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ARCADA UNIVERSITY OF APPLIED SCIENCES

ANALYTICAL SERVICE DEVELOPMENT

11.4.2024

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Content

11.04	Intro to ASD / Enjoying new life at the age of AI
12.04	First presentations (hybrid session)
25.04	Second presentation (hybrid session)
26.04	Guest lectures (Sievo Presentation / Communication and working with people in other positions by Anton)
2.05	Guest lectures (TBD)
10.05	Final presentations (hybrid session)

Agenda for today

- Defining the value proposition
- Intro to course assignment
- LLMs

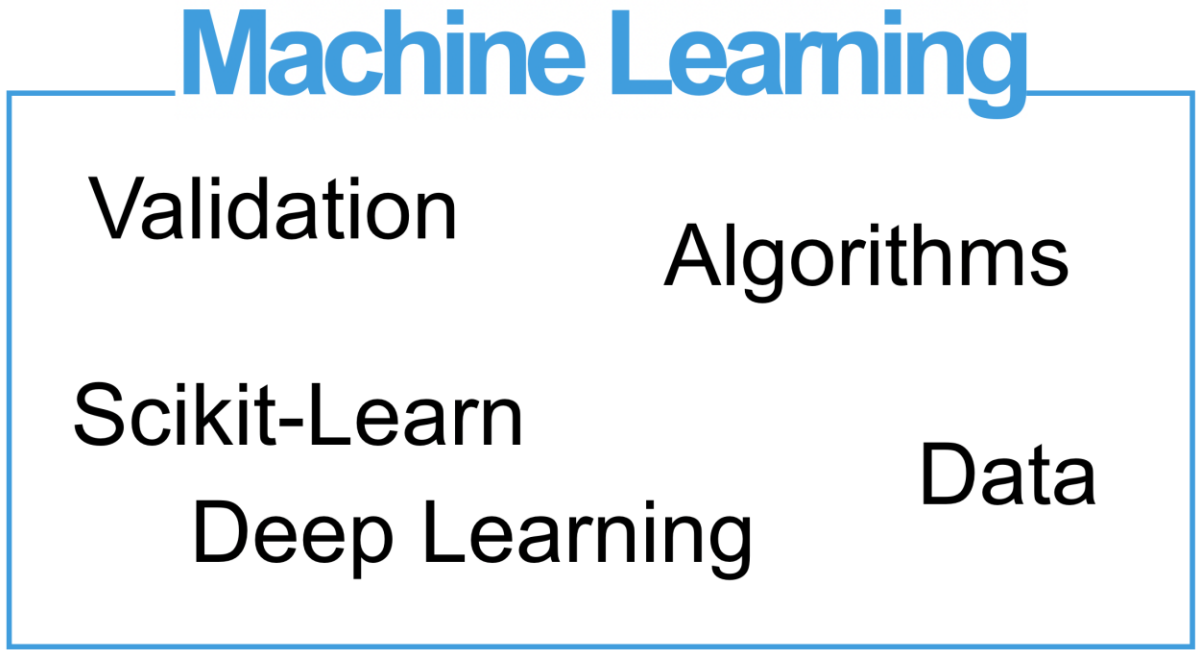
- Recommended course
  - “Introducing AI to Your Organization”
  - https://www.linkedin.com/learning/introducing-ai-to-your-organization/welcome?u=56747801

Analytical Service Development

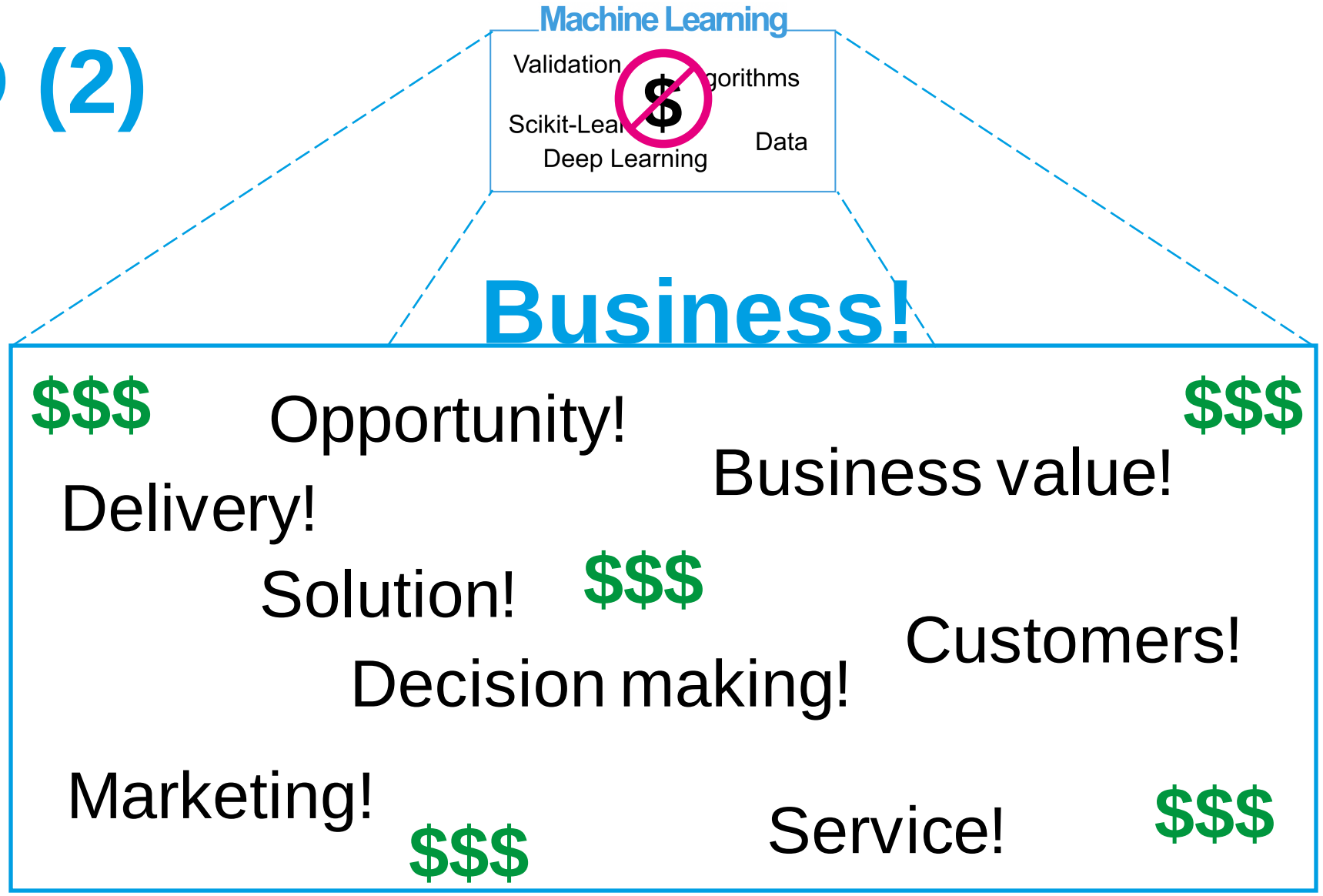
Topic of this course:

Solve a problem as a real-life AI expert!

Analytical Service Development (1)



ASD (2)


Machine Learning
Validation
gorithms
Scikit-Lea
Deep Learning
Data
Business!
$$$
Opportunity!
$$$
Business value!
Delivery!
Solution!
$$$
Customers!
Decision making!
Marketing!
$$$
Service!
$$$

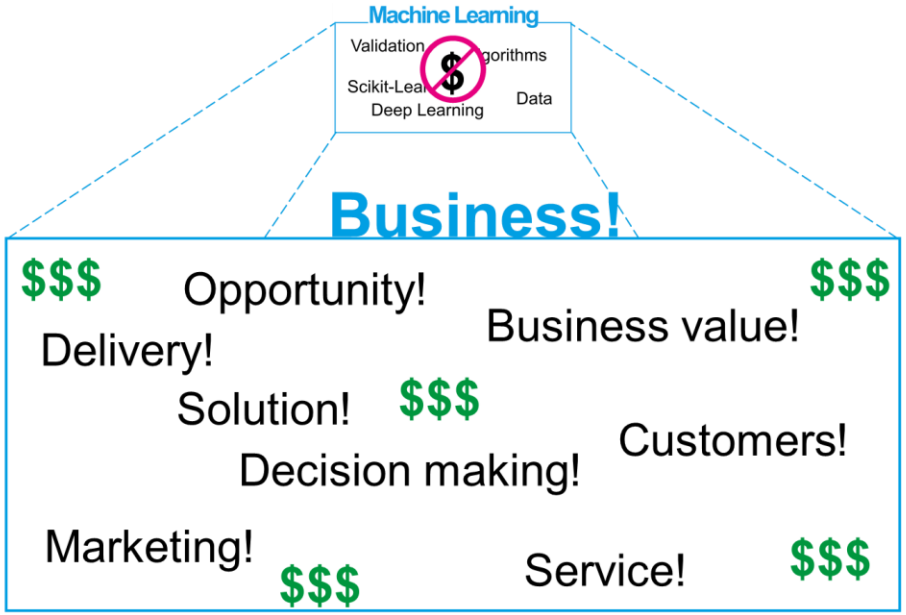
ASD (3)

Data collectors

Regulators and laws

Infrastructure providers

Investors



Re-sellers

Hackers

Security

Copy-cats

Ooups, mistakes

Analytical Service Development

- You learned all kinds of analytical methods and tools
- And made nice presentations!
- If only real life was about data and algorithms…

- But what is the **value** and how do you **measure** it?

Practical Arrangement

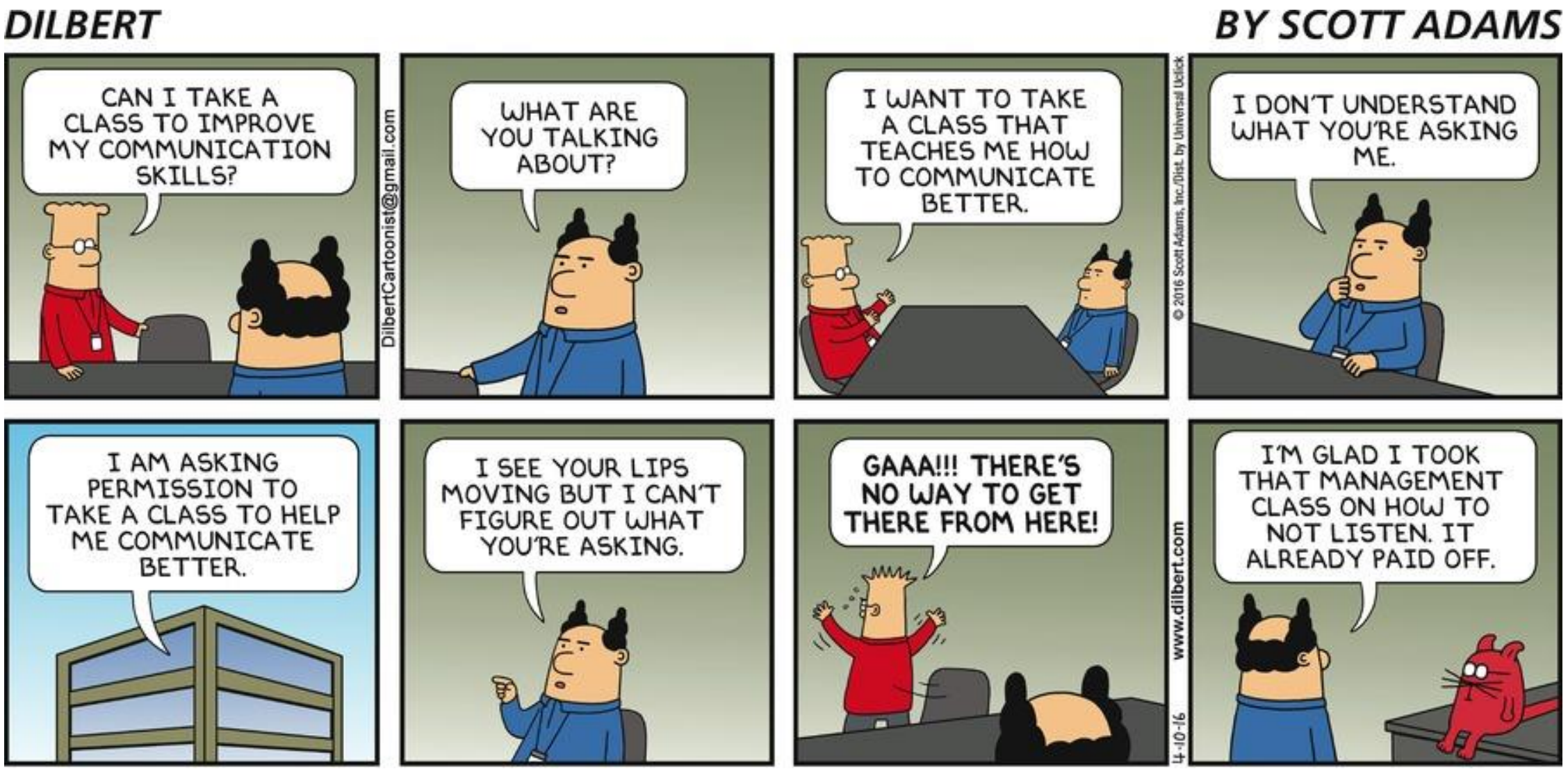
The aim of the final project is to implement the whole analytics process. This includes:

- understanding how to ask relevant questions
- determine relevant data
- communicate project goals
- propose and then implement a solution
- **assess ethics, security and explainability**
- evaluate and present your value proposition.

This is similar to what you will be tasked with in an industry environment.

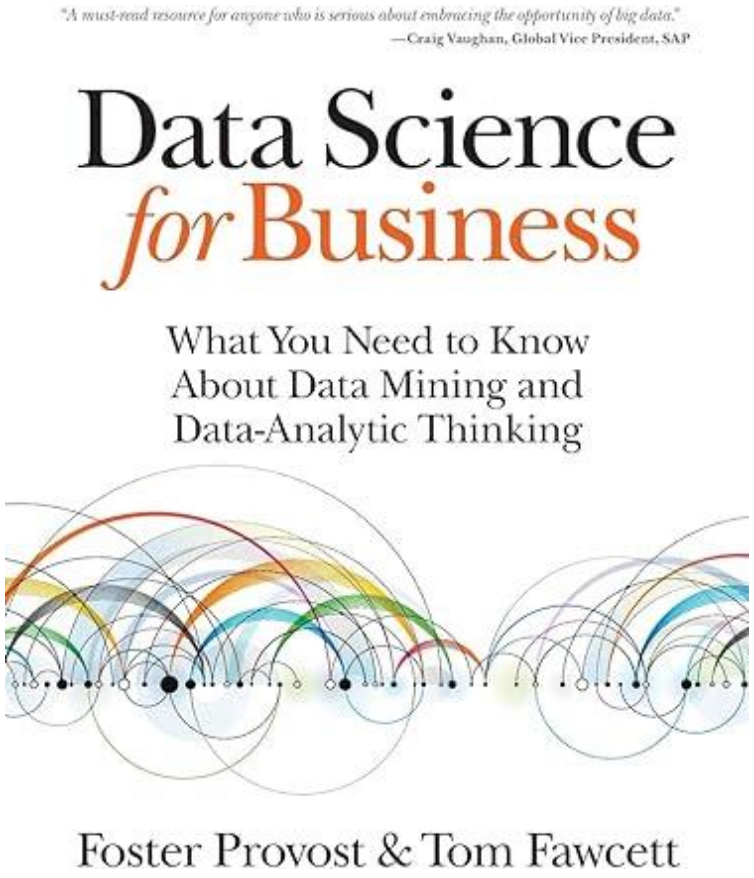
Practical Arrangement

- Every lecture week you will present your progress as on a team meeting with colleagues and the boss.
- Focus on business aspects and how analytical methods solve them; not the methods themselves.
- Cover relevant challenges and limitations from all points of view (data, algorithmic, expected quality of solution, business impact).
- Communicate your work to us as non-experts, but still be technical (mention the problems but don’t show formulas).


DILBERT
BY SCOTT ADAMS
CAN I TAKE A CLASS TO IMPROVE MY COMMUNICATION SKILLS?
DilbertCartoonist@gmail.com
WHAT ARE YOU TALKING ABOUT?
I WANT TO TAKE A CLASS THAT TEACHES ME HOW TO COMMUNICATE BETTER.
© 2016 Scott Adams, Inc./Dist. by Universal Uclick
I DON'T UNDERSTAND WHAT YOU'RE ASKING ME.
I AM ASKING PERMISSION TO TAKE A CLASS TO HELP ME COMMUNICATE BETTER.
I SEE YOUR LIPS MOVING BUT I CAN'T FIGURE OUT WHAT YOU'RE ASKING.
GAAA!!! THERE'S NO WAY TO GET THERE FROM HERE!
4-10-16
www.dilbert.com
I'M GLAD I TOOK THAT MANAGEMENT CLASS ON HOW TO NOT LISTEN. IT ALREADY PAID OFF.

Recommendation

Provost, Foster, and Tom Fawcett. *Data Science for Business: What you need to know about data mining and data-analytic thinking.* O'Reilly Media, Inc., 2013.



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Data Analytics *for* Business

Seven rules

1. Always be useful

Business does not care how cool your model is — only useful methods matter.

Analytics can do two useful things: solve problems and optimise processes:

- Solve problems that don’t have alternative viable solution, e.g. speech recognition
- Optimise process usually for reduced costs, e.g. fraud detection, predictive maintenance

2. Exact methods are irrelevant

Normally you look at the data, and use whatever is already coded but still works fine. Custom methods are very expensive and slow to create, only largest companies can afford it.

- Gathering more data will improve any ML method without extra coding — hire an intern!
- Absolute performance is second thought, important is performance improvement from previous method (mostly very basic non-ML system)

3. Business case is the king

Being useful means finding a good business case, that is ***hard*****:** virtually most important stuff is either optimized or impossible to optimize.

Finding business case can be the largest part of your work, but it's a worthy investment of efforts!

Don't start on AI that nobody needs — you will waste time, money and build a bad reputation.

4. Ask people what they need

Work processes are flowing because people run them, and people are creative. You will try to sell these people an "improvement" to their daily routines that will likely face negative attitude as "another thing my boss is forcing upon me".

Go and talk to people doing their jobs, ask them about the most irritating/slow/unproductive parts. Then use your knowledge and intuition to filter our feasible use cases for AI.

5. Machine Learning is a continuous process

Real systems are never "set and forget". They need regular re-training and re-optimization (hello Valohai!); warnings for accuracy drops below an expected threshold that happens easily when something changes in the related business process.

All AI systems create a technical debt in maintenance and handling edge cases with bugs. Keep things isolated, small, easy to understand, and avoid chaining several methods together at all costs!

https://ai.google/research/pubs/pub43146

6. Embrace the errors

All ML systems have some randomness in them (at least from noisy data) and they will eventually make mistakes.

- Consider the cost of mistake in your business case, and if you can afford them.

Combine ML with rule-based safeguards and manual handling of uncertain cases to reduce risks — your system never works alone!

7. You are not a one-man army!

Running successful business is always a team effort (unless you are a plumber…).

Think how other people can help you:

- IT guys can setup a Cloud environment, managers can organise a meeting with future users of your system to find valuable business cases (or write great presentations), even CEO can help by selling your AI system to other executives and businesses.

7. You are not a one-man army!

Running successful business is always a team effort (unless you are a plumber…).

- But you absolutely must be able to explain the excellence and importance of your work at any technical level! (without BS)
- Managing expectations is critical! People tend to think AI will magically solve all their problems. Explain what exactly what they will get, where it excels and when it fails, and how much effort *including efforts from them* it will take to create.

The assignment and grading of the course

- Implement an analytical solution or an ML solution OF YOUR OWN CHOICE in a team of max 3 people (max 100 p in total)
  - Make the problem formulation, assess feasibility, find solutions methods, implement the solution, assess the solution quality, make presentations in pptx and submit also the project (python) itself and the report.
  - Deadline 1, 12.4.2024, Presentation 10 min. Introduction to the problem, analytics, and business goal. We put emphasis here on the clarity of the problem and the availability of the data. Scheme of the analytics process needed to solve problem. (Max 10p)
  - Deadline 2, 25.4.2024, Presentation 10 min. Machine learning (Analytical) models, and full pipelines. Here some initial results should be presented, as well as some visualization. (Max 10p)
  - Deadline 3, 10.5.2024, Presentation. The whole package is ready to present as an analytics service. (Max 60 p)
  - Deadline 4, 17.5.2024, The report should be submitted, min 4 pages including graph, pictures and flowcharts, (Max 20 p).