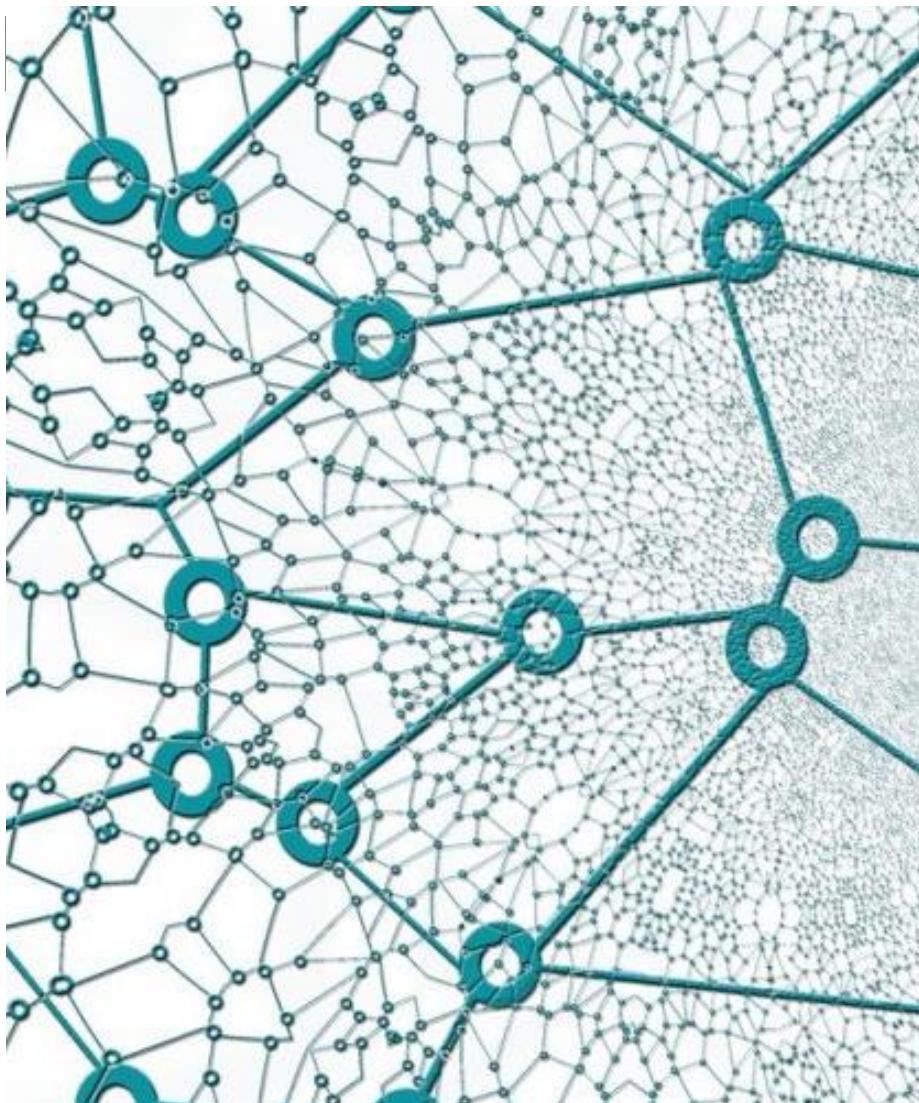


eleven
strategy consultants



CentraleSupélec

eleven data factory is the data arm of eleven, the Europe's first ever **sector specialist strategy firm** specifically founded to address the **challenges of the digital revolution**



- **eleven** is a **strategy consulting firm born digital** and working for clients exclusively on C-level digital related matters
- Our professional commitment is underpinned by a **set of core values**: intellectual honesty, enthusiasm, exacting standards, excellence
- We were **founded in Paris in 2008** and have scaled through double digit annual growth to **over 50 consultants**
- Our team consists of **digital native senior consultants and data scientists** graduated from the most relevant international engineering and business schools who cut their professional teeth in tech startups and highly selective doctoral schools
- **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...
- Topics and assets, we intervene on cut **across all industry sectors** including inherently brick and mortar ones where we identify **growth opportunities through digitalization**
- Having developed an undisputed expertise of **digital issues** on several key **industry sectors**, **eleven** is considered as the first strategy firm positioned as a **digital sector specialist** in Europe

eleven has developed four complementary offers to address the full spectrum of strategic topics around digitalization and disruption, serving clients across several key industries

ELEVEN'S FOUR OFFERS

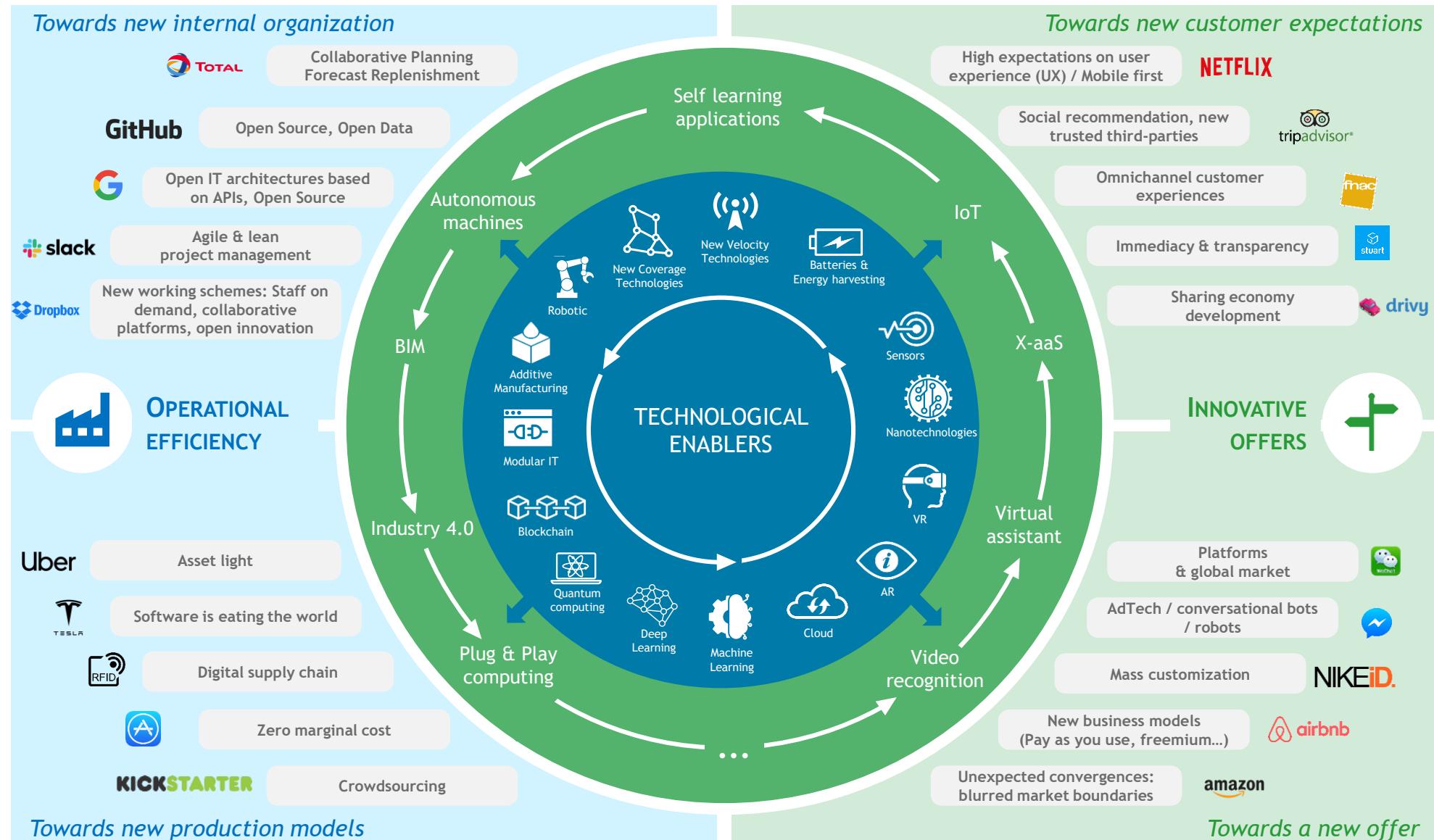


KEY QUESTIONS ADDRESSED BY ELEVEN'S FOUR OFFERS

- | | | | |
|---|---|---|---|
| <ul style="list-style-type: none">➤ How does digital disrupt my industry and business?➤ To what extent am I prepared to take advantage of this?➤ What moves should I make to thrive? | <ul style="list-style-type: none">➤ Which digital bets should I make?➤ How can I develop proofs of concept to gain buy-in?➤ How can I scale proven concepts into a new business? | <ul style="list-style-type: none">➤ How can data science and A.I. be most relevant to my business?➤ What A.I. disruptions can I expect?➤ How should I respond? | <ul style="list-style-type: none">➤ Is my digital-enabled target attractive?➤ How can I drive digital-enabled value from my asset?➤ What equity story can I tell?➤ How best to position my asset for exit? |
|---|---|---|---|

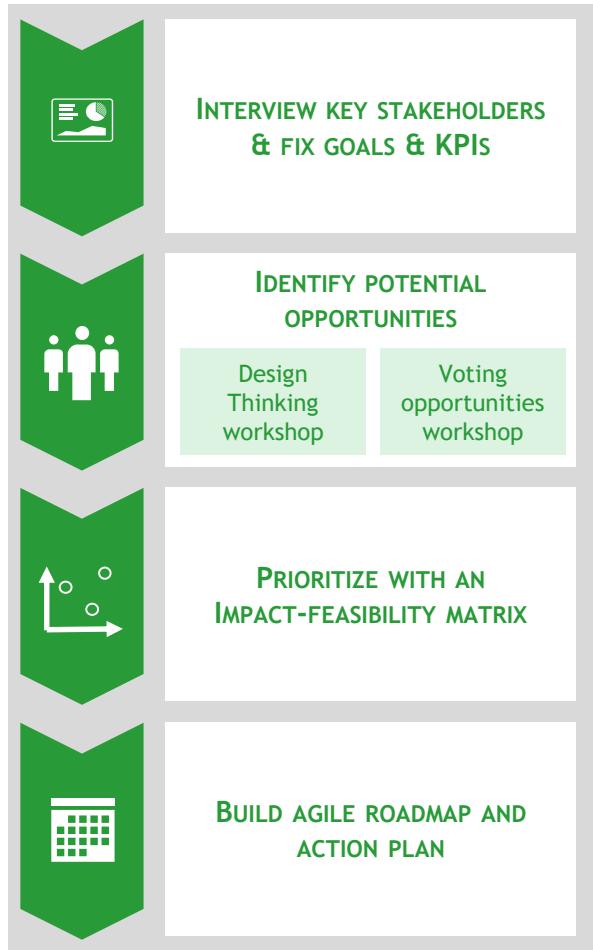


Our projects are built around ongoing major disruptions, including **new modes of production, consumption and collaboration**, which represent major challenges for existing players



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

DEFINITION OF THE DIGITAL STRATEGY AND ASSOCIATED ROADMAP, TEAM BUY-IN, AND PROJECT LAUNCH



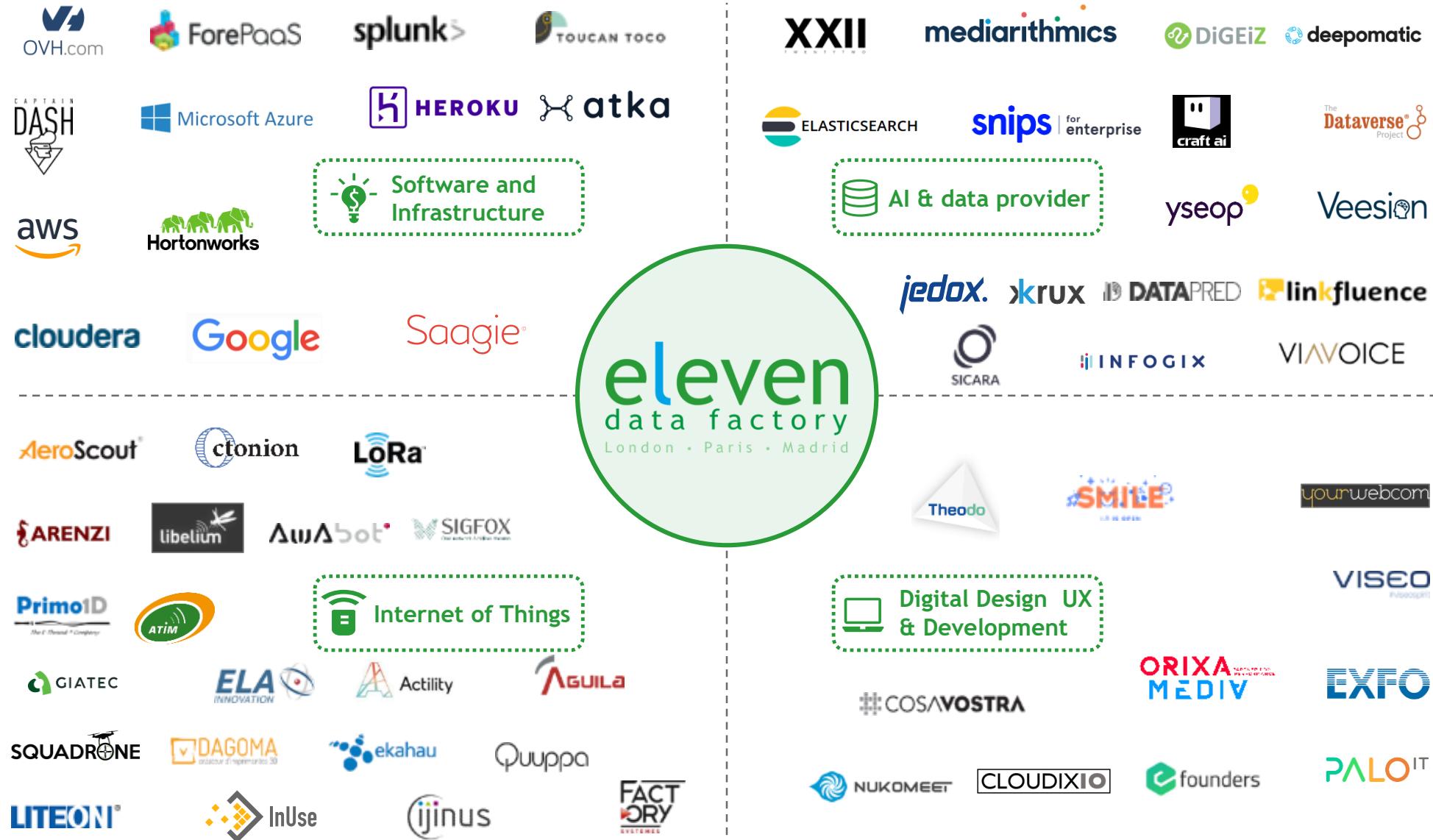
AN “END-TO-END” APPROACH CARRIED BY MANAGERS, ACTING AS INTRAPRENEURS ON EVERY PROJECT

ACCELERATED AND SUSTAINABLE TRANSFORMATION OF THE COMPANY

PROJECT COMPLETION: CONCRETIZATION OF THE “DIGITAL FOOTPRINT” OF THE COMPANY



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



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



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



CHRISTOPHER RISCHARD

- After 10 years in the United States selling internet solutions, Christopher spent 8 years at Booz&Co in Paris and later as a Principal in Madrid, focusing on digitalization strategy in EMEA. Based in London since 2014, Christopher continues to deliver commercial due diligence and disruptive digital strategy work across industries with an emphasis on private equity clients.
- Academics: ESSEC Paris, INSEAD MBA



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

Our data scientist consultants combine both unique technical and functional skills shaping the backbone of eleven unique **strategy-driven data science**



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 and industrialization

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



Strategy

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



Transformation

*eleven's consultants are able to adapt to various stakeholders 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***



In addition, eleven leverages its R&D and academic efforts to constantly keep an edge in terms of AI technologies

Several eleven consultants hold PhD and are active in data science R&D



Pietro,
Case Team Leader Data Scientist



MSc Mathematical
engineer
Politecnico di Milano



PhD
CentraleSupélec



Daniel,
Manager Data Scientist



MSc Applied math
Ecole Polytechnique

PhD - Computer Science
UPMC

Post PhD - Data Science
Paris XIII

Examples of R&D projects undertaken



Predictive
meta-models



Self-learning
algorithms



In-door
geo-localization



Computer vision



Attrition models based on neural networks

Selection of Eleven's open initiatives

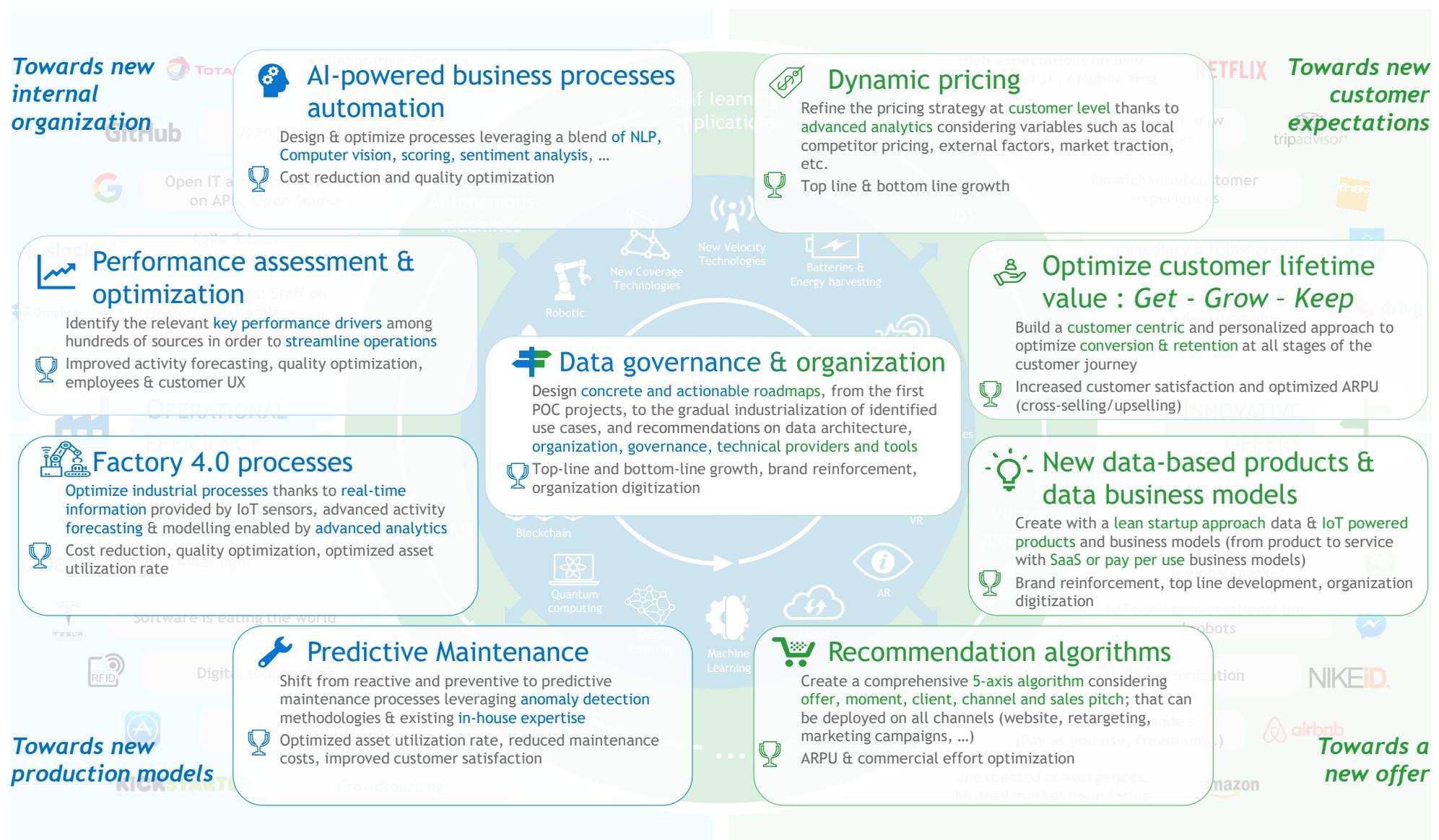


Animation of round table discussion on AI
research with Cedric Villani

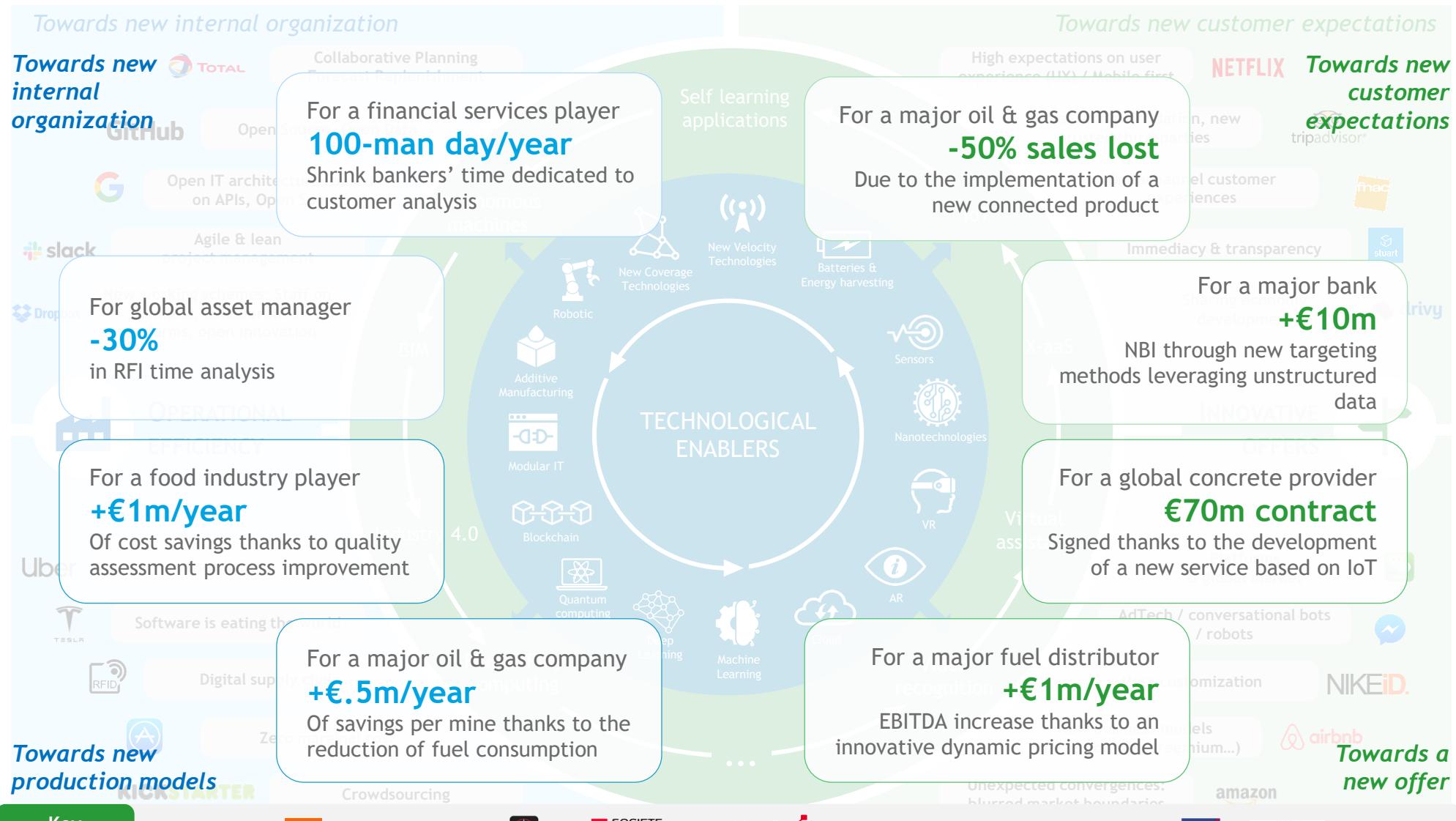


Construction of global CEO ranking
for Harvard Business Review

eleven data factory covers **all disruptions** brought by the **data revolution** from customer expectation to internal production models and organization



Our unique **strategy-driven data methodology** ensures end-to-end **KPIs monitoring** and **financial impact achievement**



Our three complementary offers address the full spectrum of data-related needs from the strategy to use case industrialization

KEY QUESTIONS ADDRESSED BY ELEVEN'S EXPERTISE



Data strategy



Agile use case implementation



Industrialization

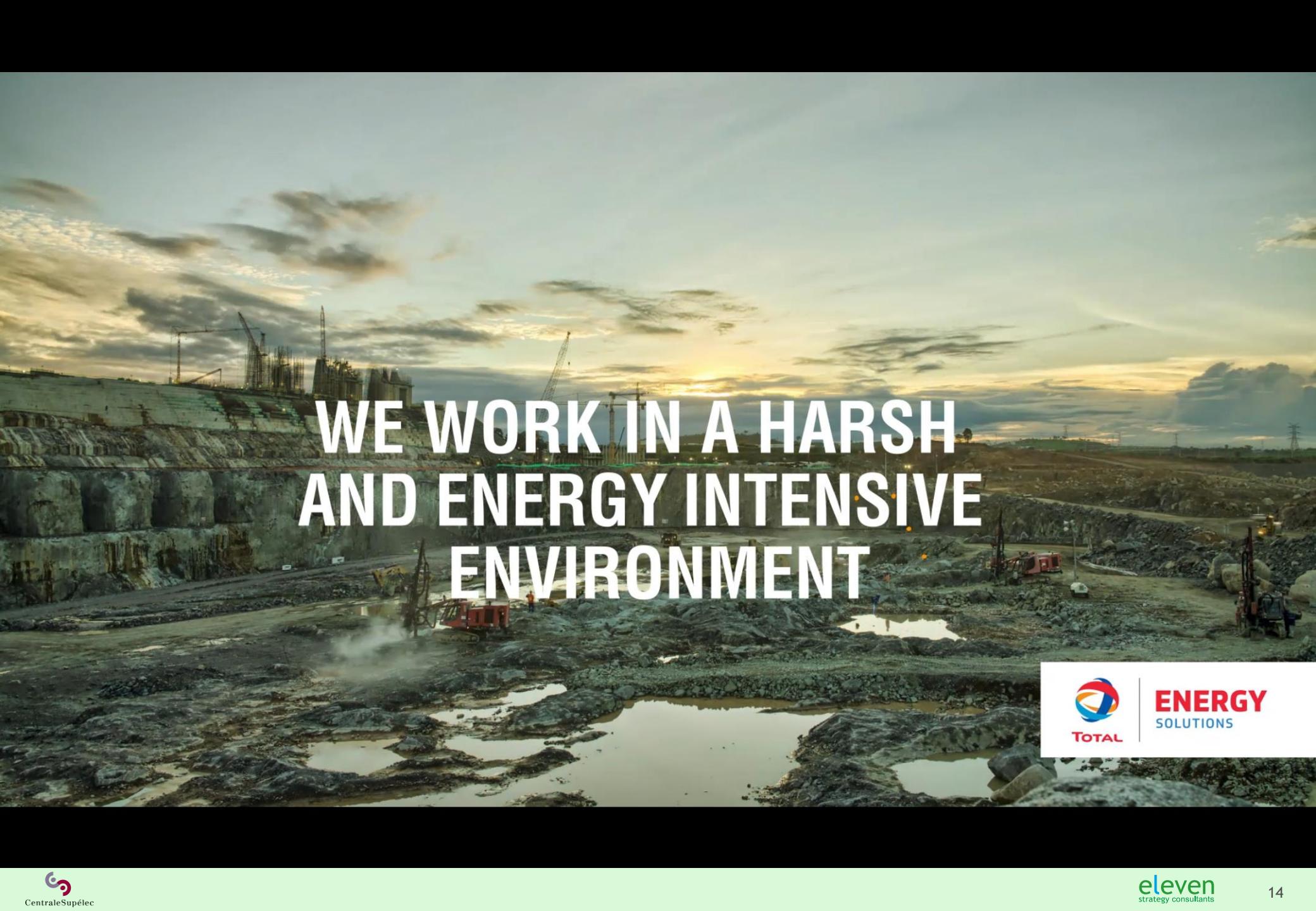
- What A.I. disruptions can I expect?
- How does data disrupt my industry and business?
- To what extent am I prepared to take advantage of this?
- What moves should I make to thrive?
- How can I identify relevant A.I. use cases?
-

- How can I speed up my use case built & test phase?
- How can I assess and proof the impact of my use cases?
- How can I leverage state-of-the-art data methods to improve my business?
- What are the most relevant technologies to achieve the identified goals?

- How can I scale proven concepts into a new business?
- How can I industrialize them?
- What is the most relevant technological stack that should I used?
- What organization and data governance should I set up?

Supercase 1: Optimizer Image Recognition





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

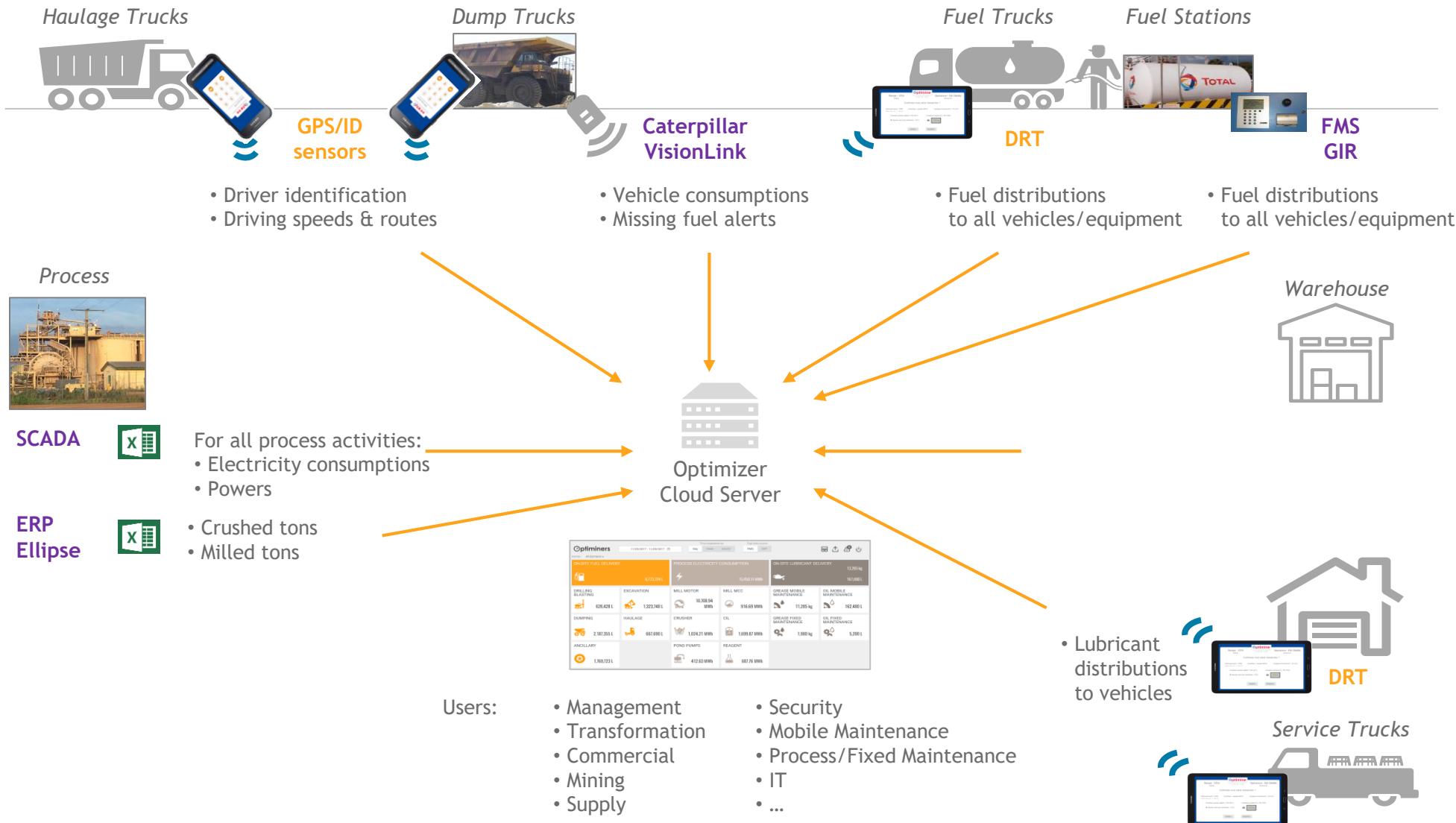


**ENERGY
SOLUTIONS**

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**



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

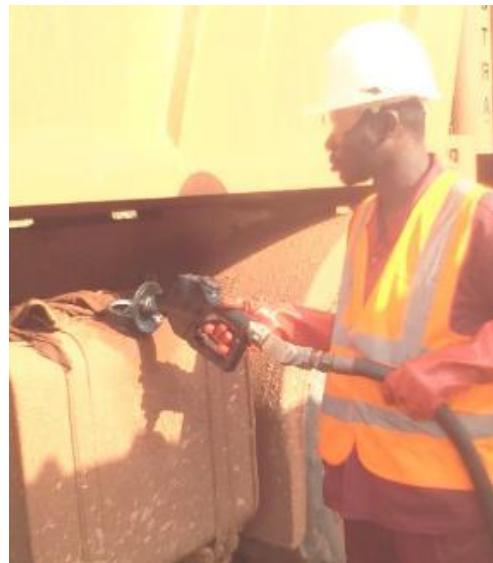
1

Photo of the pump display before fuel transaction



2

Fuel transaction



3

Photo of the pump display after fuel transaction



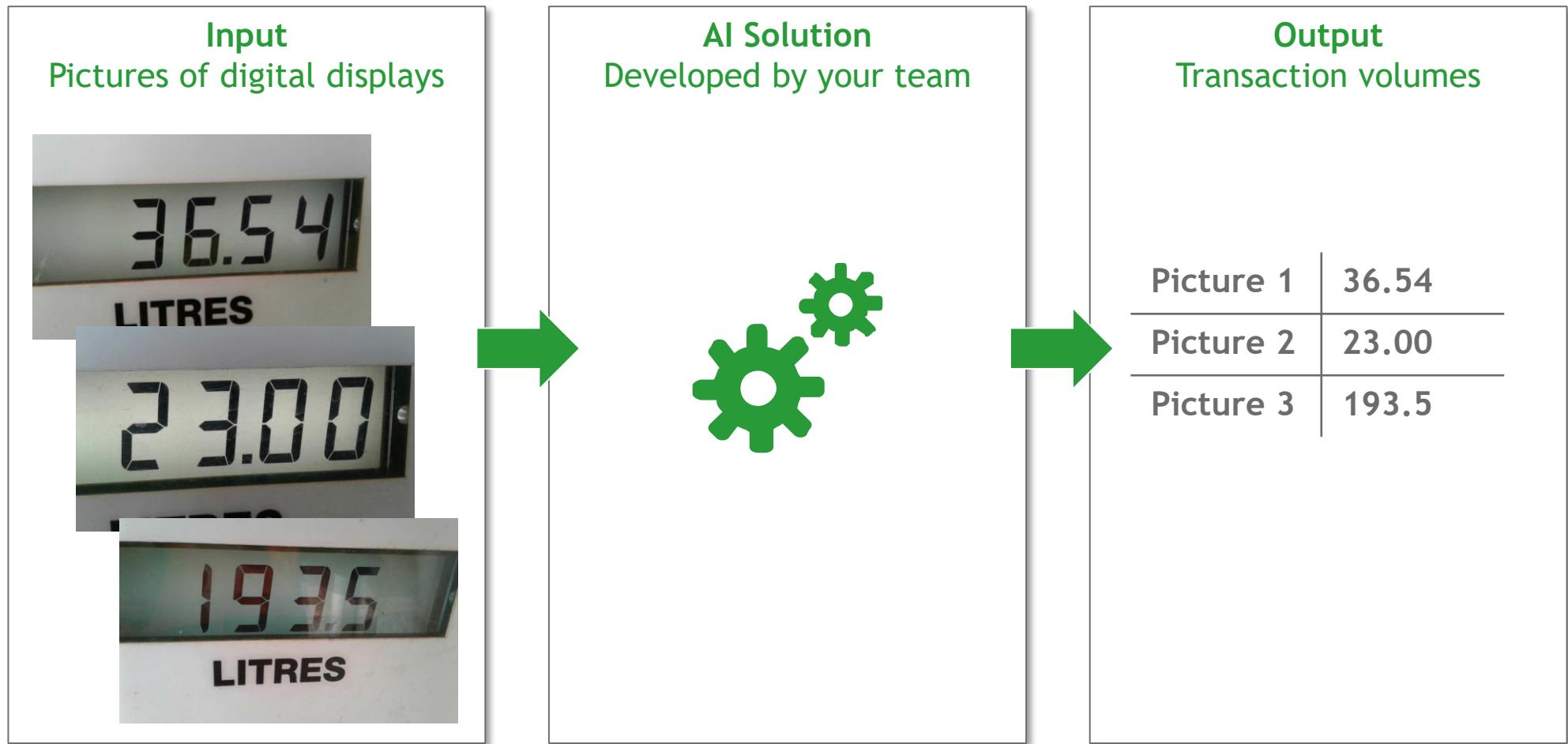
Picture #1: Display before transaction

Optimizer
Cloud Server



Picture #2: Display after transaction

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



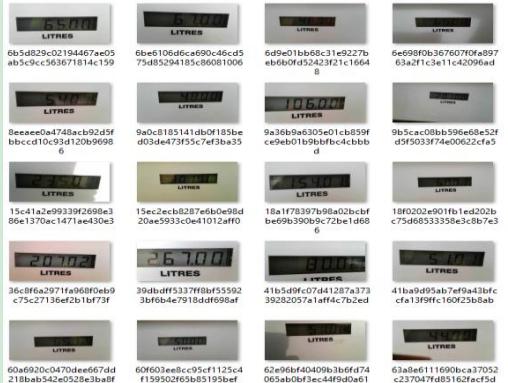
Analog displays



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

Digital Numbers

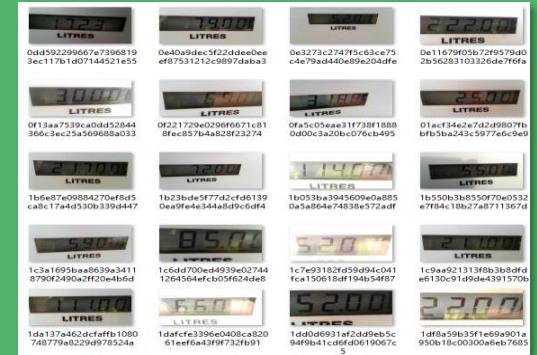
High quality pictures
Nb : 240



Medium quality pictures
Nb : 250

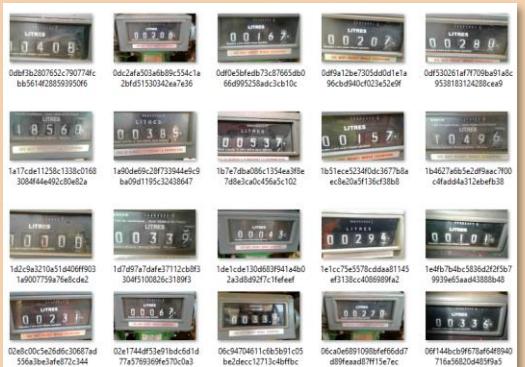


Low quality pictures
Nb : 360



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	5232b54dc19f64026dde07b3d3f3b7b868162352.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: NLP for cryptocurrency predictive model



+ 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

0

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.

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.

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

LesEchos

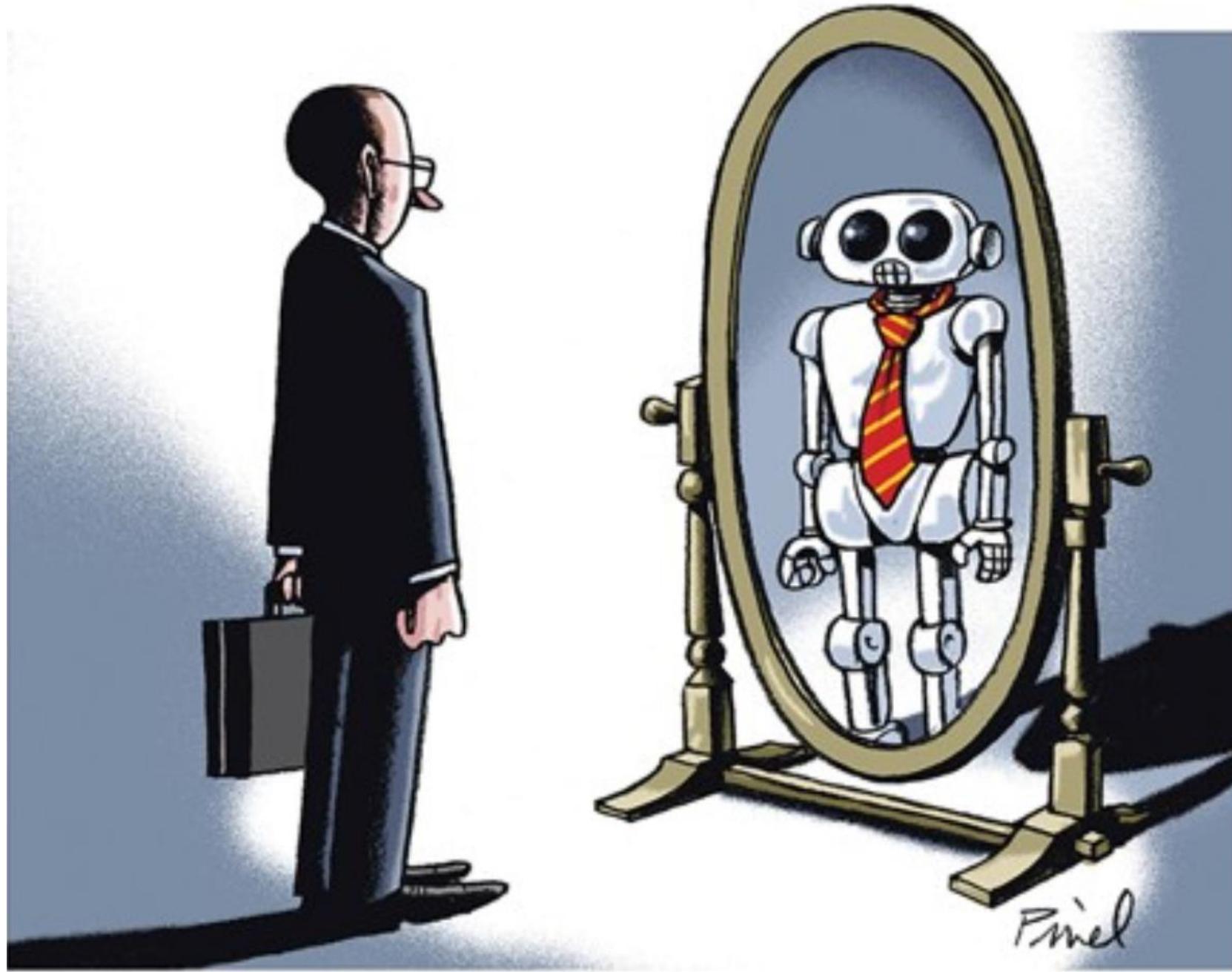
DOSSIER :

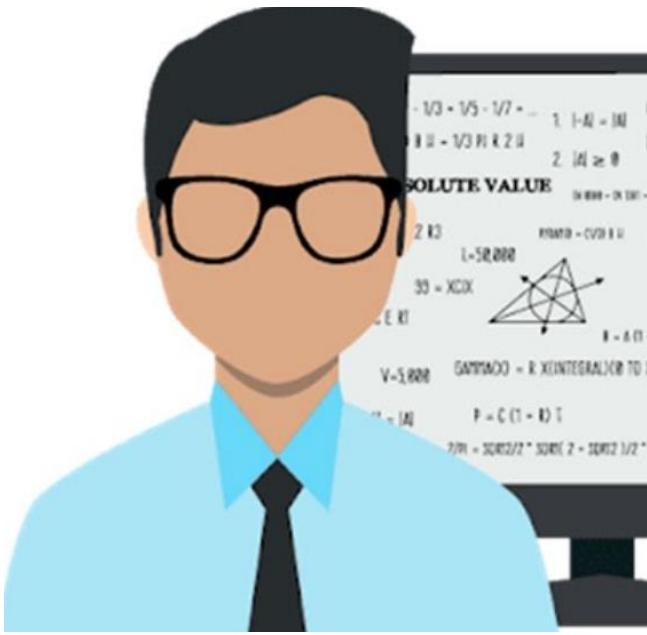
Energie :
 sur les chemins de la transition



Pour retrouver tous les détails de ce dossier

CLIQUEZ ICI





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

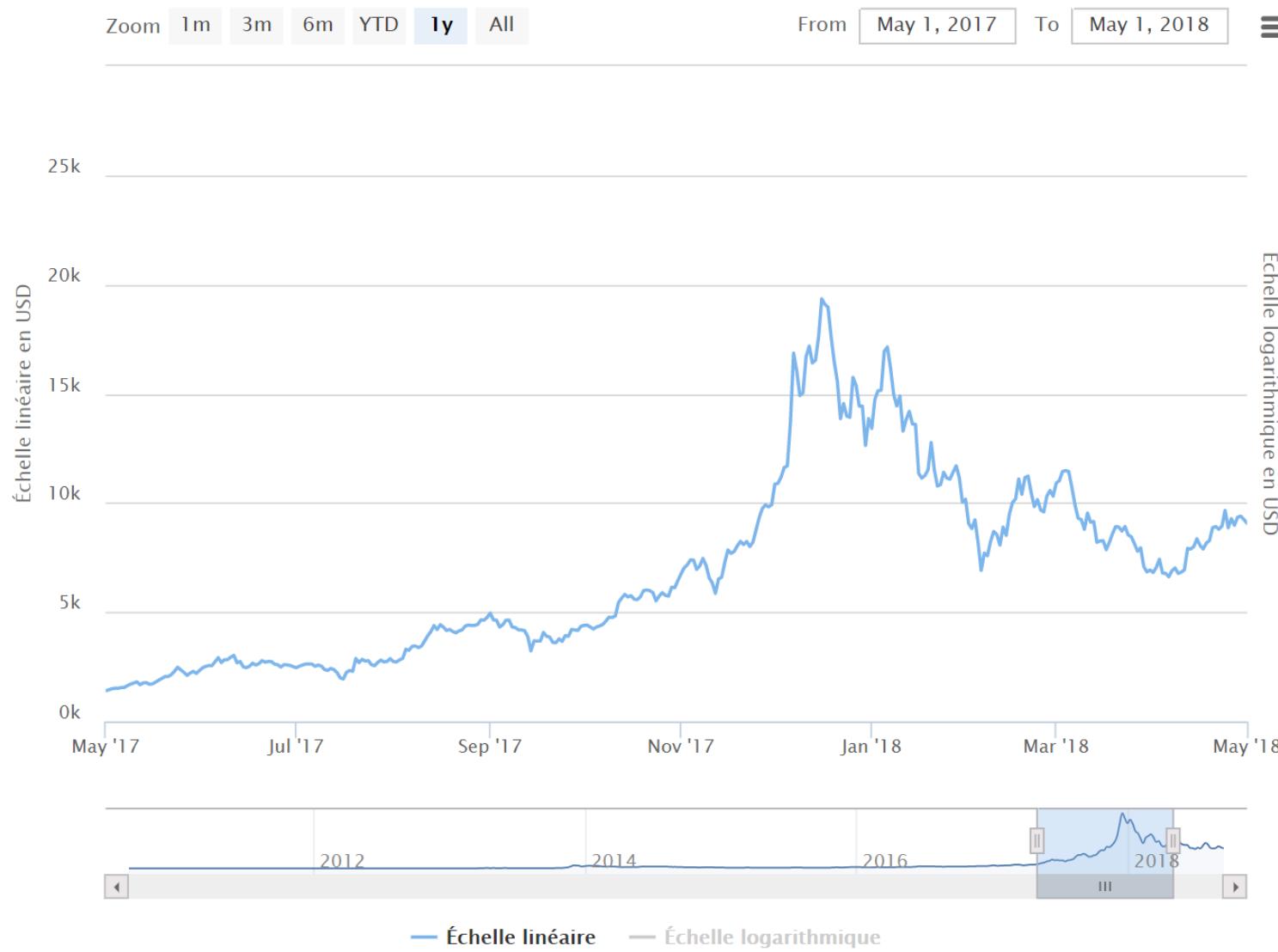
if __name__ == '__main__':
    if len(sys.argv) < 2:
        sys.exit("expected arguments: bbn-decoder-args tf_model_file")

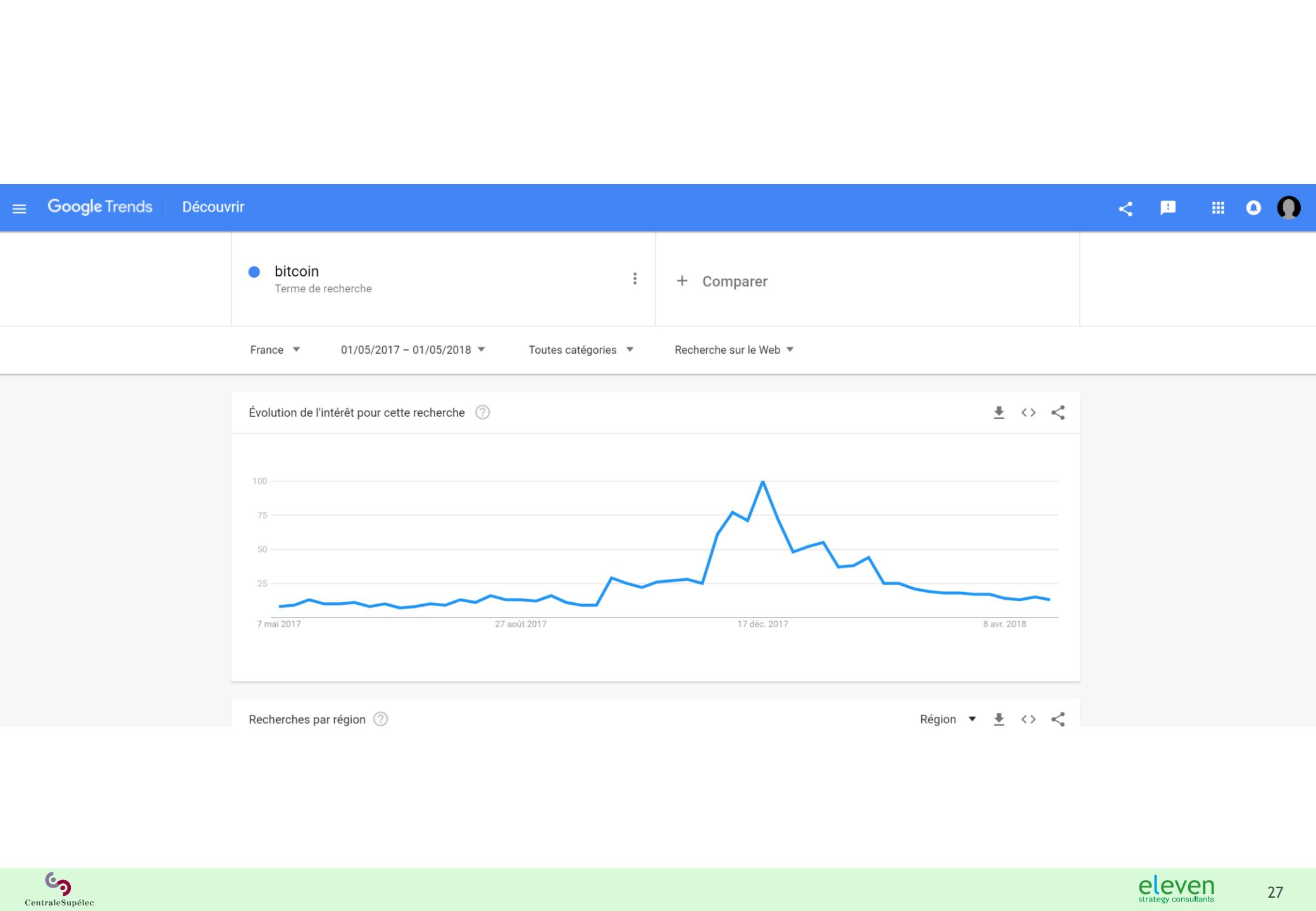
    tf_model_file = sys.argv.pop()
    tf_model_op = tf_wp.load_model(tf_model_file)
    decoder = PySageDecoder()
    decoder.setup(sys.argv)

    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



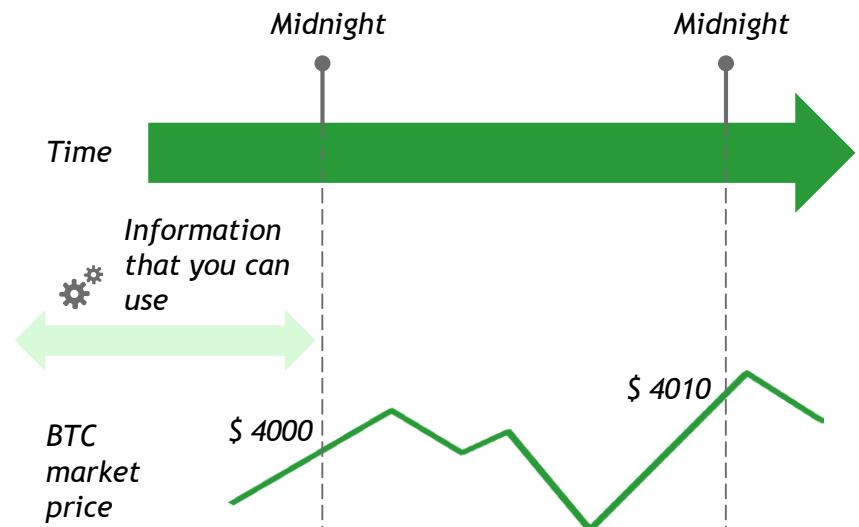
CONTEXT

- 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**
- You will have to predict this from **May 1st 2017** to **May 1st 2018**



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



How this is going to work

TASK

DESCRIPTION

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

2

Binary outcome
Model building

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

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)

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">• ?

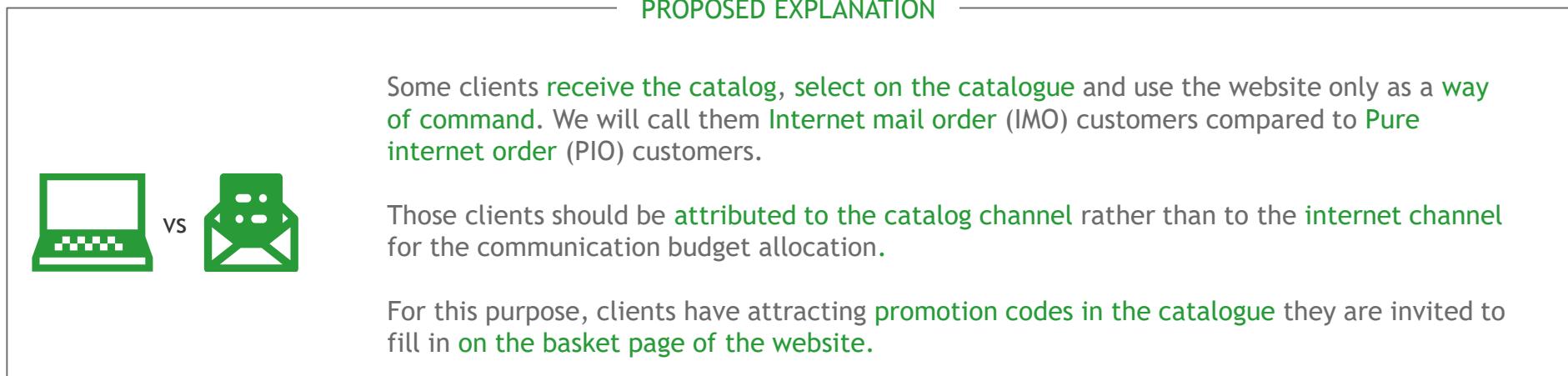
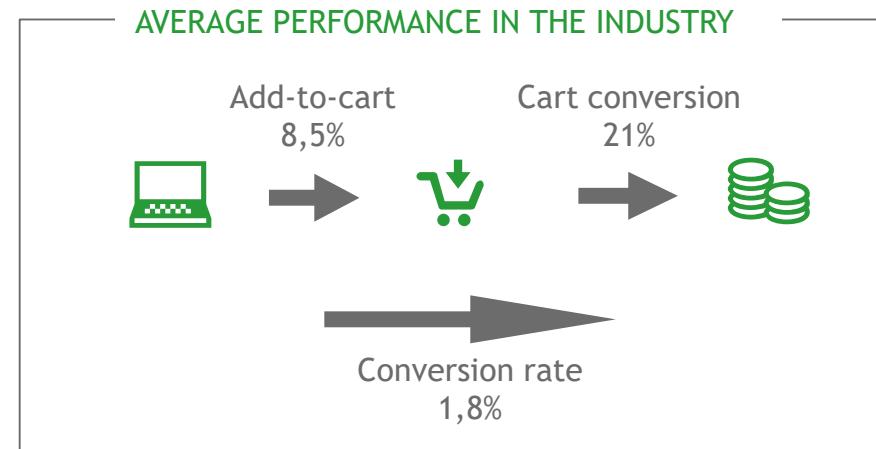
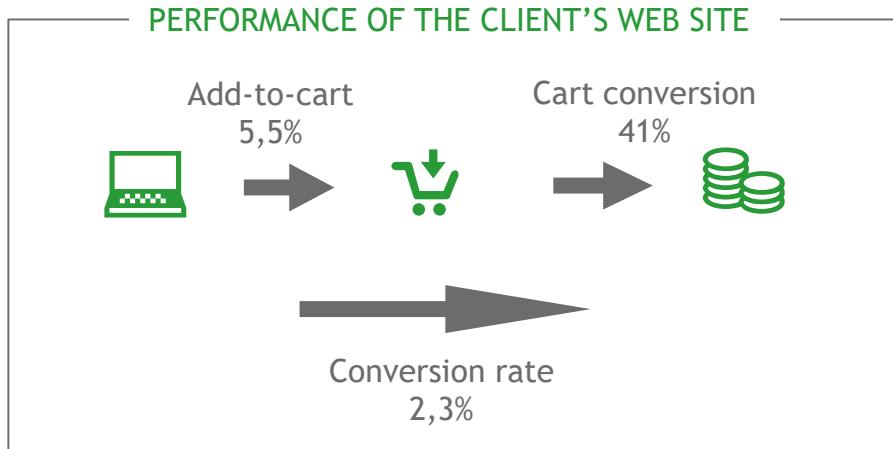
Supercase 3: Cross-channel attribution & *Client segmentation*



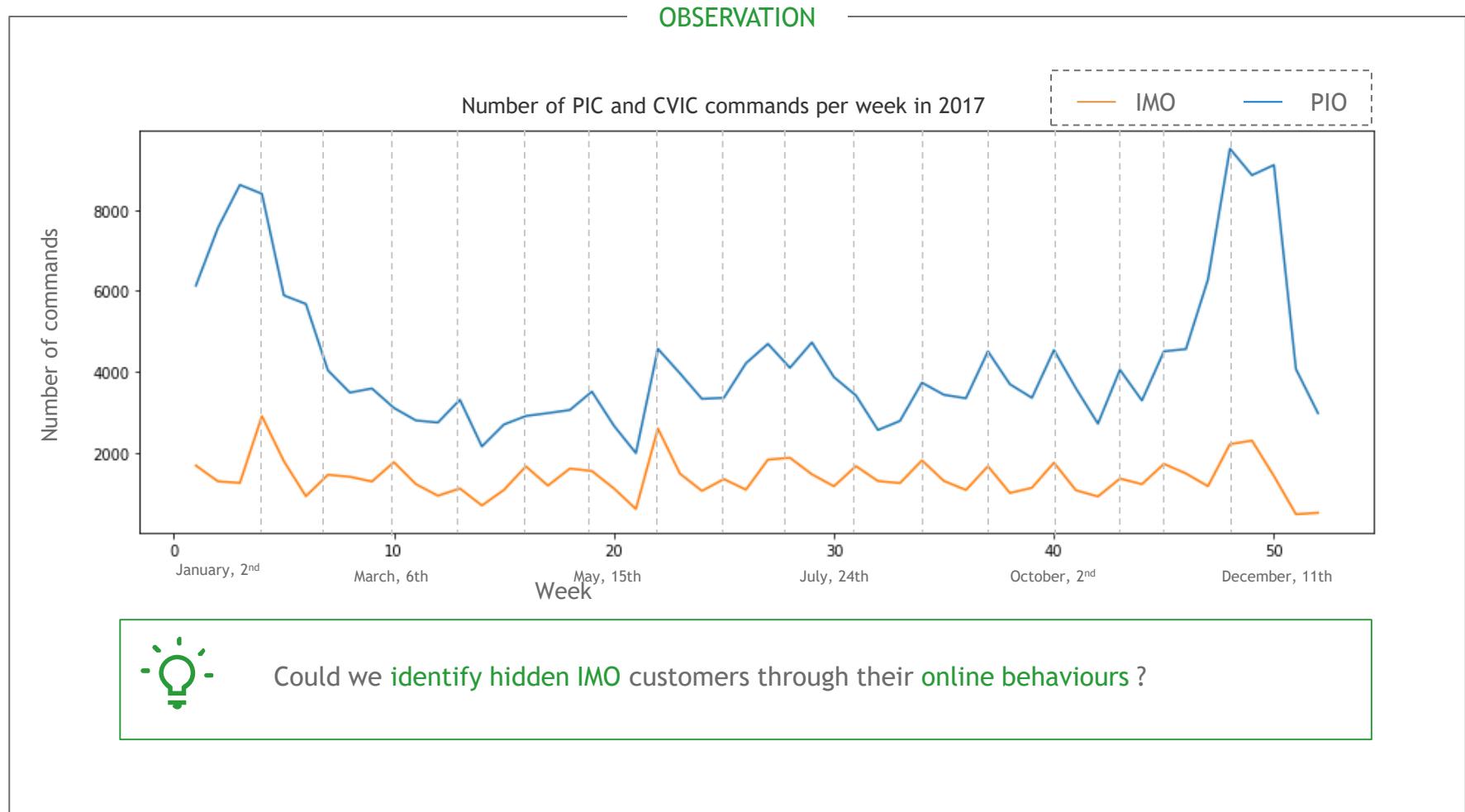
Our client is a **cross-channel player** in the **textile industry**. Originally selling by **catalogue** and over **the phone** it is now distributing through its own website and has a few dozens of stores



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



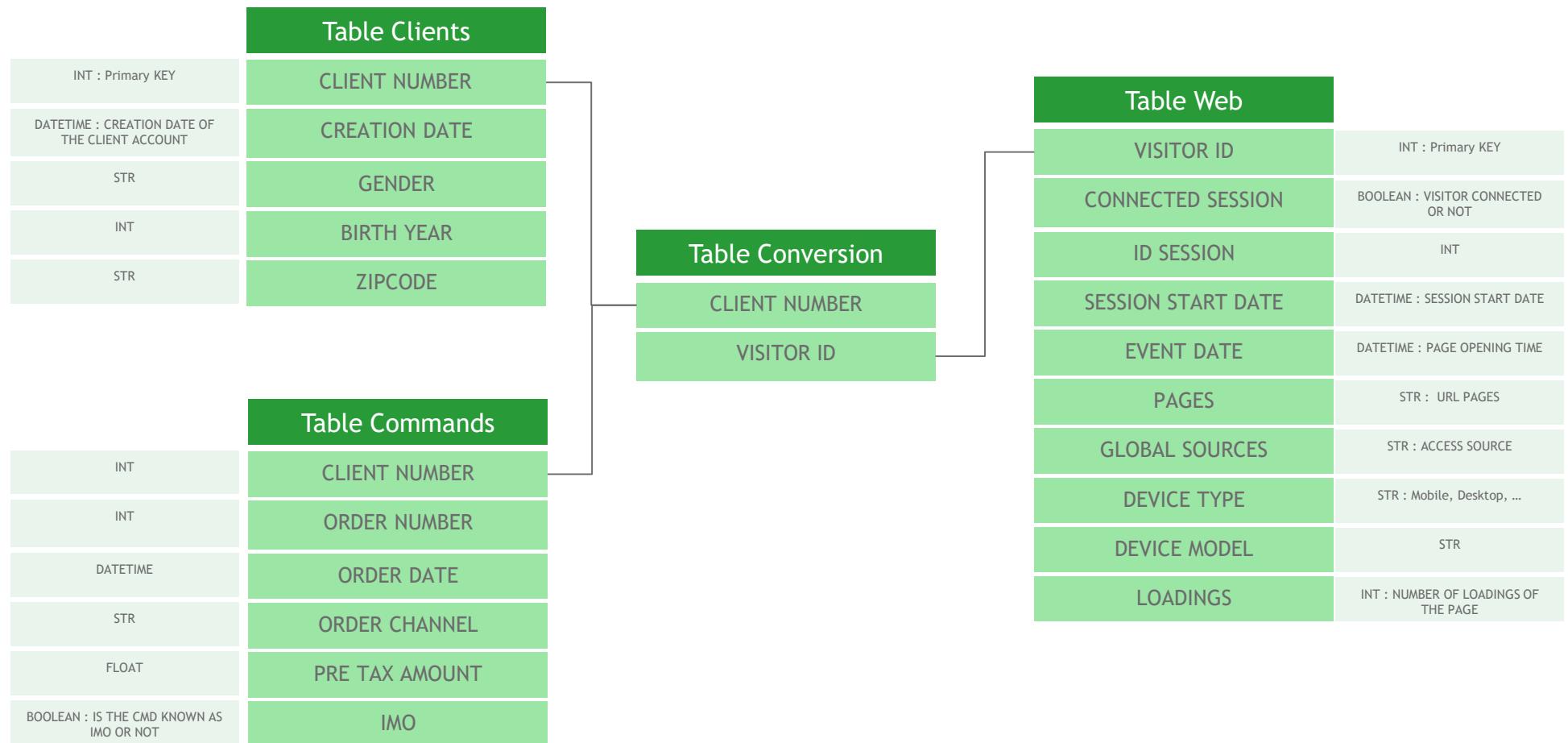
Analyse the impact of the new segmentation model on strategic budget decisions and propose changes to the marketing strategy



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

Planning of the week:

	<i>When?</i>	<i>What?</i>	<i>Where?</i>
1	Monday 25th	9h45-12h 14h-17h	Introduction of the modalities of the challenge and of cases Group work
2	Tuesday 26th	All day	Class day
3	Wednesday 27th	All day	Autonomous group work
4	Thursday 28th	9h-12h 14h-17h	Group work Autonomous group work
5	Friday 29th	9h-12h 12h30-15h30 15h45-17h30 17h30-19h	Final pitch preparation Final presentations by group in front of the jury Winner groups' presentation in front of other groups Cocktail

The Slack workplace:

For this challenge, we opened a **Slack workplace** for you to ask your questions when eleven consultants are not on campus

On this workplace, you will find four channels:

- 1) **general-information**: for all questions and information related to the organization of the challenge
- 2) **optimine_case**: for all questions specifically related to the Optimine case
- 3) **e-commerce_case**: for all questions specifically related to the E-commerce case
- 4) **cryptocurrency_case**: for all questions specifically related to the crypto currency case

Additional information may also be pinned in these channels (schedules, classroom numbers, etc.)

Please use the right channel to ensure fluidity of the interactions

Before asking something, also make sure that the requested information has not been given already ;)



You should have been invited by mail to join the workplace

If not, please come see us at the end of this session

Link to access the workplace:

<https://datacaseschal-xol2426.slack.com/messages/CH03C9W4W/>

You may download the slack application on your device or access it via your usual browser

Expected output:

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

- **Due Thursday 28th 8p.m.:** The file with your **code** (for this assignment we highly recommend using Python and/or R)
 - **Due Friday 29th:** A **PowerPoint presentation** of your work (including your experiment process, your train of thoughts, the hardships you had to overcome...)

PRESENTATION



CODE

Final presentation details and best practices:

On Friday 29th, you will have to present your work in front of a **jury** during a **closed-door session**

The modalities of the presentation will be as follow:

- **12min group pitch** based on a PowerPoint presentation (this presentation may be slightly different than the one sent)
- **~8min Q&A session** with the jury
- **~5min debrief** from the jury

For each supercase, a winner will be announced. The three winner groups will then **present their work to the other students** (same modalities with questions from the students)



The presentation must be **as professional as possible**. Here are some advices and best practices that may be useful:



- **Structure your presentation:** start by stating the problem that you want to solve, then present the way you tackled it, and finally describe your solution. The “story” of the presentation should be natural and easy to follow
- **Be concise and precise:** focus on the most important messages, as you only have 12 minutes to present the work achieved for the entire week. You should limit the number of slides you present (you can still add appendices if needed)
- **Be organized as a team:** split up the speaking time between the team members beforehand to make it smoother
- **Be honest:** tell where you encountered issues or challenges
- **C-suite level:** you should convince both the CEO and the CTO/CDO of the company

Download instructions & submission process:

How to download datasets ?

You can download datasets and instructions at the following links:

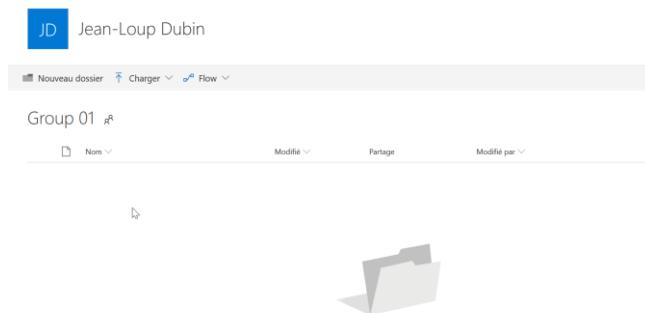
- Supercase #1: [Optimizer \(Image recognition\)](#)
- Supercase #3: [E-commerce \(Classification\)](#)

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

The screenshot shows a Microsoft OneDrive interface. At the top, there's a navigation bar with 'Office 365', a user icon 'JD Jean-Loup Dubin', and a 'Collaborateur invité' button. Below the navigation bar, a 'Télécharger' (Download) button is highlighted with a cursor. The main area displays a file named 'Supercase 3 - Classification'. The file details are shown below the name: 'Nom' (Name) is 'Supercase 3 - Classification', 'Modifié' (Modified) is '7 septembre' (September 7), 'Partage' (Sharing) is 'Partagé' (Shared), and 'Modifié par' (Modified by) is 'Jean-Loup Dubin'. There are also icons for 'Ajouter' (Add) and 'Supprimer' (Delete).

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.

Evaluation criteria:

Although different in their essence, all supercases will be graded based on **similar criteria**:

1. The **engagement** of the team during the week (how far you've gone, how autonomous you have been, etc.)
2. The **creativity** and **relevance** of the **methodology** (i.e. scientific approach) you choose regarding the problem you have to solve and the data you had
3. The **performance** of your model
4. The explanation of your **technical choices** and your ability to present them in non-technical terms
5. The critical **business views** on your **current results**, and the **next steps** you could consider to improve them
6. The **quality of your final presentation**: how professional it looks (**slide quality**), how clear and complete it is (**storytelling**), how pertinent your answers are, etc.
7. Your **relative overall performance** compared to other groups



Please note that all groups will be graded at the end of the week

Final advices:

You have a lot of work to do during the week, hence you should **be as organized as possible**:



- **Manage your time:** split up the tasks at the beginning of the week between the team members (e.g. one person dedicated to data scrapping, another dedicated to setting up the model, etc.)
- **Do not underestimate the workload**
- **Diversify to reduce risk:** (performance vs feasibility)
- **Set up regular group meetings** to share your work, so that you can adjust the workload depending on your advancements
- Do not hesitate to **ask questions if necessary**, but make sure to go around all possibilities before (you are here to learn, not for the grade)
- **Save time to prepare the PowerPoint document and the final presentation:** this is the only thing clients will see and will act as the showcase of your work

Have fun! This is the best way to submit a work of great quality

Any questions?



Thank you and good luck!

Reminder: **eleven** consultants will stay here from 2pm to 5pm today to answer your questions