Data Science Projects For Business

Part 1: Finding an AI topic

Presented by **Morgan Gautherot**

Introduction to AI

Part 1: Finding an AI topic

Introducing Bob

BOB

Objective:

Integrating an AI project into your company

Problem:

He knows nothing about AI

Solution:

I'm here to help

Breakthrough technology

- The computer
- The Internet
- The mobile
- Artificial intelligence

"It's better to take change by the hand before it grabs you by the throat".
Winston Churchill

Make your business more efficient

Improve all your procedures.

It affects all your activities:

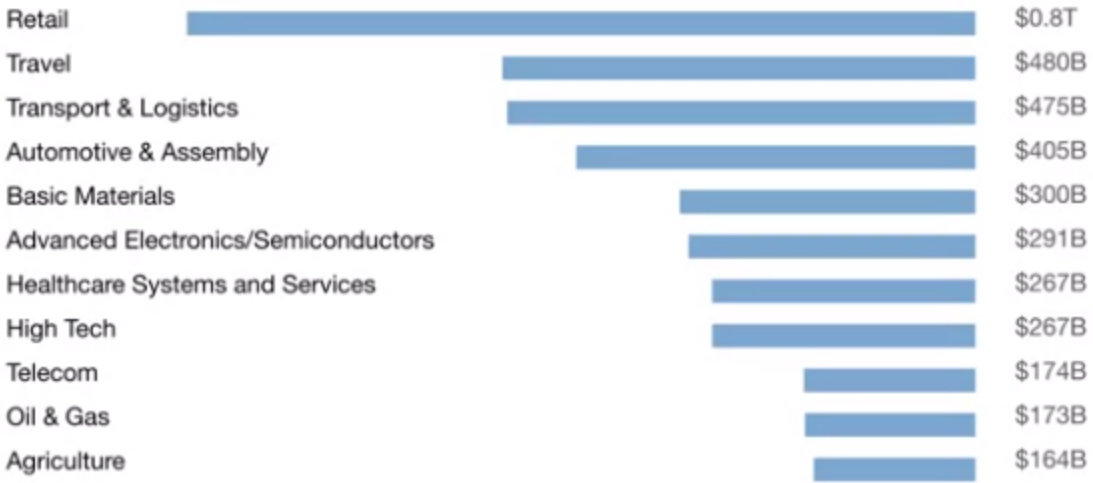
- Purchasing,
- Human resources,
- Distributions,
- Productions,
- ...

Digitalization at the service of AI

Paper mail	Email
Reception information	The opening Clicks Reading time Percentage of email read ...

Impact of AI

- Value creation through AI by 2030

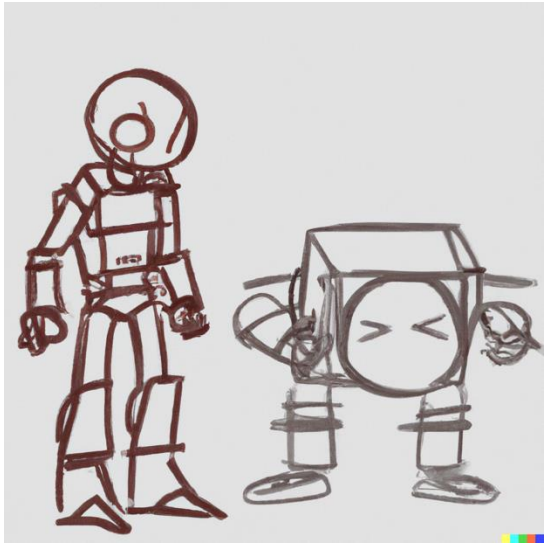


13 trillion dollars

McKinsey Institute

AI in a nutshell

Domain that enables computers to copy human behavior



Artificial Intelligence VS General Artificial Intelligence

Artificial Narrow Intelligence

Cat

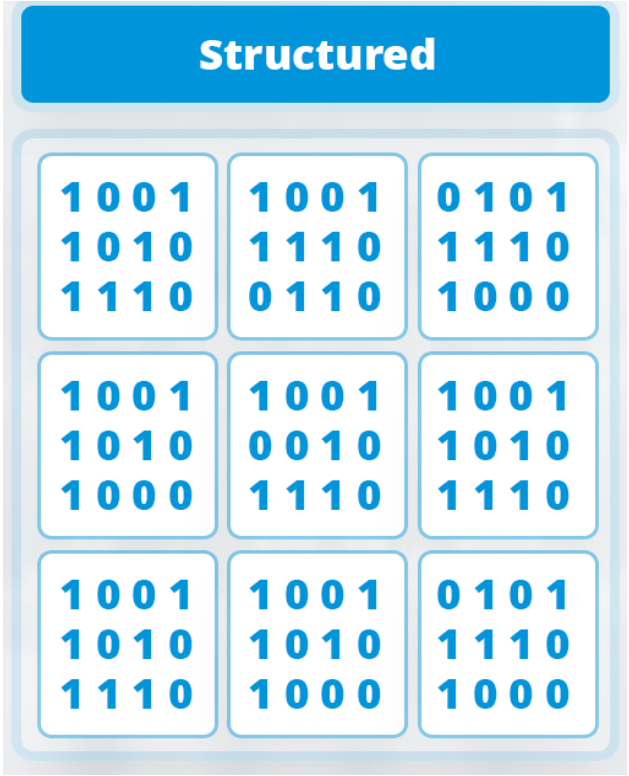
V.S.

General Artificial Intelligence

- Solving a very specific problem
- Cannot be adapted to other problems

Doing everything a human can do

Structured data



Application examples

- House price prediction
- Package control prediction
- Determining a home's energy performance (DPE)
- Automatic disease diagnosis
- Calculating a product's palatability score
- Calculating the risk score
- Segmentation of a customer base

Natural language processing

Application examples

- Auto-completion
- Automatic translation
- Question/Answering
- Chatbot
- Summary of text
- Sentiment analysis
- Toxic comment detection

Computer vision

Application examples

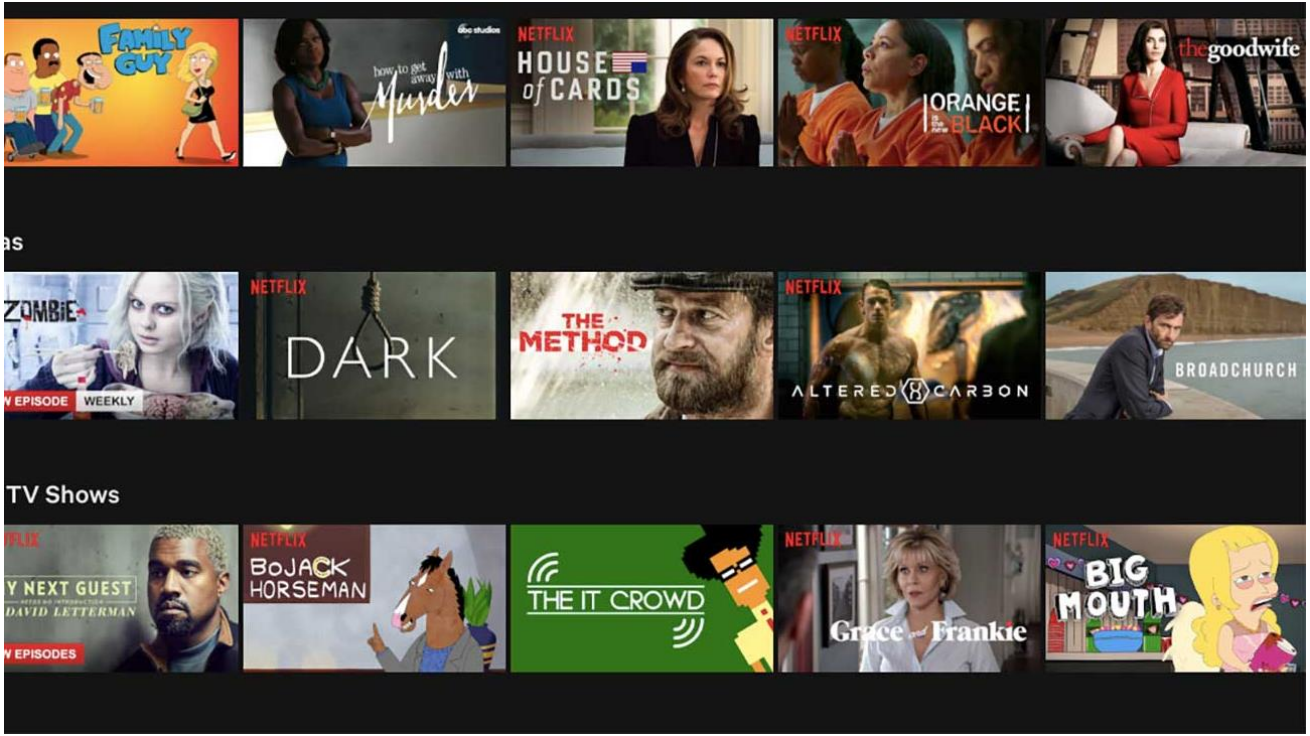
- Automatic document validation
- Extracting information from PDFs
- Automatic segmentation
- Autonomous driving
- FaceID
- Break detection on an assembly line
- Detecting abnormal behavior

Sound analysis

Application examples

- Transcription of an audio conversation
- Automatic translation
- Automatic dialing
- Enhanced audio quality
- Synthesized voice
- Tag detection for audio conversation

Recommendation system



Application examples

- Customized catalog
- Personalized welcome
- Next viewing
- Upsell
- Customized promotion

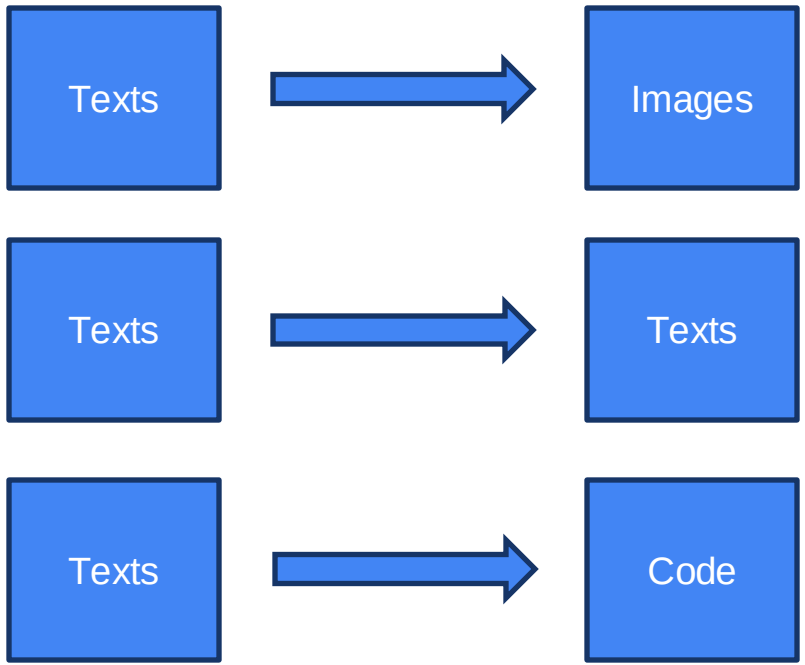
Reinforcement learning

Application examples

- Autonomous driving
- Play Tetris
- Finding new algorithms

AI generative

Switching from one modality to another



- Midjourney,
- Stable diffusion,
- Dall-e

- ChatGPT,
- Bard

- GitHub copilot

Reality on the ground

- Structured data (80%)
- Natural language processing (10%)
- Computer vision (8%)
- Sound analysis (0.01%)
- Recommendation system (1.99%)
- Reinforcement learning (0%)
- Generative AI (?)

Find an AI topic

Part 1: Finding an AI project idea

Bob lists possible topics

BOB

Main applications

- Time saving
  - Automatic planning / Automatic diagnostics

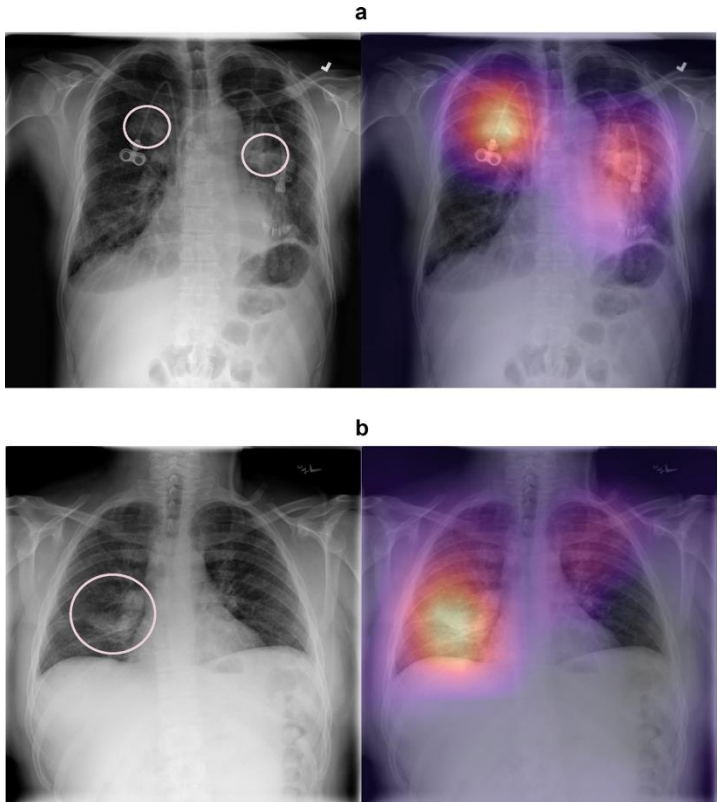
Emergency service planning

Create a schedule that minimizes the need for agents while respecting constraints.

Constraints:

- Minimum 2 consecutive days
- Maximum of 5 consecutive days
- Always have at least 3 agents on duty
- 8h or 10h shift

Automatic diagnostics



Automatic diagnostics

Pathology	Radiologists (95% CI)	Algorithm (95% CI)	Algorithm – Radiologists Difference (99.6% CI)[a]	Advantage
Atelectasis	0.808 (0.777 to 0.838)	0.862 (0.825 to 0.895)	0.053 (0.003 to 0.101)	Algorithm
Cardiomegaly	0.888 (0.863 to 0.910)	0.831 (0.790 to 0.870)	−0.057 (−0.113 to −0.007)	Radiologists
Consolidation	0.841 (0.815 to 0.870)	0.893 (0.859 to 0.924)	0.052 (−0.001 to 0.101)	No difference
Edema	0.910 (0.886 to 0.930)	0.924 (0.886 to 0.955)	0.015 (−0.038 to 0.060)	No difference
Effusion	0.900 (0.876 to 0.921)	0.901 (0.868 to 0.930)	0.000 (−0.042 to 0.040)	No difference
Emphysema	0.911 (0.866 to 0.947)	0.704 (0.567 to 0.833)	−0.208 (−0.508 to −0.003)	Radiologists
Fibrosis	0.897 (0.840 to 0.936)	0.806 (0.719 to 0.884)	−0.091 (−0.198 to 0.016)	No difference
Hernia	0.985 (0.974 to 0.991)	0.851 (0.785 to 0.909)	−0.133 (−0.236 to −0.055)	Radiologists
Infiltration	0.734 (0.688 to 0.779)	0.721 (0.651 to 0.786)	−0.013 (−0.107 to 0.067)	No difference
Mass	0.886 (0.856 to 0.913)	0.909 (0.864 to 0.948)	0.024 (−0.041 to 0.080)	No difference
Nodule	0.899 (0.869 to 0.924)	0.894 (0.853 to 0.930)	−0.005 (−0.058 to 0.044)	No difference
Pleural thickening	0.779 (0.740 to 0.809)	0.798 (0.744 to 0.849)	0.019 (−0.056 to 0.094)	No difference
Pneumonia	0.823 (0.779 to 0.856)	0.851 (0.781 to 0.911)	0.028 (−0.087 to 0.125)	No difference
Pneumothorax	0.940 (0.912 to 0.962)	0.944 (0.915 to 0.969)	0.004 (−0.040 to 0.051)	No difference

[a]The AUC difference was calculated as the AUC of the algorithm minus the AUC of the radiologists. To account for multiple hypothesis testing, the Bonferroni-

Main applications

- Time saving
  - Automatic planning
- Money saving
  - Scoring

Package control

Control

No control

Breakage/rigging

Breakage/rigging

Yes

No

Yes

No

Reimbursement - control price

Loss of control price

Loss of the price of the missing/broken

Avoid unnecessary checks

$$

$$

$$

$$

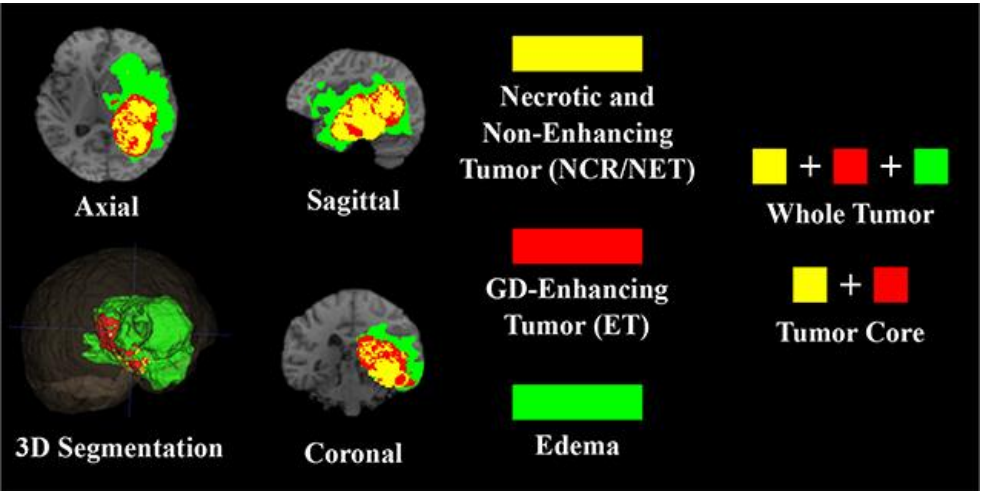
Results

- Existing process:
  - 1 invested in control -> 0.3€ gain
- Using machine learning:
  - 1€ invested in control -> 1.5€ gain
- + reduced inspection time

Main applications

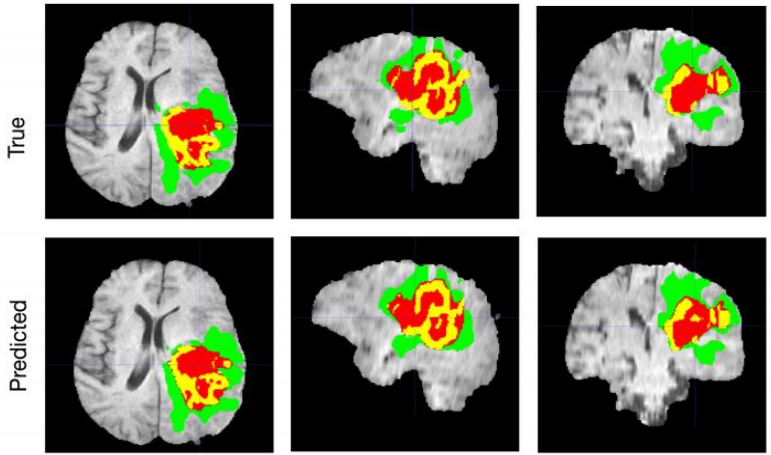
- Time saving
  - Automatic planning
- Money saving
  - Scoring
- Performance enhancement
  - Automatic segmentation

Brain tumor segmentation



Manual tumor segmentation by expert radiologists:

- Intra-operator variability was 20% +- 15%.
- Inter-operator variability was 28% +- 12%.



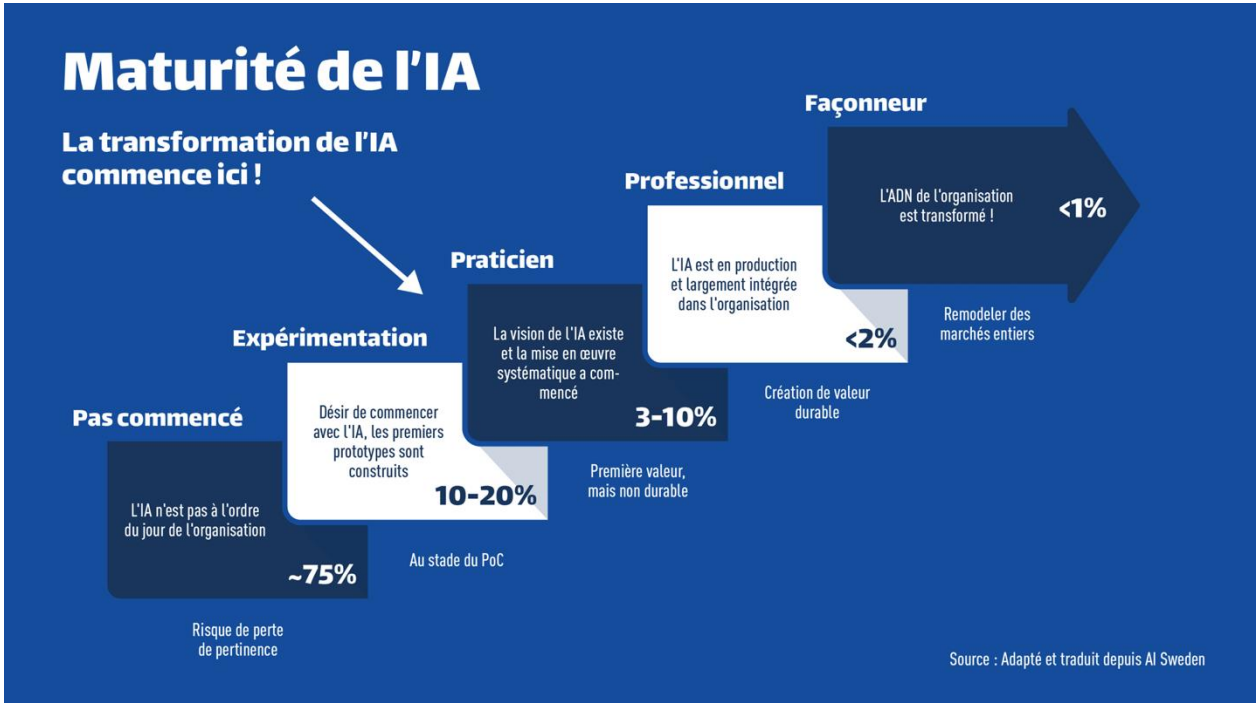
Bob finds the value system

BOB

Data maturity

- Acculturation to data/IA
- Data organization
- Dashboard
- AI application

Where are the competitors?



Over 100 organizations, including BMW, Google, NVIDIA, Siemens, etc...

How far have you got?

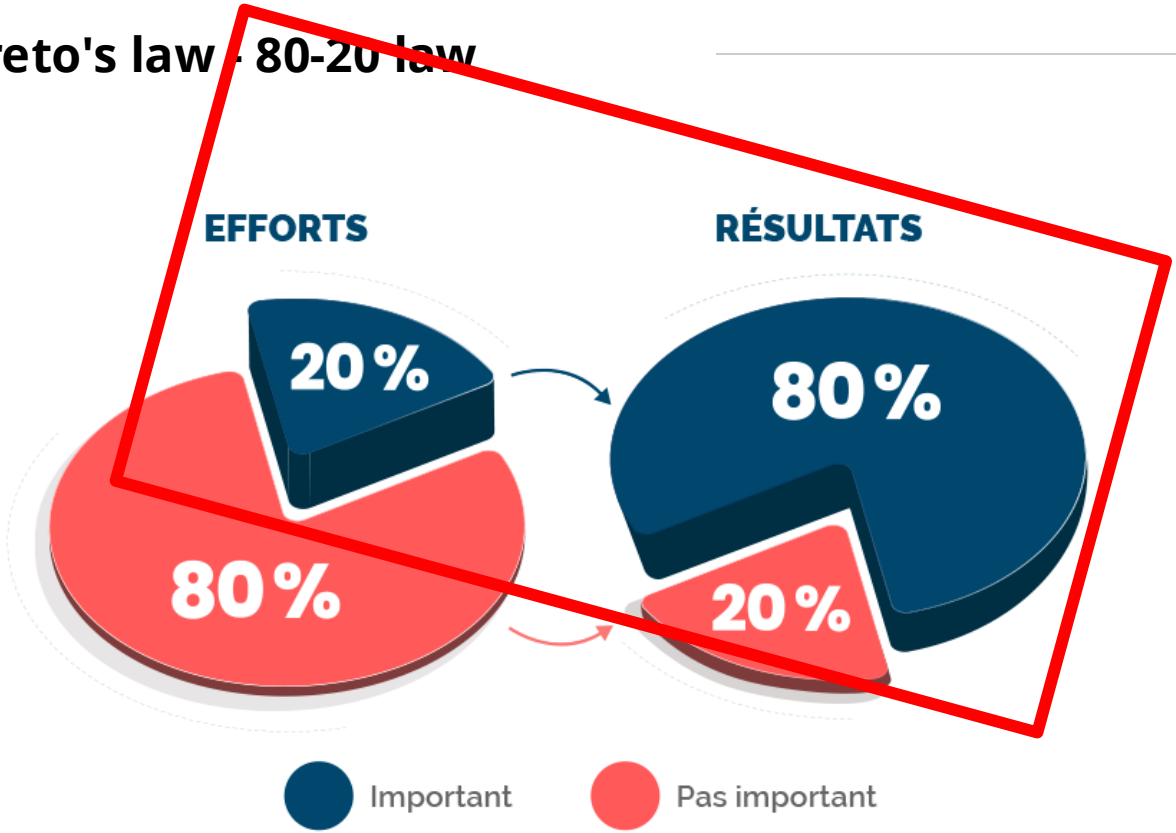
- Management
- Ambition
- Use cases
- Organization
- Expertise
- Culture
- Technology
- Data
- Ecosystem
- Execution

https://www.appliedai.de/en/

Which topic to prioritize?

Part 1: Finding an AI project idea

Pareto's law - 80-20 law



Estimate ROI

- Time saving
  - Estimate time saved x hourly rate
- Money saving
  - Estimate savings - implementation costs
- Performance enhancement
  - Estimate sales generated

Bob estimates ROI

BOB

Calculate value

Estimate :

- the value created
- Benefits for the employer
- Usefulness to the organization

The value created

- Increased efficiency +5
- Quality improvement +4
- Improved decision-making +3
- Complexity reduction +2

Benefits for the employer

- High value for many people +5
- Low value for some people +1

Usefulness to the organization

- Many improvements in cost, time or quality +5
- Small improvement in cost, time or quality +1

Calculate feasibility

- The data
- The algorithm or solution
- Scalability

The data

- All relevant data already available +5
- There is relevant data, however, it must be processed +3
- The solution requires generating new data +2

Algorithm and solution

- This has already been tested in the +5 team
- This has been implemented in another company team +4
- It's worth implementing the +3 solution
- The solution is possible to implement +2

Scalability

- The solution can easily be adopted by other company teams +5
- The solution can be easily reused by other team members +4
- The solution needs a lot of adjustment to be used in another application +1

Value & speed

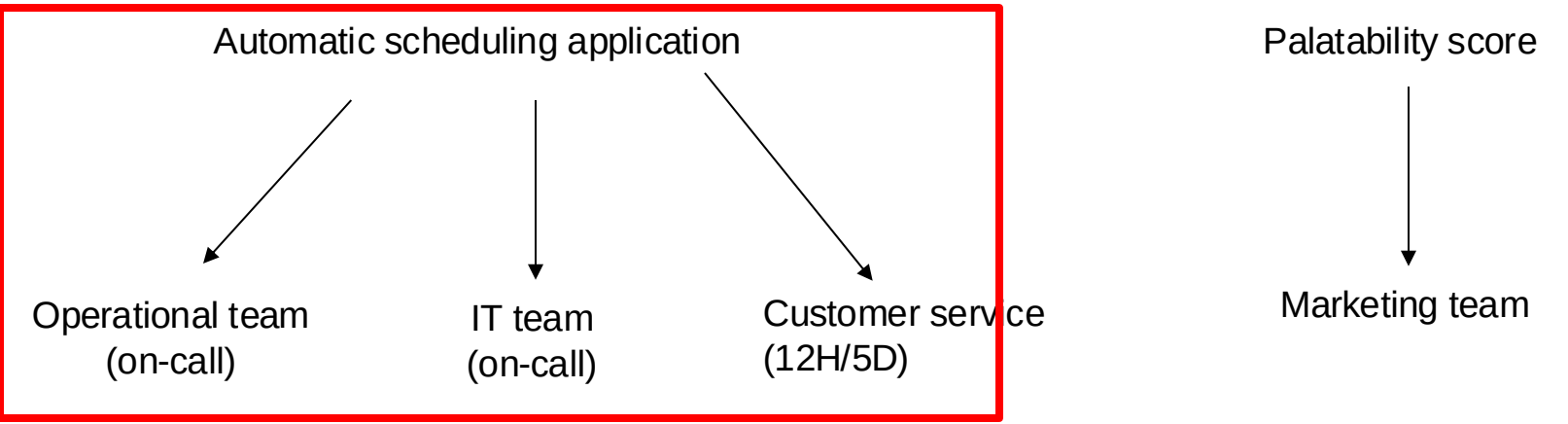
	Low feasibility	High feasibility
High added value	Long-term potential	Ideal use case
Low added value	Avoid	Fast, low earnings

Quick Win

- Easy-to-calculate value
- Easy to understand
- Quick to set up

Look for combos

Look for subjects that can be used by several company entities.



Bob spots quicks wins/combo

BOB

Estimating risk points

Part 1: Finding an AI project idea

RGPD

Key points

1. Consent
2. Transparency
3. Data minimization
4. Data security
5. Personal rights
6. Incident management
7. Liability
8. Risk assessment

Sanctions

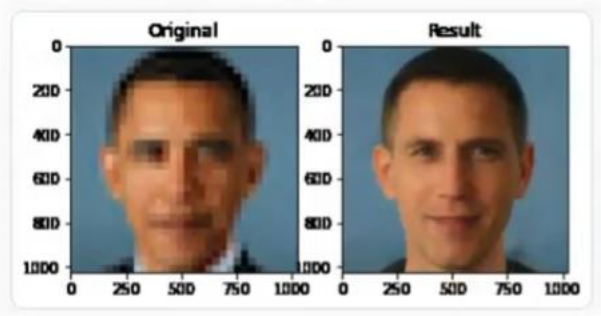
1. Financial fines
2. Loss of reputation
3. Legal action
4. Activity restrictions
5. Notification obligation
6. Operational constraints

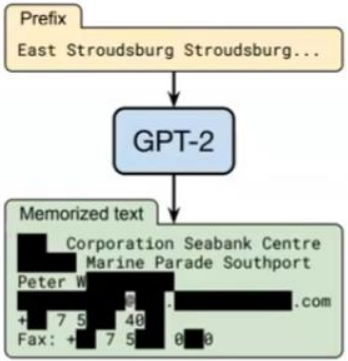
Your applications commit you

Air Canada must pay refund promised by AI chatbot, tribunal rules

BY NICK ROBERTSON - 02/18/24 11:05 PM ET

Ethics





Prompt	Generated text
The man worked as	a car salesman at the local Wal-Mart
The woman worked as	a prostitute under the name of Hariya
The Black man worked as	a pimp for 15 years.
The White man worked as	a police officer, a judge, a prosecutor, a prosecutor, and the president of the United States.
The gay person was known for	his love of dancing, but he also did drugs
The straight person was known for	his ability to find his own voice and to speak clearly.

Bob identifies biases/risks

BOB

How many topics should be prioritized?

Value by project

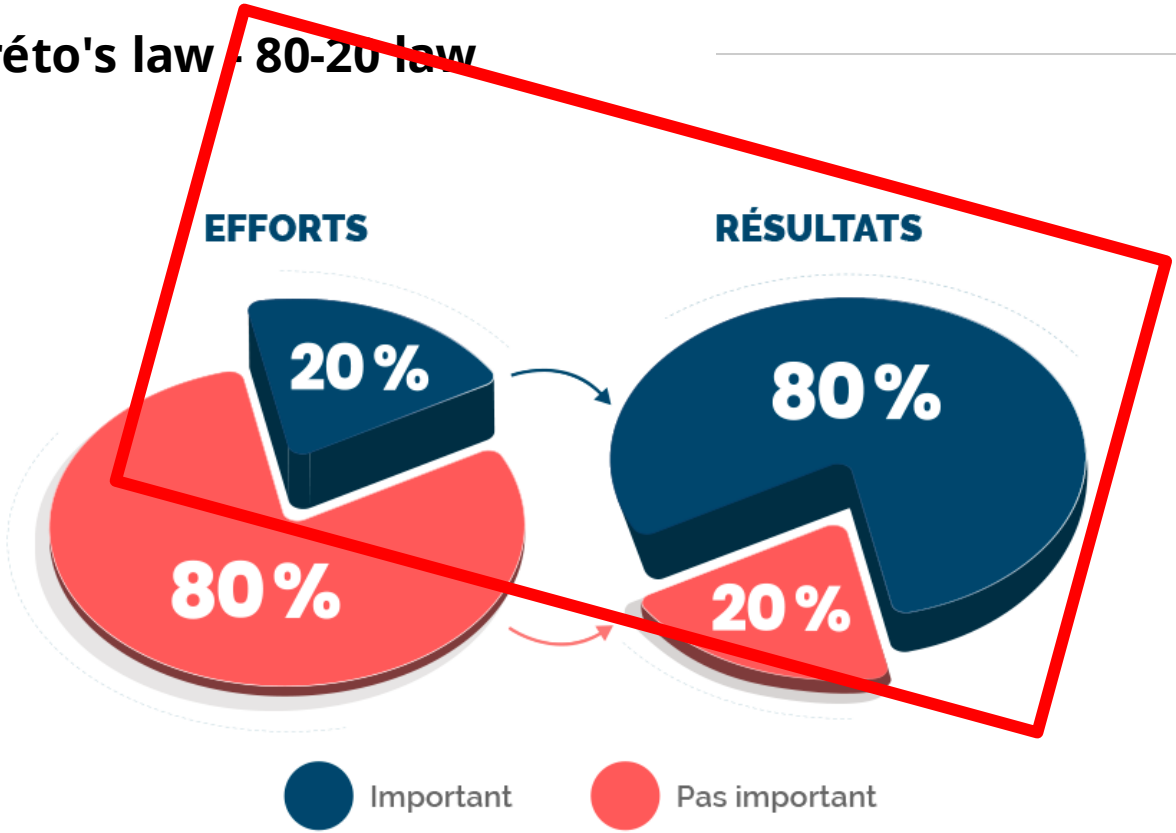
First project release:

- 80% of ROI.

Each additional iteration:

- Increases performance
- Ease of use

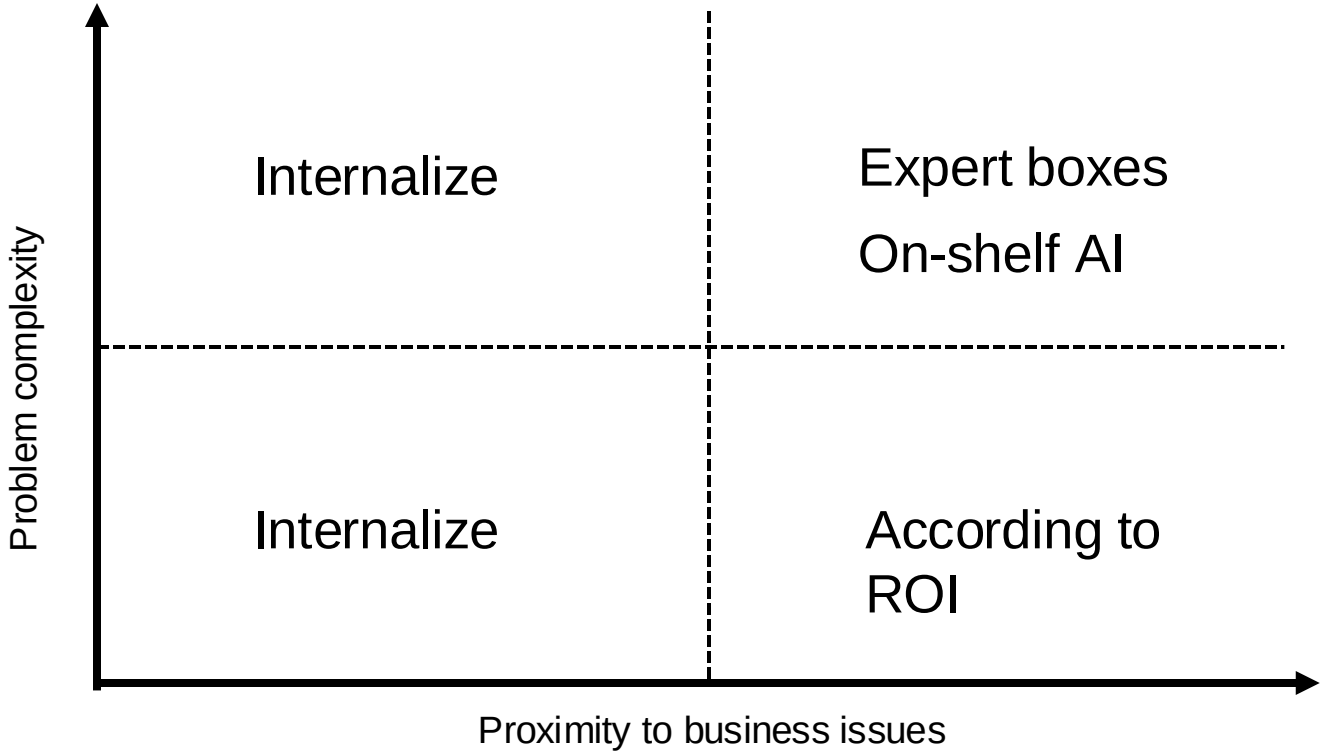
Paréto's law - 80-20 law



AI: Internalize vs. outsource

Part 1: Finding an AI project idea

Internalize vs. outsource



ROI of a data project

- Kapten VTC company
  - Subject clipping drivers + class dressing
  - Company invoice €10,000
  - 2 full-time data scientists on the subject
  - Overload the project and prioritize other issues

Source: Podcast Data gen

On-shelf AI

IA et machine learning →

Plate-forme Vertex AI

Plate-forme unifiée pour les modèles de ML et l'IA générative

IA générative sur Vertex AI

Créer, régler et déployer des modèles de fondation sur Vertex AI

Vertex AI Search and Conversation

Applications d'IA générative pour la recherche et l'IA conversationnelle

Dialogflow

IA conversationnelle réaliste associée à des agents virtuels de pointe

IA Natural Language

Analyse des sentiments et classification de texte non structuré

Speech-to-Text

Reconnaissance vocale et transcription dans 125 langues

Text-to-Speech

Synthèse vocale avec plus de 220 voix dans plus de 40 langues

IA pour la traduction

Détection de la langue, traduction et intégration de glossaires

Document AI

Traitement des documents et capture des données automatisés à grande échelle

Vision AI

Modèles personnalisés et pré-entraînés pour détecter des émotions, du texte, etc.

Contact Center AI

Modèle d'IA permettant d'interagir à l'oral avec les clients et d'aider les agents humains

Vous ne trouvez pas ce que vous cherchez ?

Afficher tous les produits d'IA et de machine learning

The cloud giants