            if refills.loc[i-1].date >= date + days * 24 + seconds / 86400
                df_refills["hours"] = min(df_refills.loc[i,"hours"],df_refills.loc[i-1,"hours_between"])
```

Download instructions & submission process

How to download datasets ?

You can download datasets and instructions at the following links:

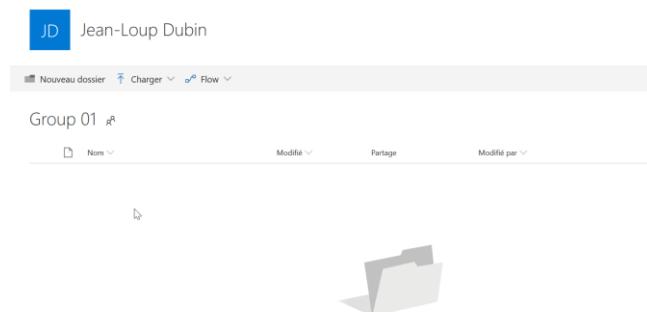
- Supercase #1: [Optimizer \(Image recognition\)](#)
- Supercase #2: [Crypto Currency \(NLP\)](#)
- Supercase #3: [E-commerce \(Classification\)](#)

To download files, select it and then click on “Download”:



How to submit your works ?

Each group will receive a link to a DropZone to submit their assignment (Presentation + Code)



Notes:

- You can organize your DropZone folder as you wish.
- To upload file, just click and drop files in the DropZone.
- You can't delete files, but you can replace it as many times as you like.