

Artificial Intelligence for Humans

Krakow, 6th of April 2019

Expectation vs Reality

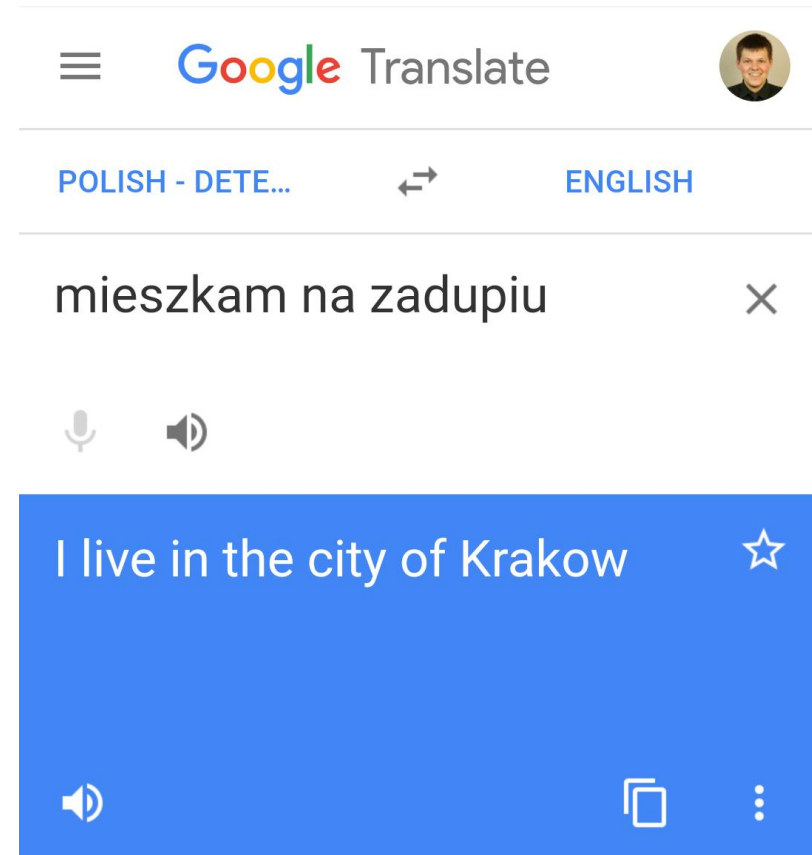


Expectation

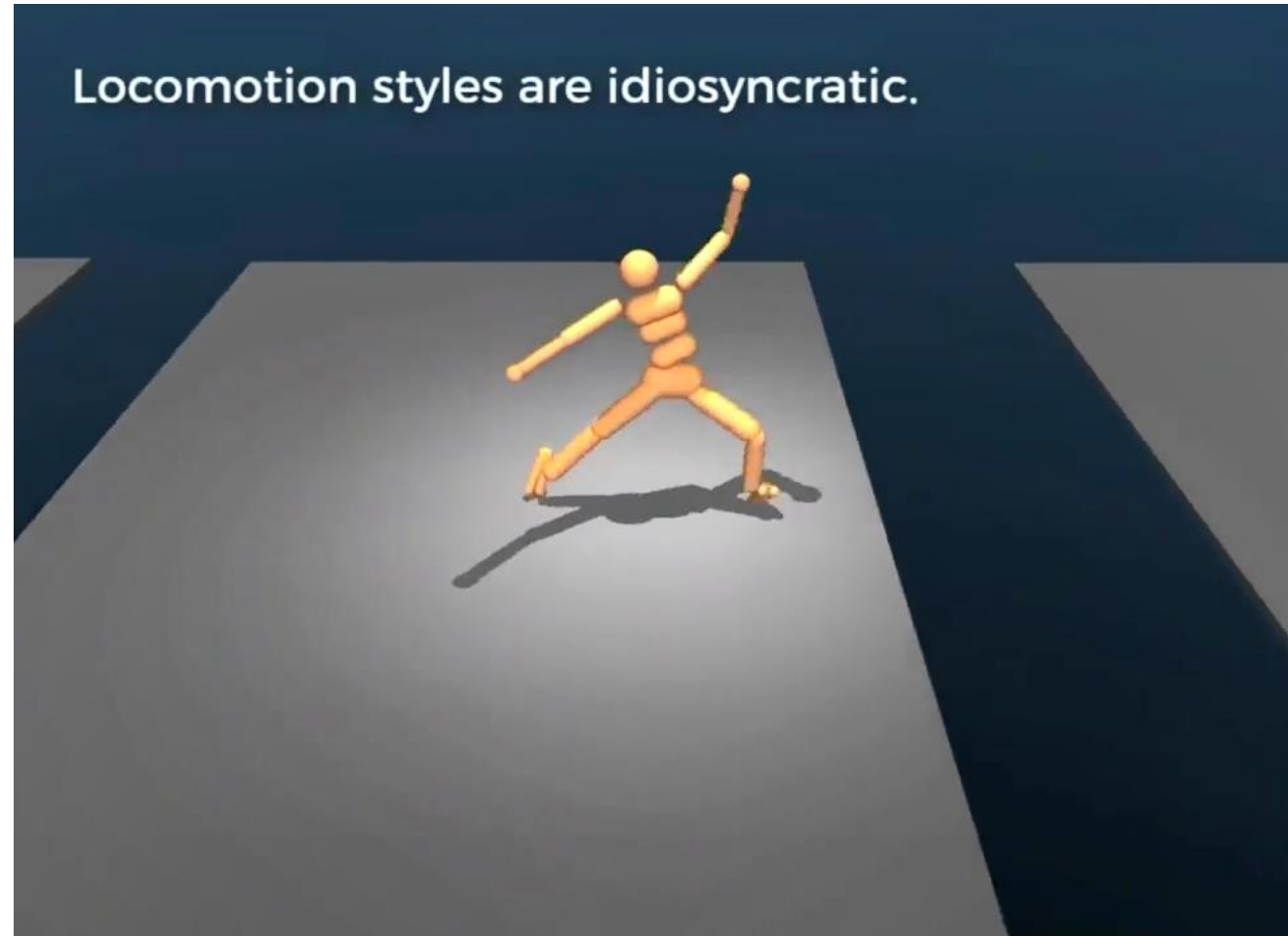


Source: bit.ly/2I6sSAN

Reality



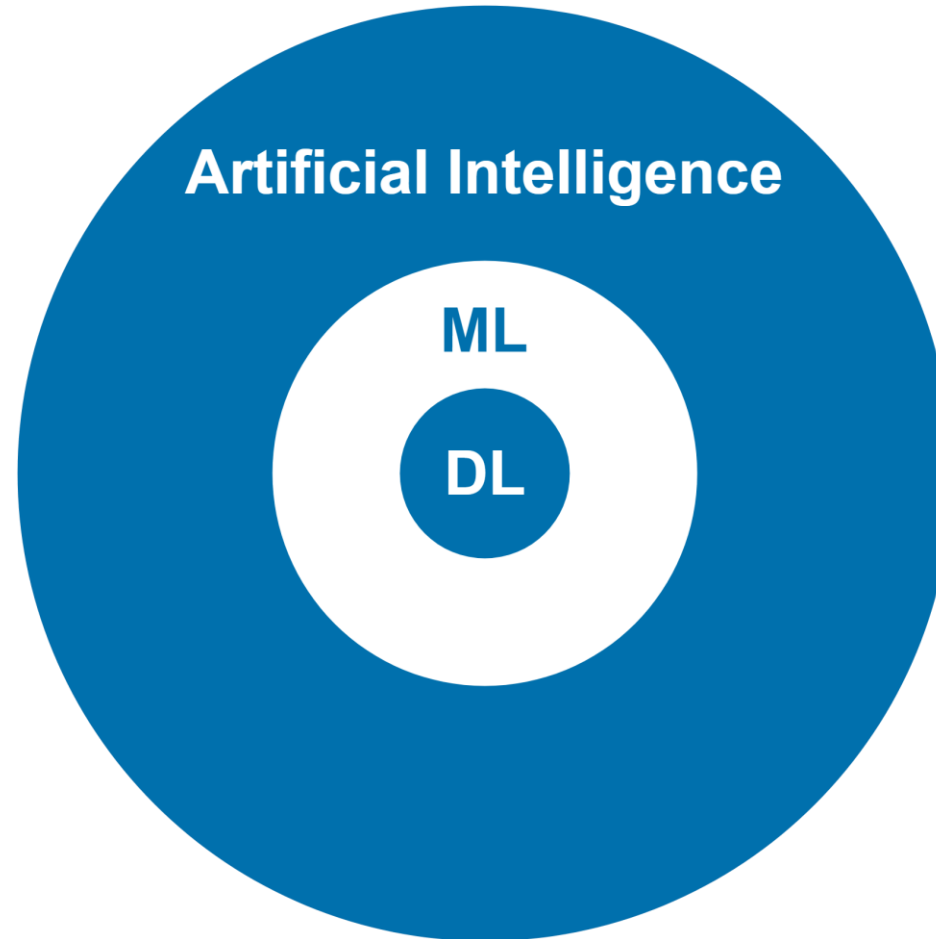
Expectation vs Reality



Source: bit.ly/2P0nqTi

Terminology

Artificial Intelligence vs Machine Learning



Artificial Intelligence vs Machine Learning



Mat Velloso

@matvelloso



Difference between machine learning and AI:

If it is written in Python, it's probably machine learning

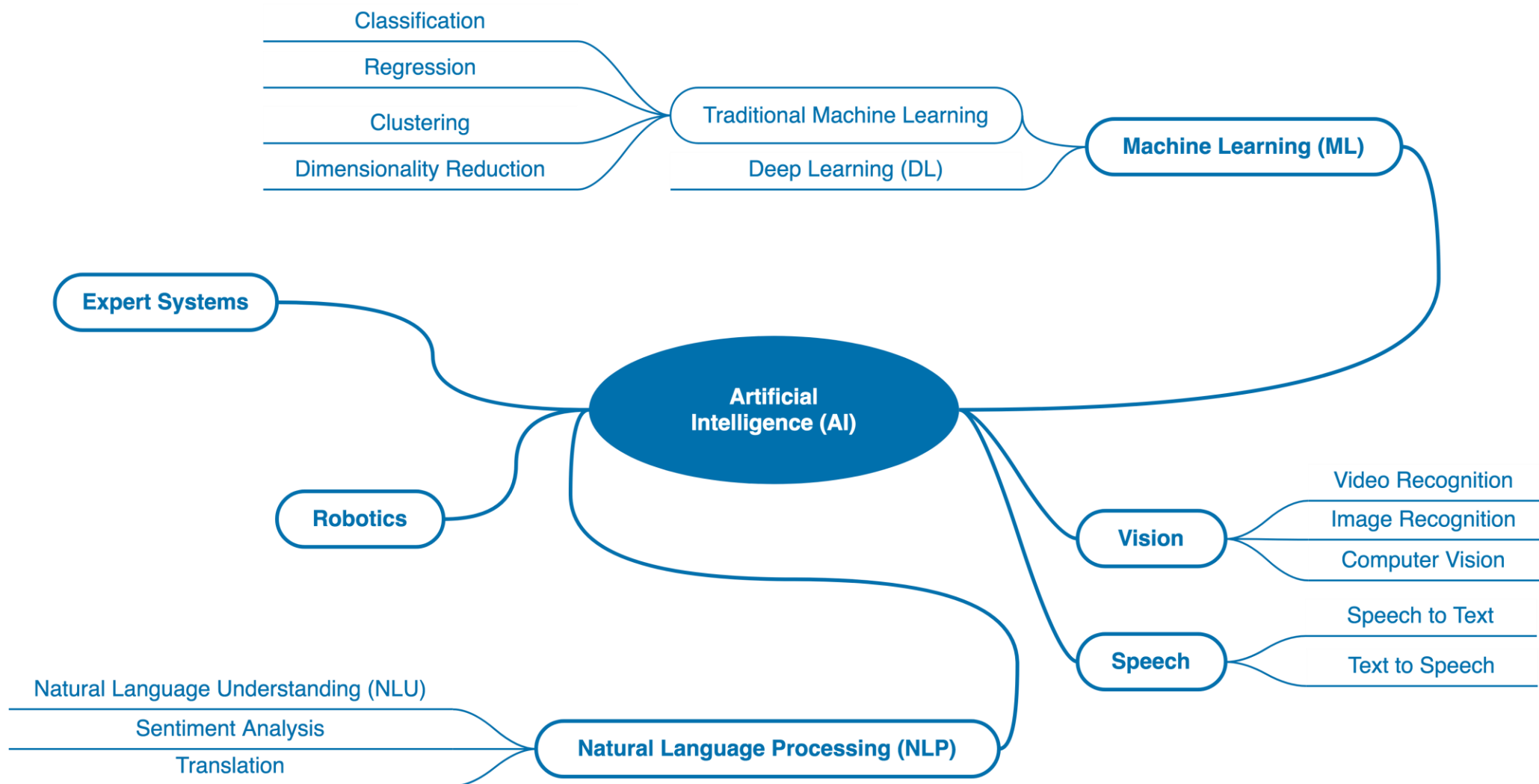
If it is written in PowerPoint, it's probably AI

♡ 23K 2:25 AM - Nov 23, 2018



💬 8,467 people are talking about this

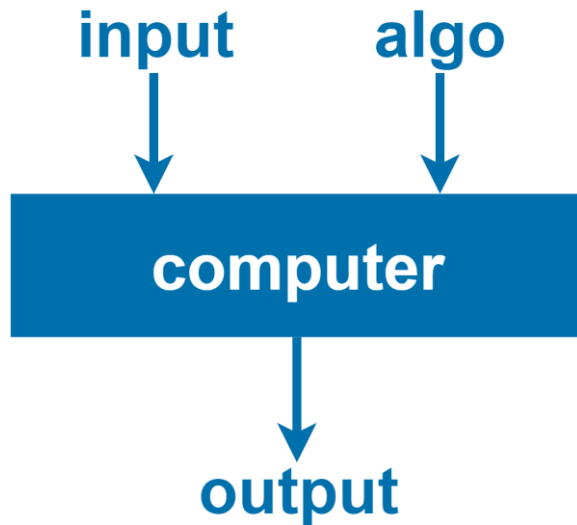




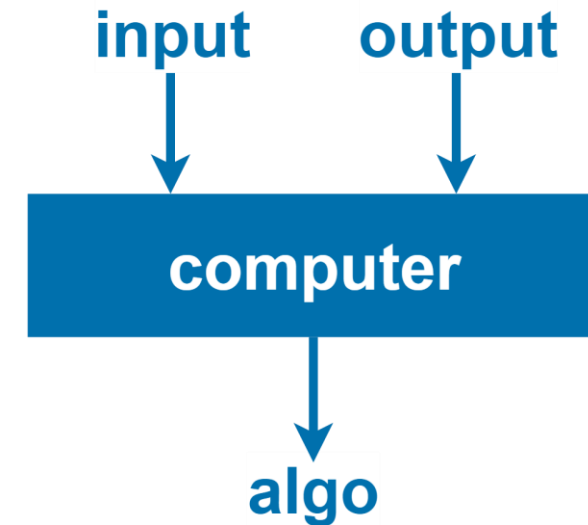
Traditional Programming vs Machine Learning



Traditional Programming



Machine Learning



Traditional Programming vs Machine Learning



Traditional Programming

$$1 + 1 = \square$$

$$1 + 2 = \square$$

Machine Learning

$$1 \square 1 = 2$$

$$1 \square 2 = 3$$

Traditional Programming vs Machine Learning



Traditional Programming

$$1 + 1 = \square$$

$$1 + 2 = \square$$

$$1 + 3 = 4$$

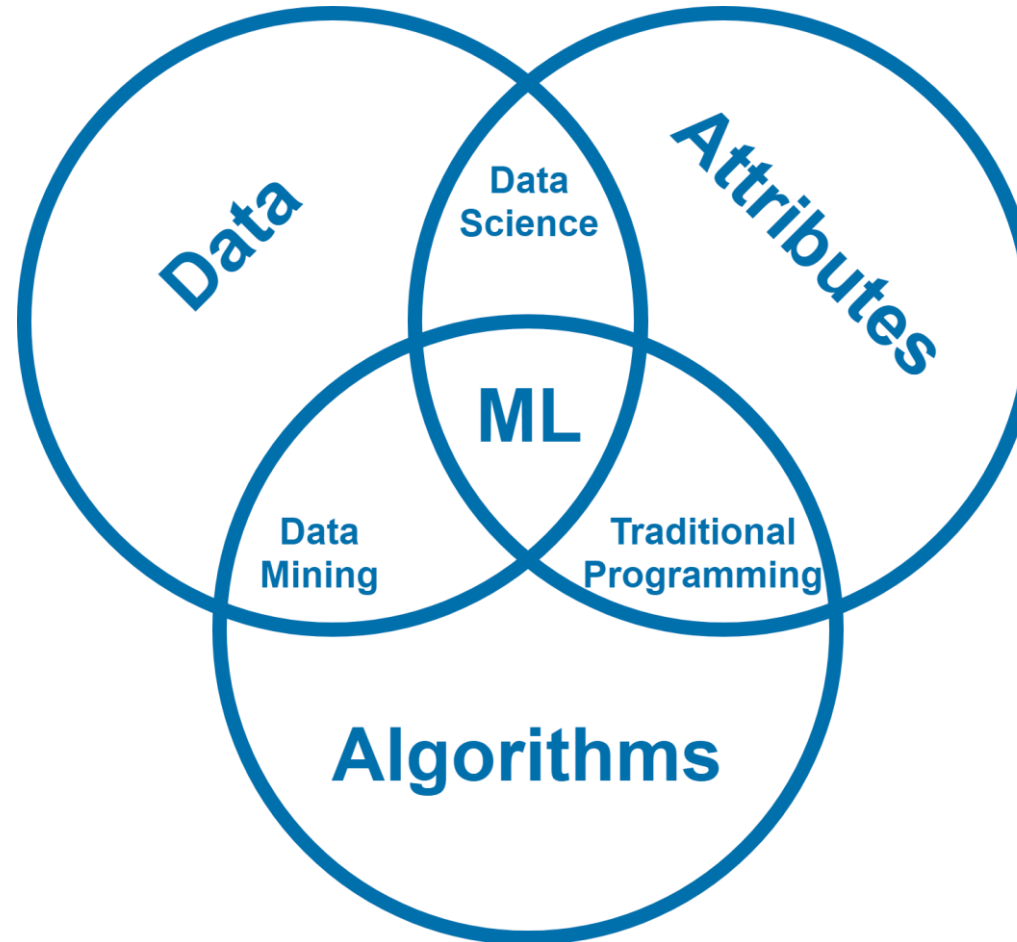
Machine Learning

$$1 \square 1 = 2$$

$$1 \square 2 = 3$$

$$1*1 + 3*1 = 4$$

Data Science vs Data Mining



Data science job roles

Part 1



Data Scientist

- Python
- R
- Pandas, Apache Spark
- Plotly
- Scikit-learn
- TensorFlow
- Jupyter



Artificial Intelligence Engineer

- Python
- Cloud computing
- Scikit-learn
- TensorFlow
- Jupyter
- PowerPoint
- Draw.io



Data Architect

- Cloud computing
- PowerPoint
- Draw.io
- Excel



Data science job roles

Part 2



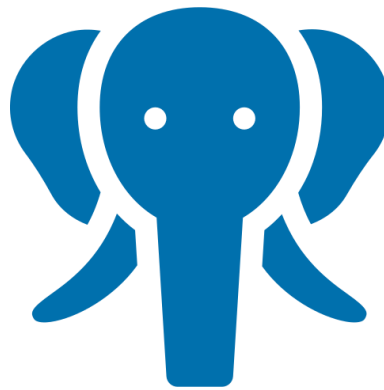
Data Engineer

- Python
- Pandas, Apache Spark
- Cloud computing
- Linux
- Hadoop
- Git



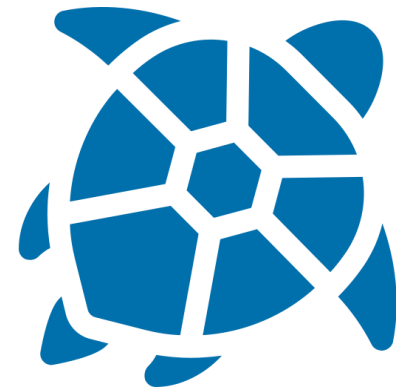
Big Data Specialist

- Java
- Hadoop
- Linux
- Git



Data Analyst

- BI tools
- SQL
- Excel
- PowerPoint





ML tasks

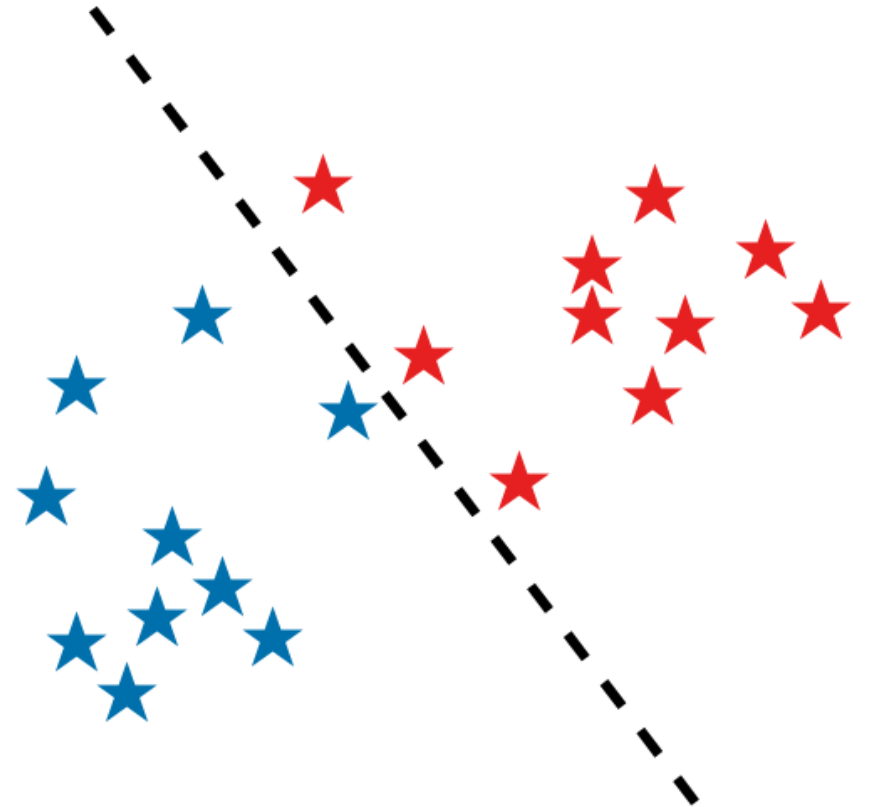
Classification



Prediction value as category like yes/no, positive/negative, etc.

Examples:

- Email filtering.
- Credit scoring.
- Finding named entities in text: person, organization, location, etc.
- Language identification.
- Prediction of diabetes.



Credit scoring



Classes: *1* – grant credit, *0* – not grant credit.

Attributes:

1. age
2. civil status
3. credit limit
4. education
5. gender
6. income
7. job title
8. work experience



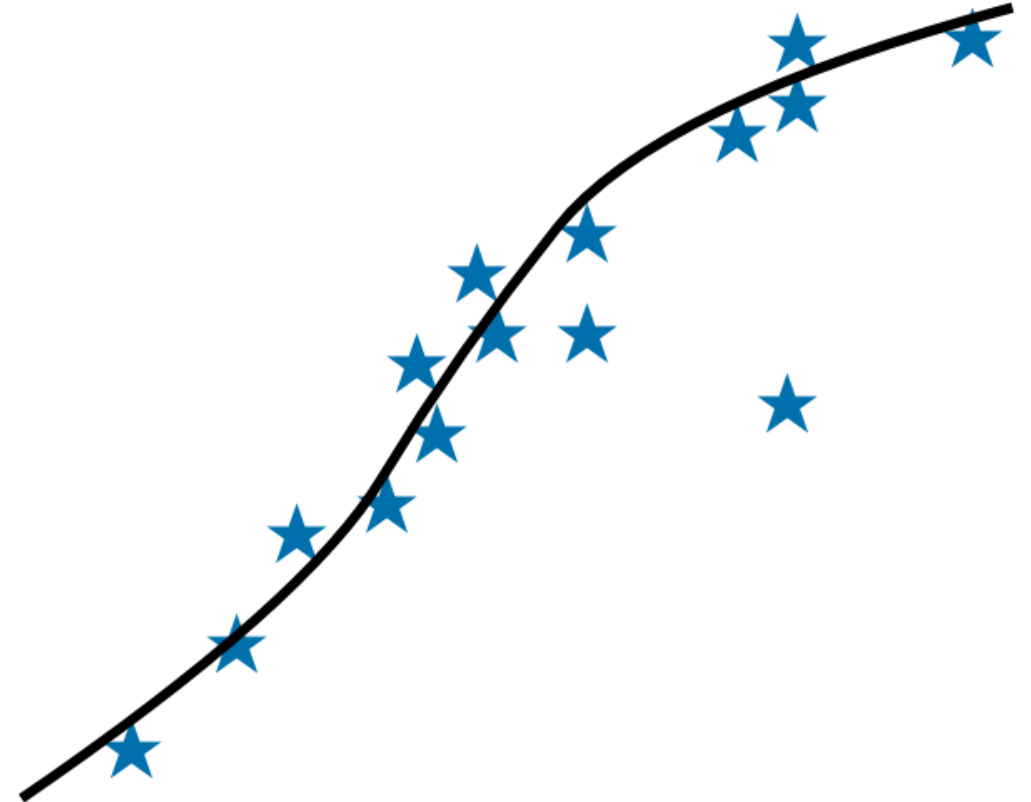
Regression



Prediction value as continuous value.

Examples:

- Company's yearly revenue prediction.
- Foreign exchange market prediction.
- Job salary prediction.
- Predicting house and car price.
- Stock market prediction.



Stock market prediction



Output: daily price of share (close price)

Attributes:

1. weekday
2. previous open price
3. previous open price for high correlated share
4. previous low price
5. previous high price
6. previous volume
7. previous stock market index
8. previous exchange rate



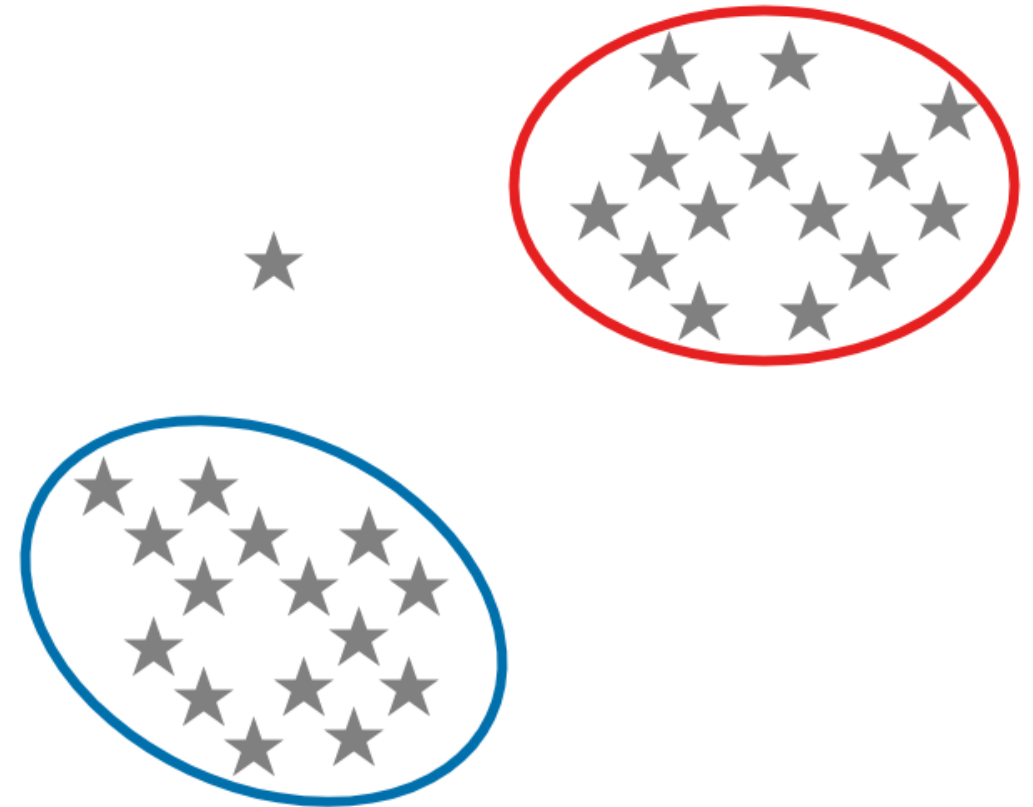
Clustering



Grouping a set of points to clusters.

Examples:

- Fraudulent bank transaction identification.
- Human activity recognition using smartphones.
- Image compression.
- Recommender system.
- One-class classification.



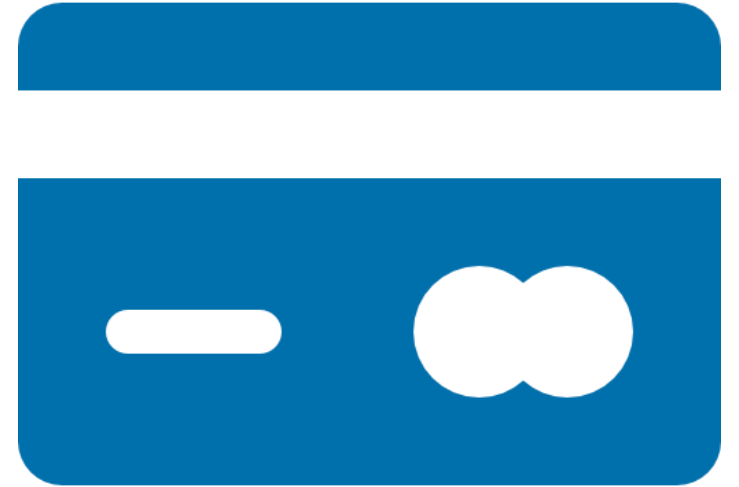
Fraudulent bank transaction identification



Output: money transfer approve or reject.

Attributes:

1. amount
2. currency in
3. currency out
4. quarter
5. receiver
6. receiver country
7. sender
8. sender country
9. weekday



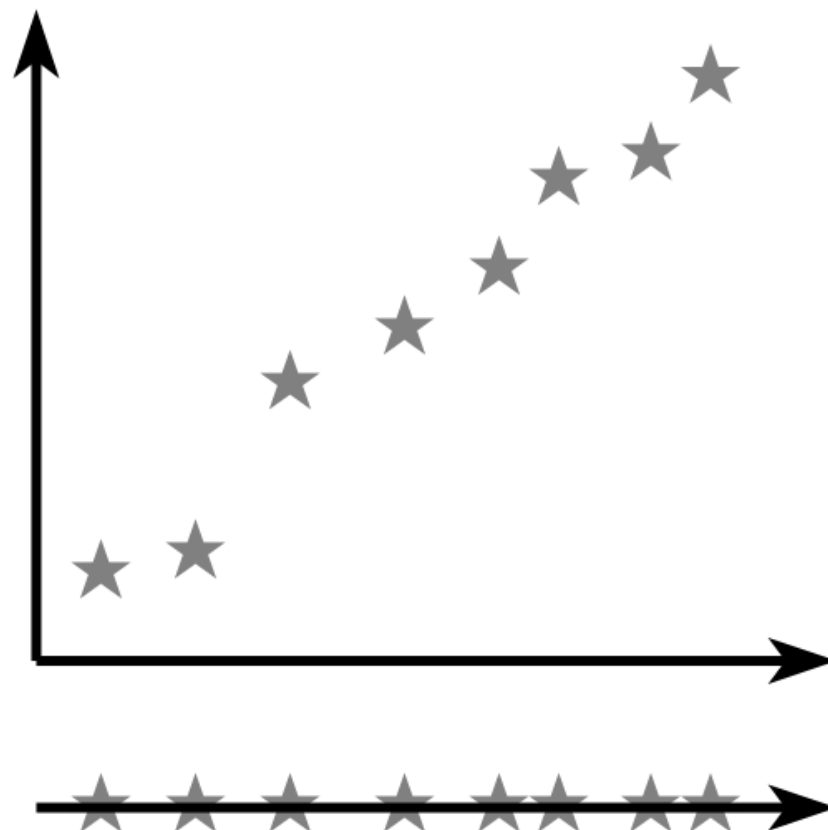


Dimensionality reduction

Reducing the number of attributes.

Examples:

- Data visualization.
- Fake image detection.
- Recommender system.
- Risk management.
- Topic Modelling.



Recommender system



	movie1	movie2	...	movieN
name1				
name2				
...				
nameN				

name1				
name2				
...				
nameN				

Recommender system



	movie1	movie2	...	movieN
name1				
name2				
...				
nameN				

	genre1	genre2	...	genreN
name1				
name2				
...				
nameN				

BREAK

Test

Part 1



- Anomaly detection.
- Cancer prediction.
- Champions League winner prediction.
- Character recognition.
- E-commerce business forecasting.
- Employee attrition prediction.
- Employee's unplanned absence prediction.
- Image clustering.

Test

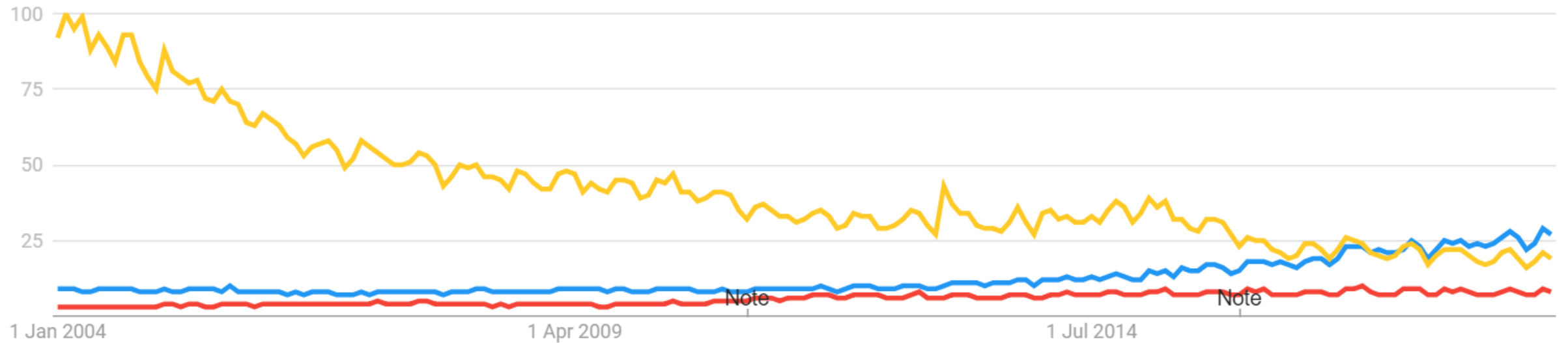
Part 2



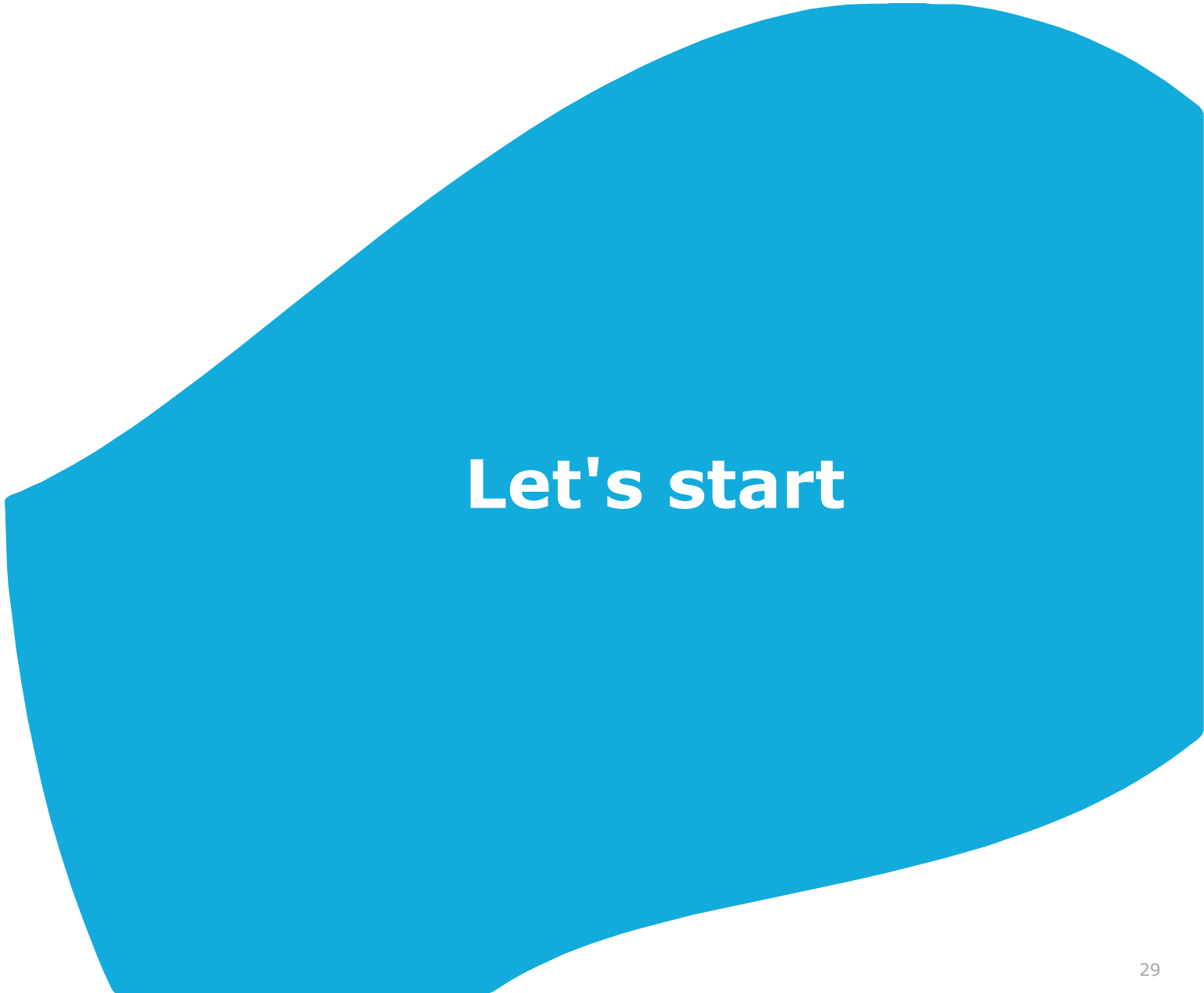
- IT system availability prediction.
- Joiner prediction in recruitment.
- Map points combining.
- Market basket analysis.
- Market segmentation (types of customers, loyalty).
- Project overrun prediction.
- Sentiment analysis.
- Telecom industry churners prediction.

Python vs R

Python vs R vs Java



Source: bit.ly/2Ojajhs



Let's start

Classification in Python

Predict Diabetes



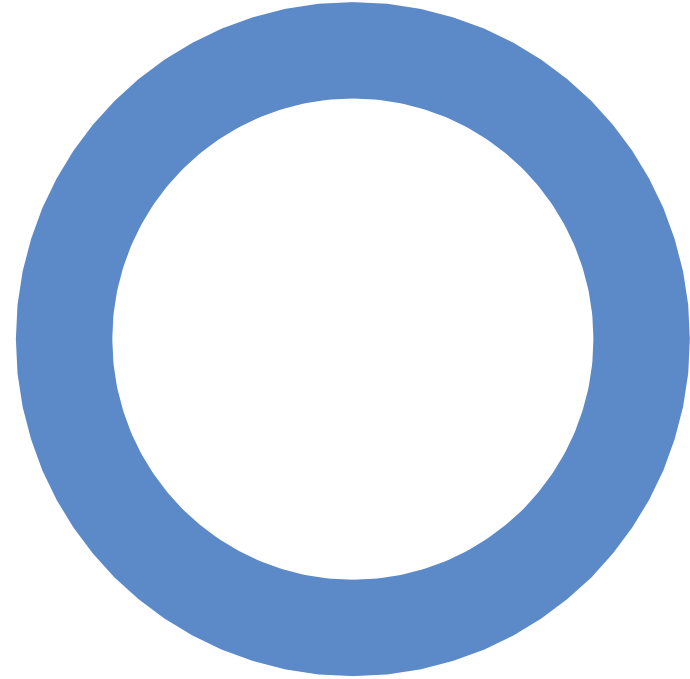
Classes: *1* – diabetic, *0* – non-diabetic.

Attributes:

1. number of pregnancies
2. plasma glucose concentration
3. blood pressure
4. skin fold thickness
5. serum insulin
6. body mass index
7. diabetes pedigree function
8. age

Data and code source: bit.ly/2Mbo53w

Image source: bit.ly/2MN4Myi



Classification in R Banknote Auth



Classes: 1 – genuine, 0 – counterfeit (fake).

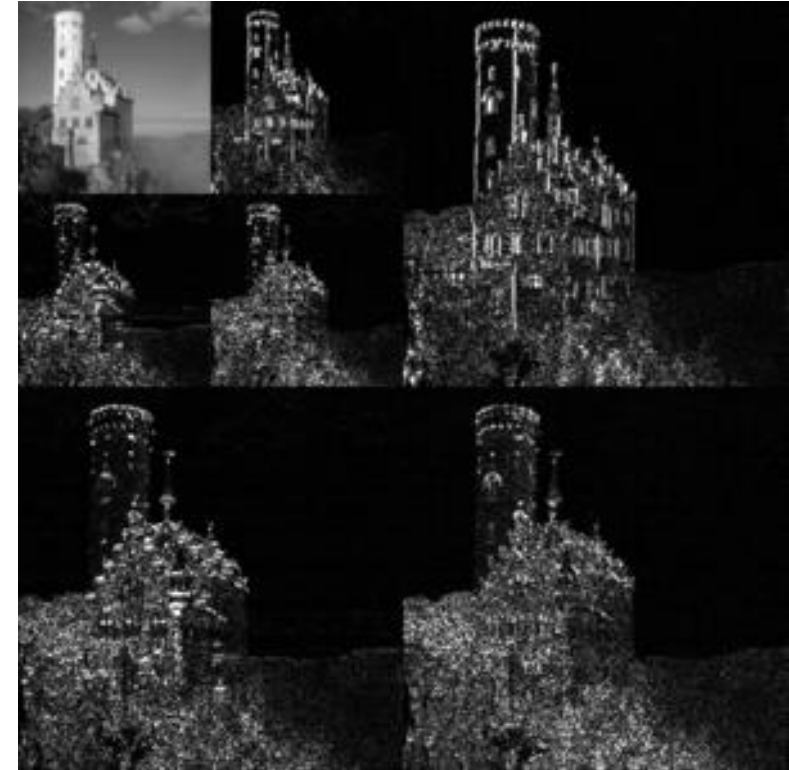
Attributes:

1. [variance](#) of Wavelet Transformed image
2. [skewness](#) of Wavelet Transformed image
3. [kurtosis](#) of Wavelet Transformed image
4. entropy of image

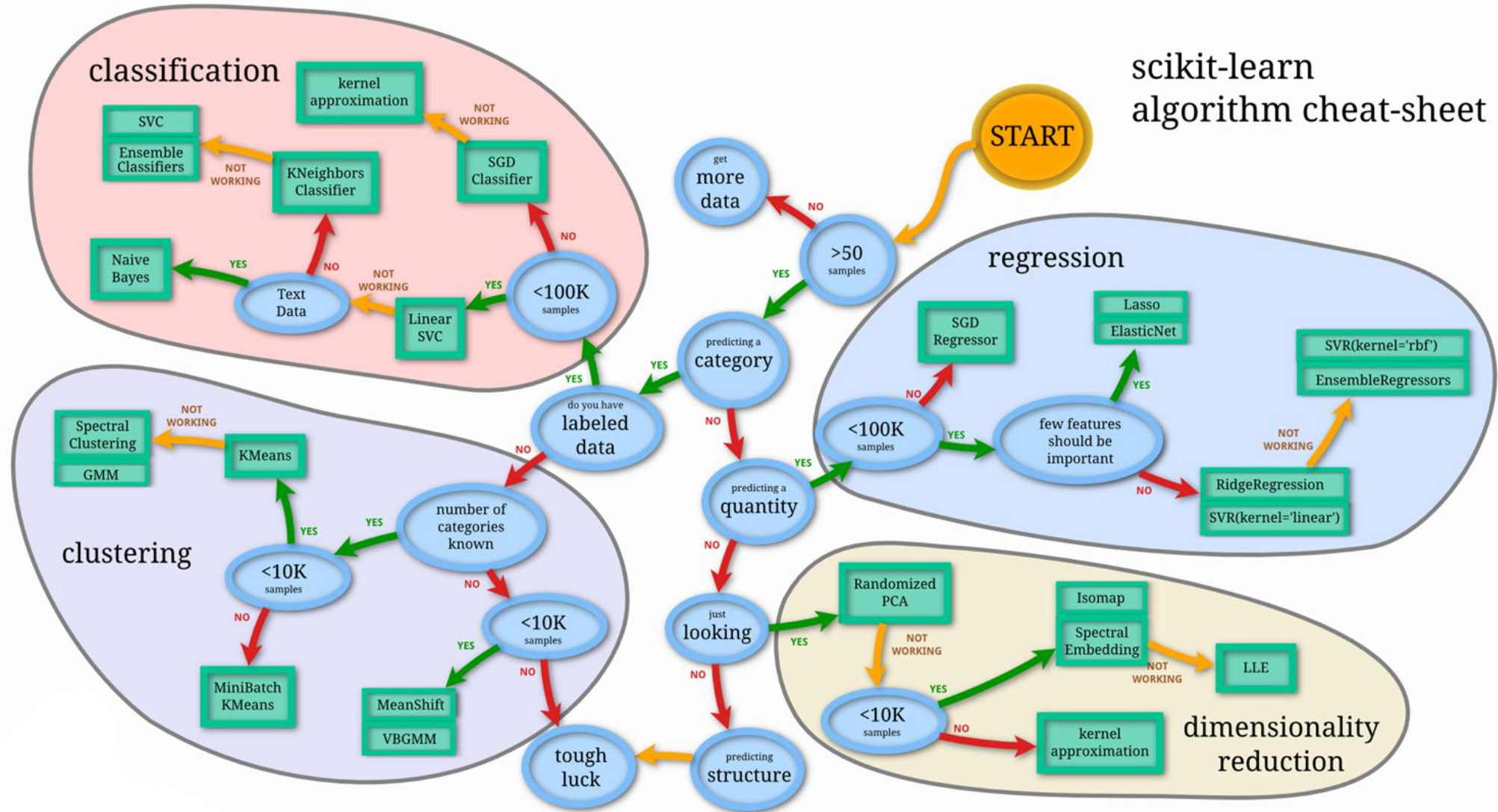
Data source: bit.ly/2JpLsp3

Code source: bit.ly/2K2wcP3

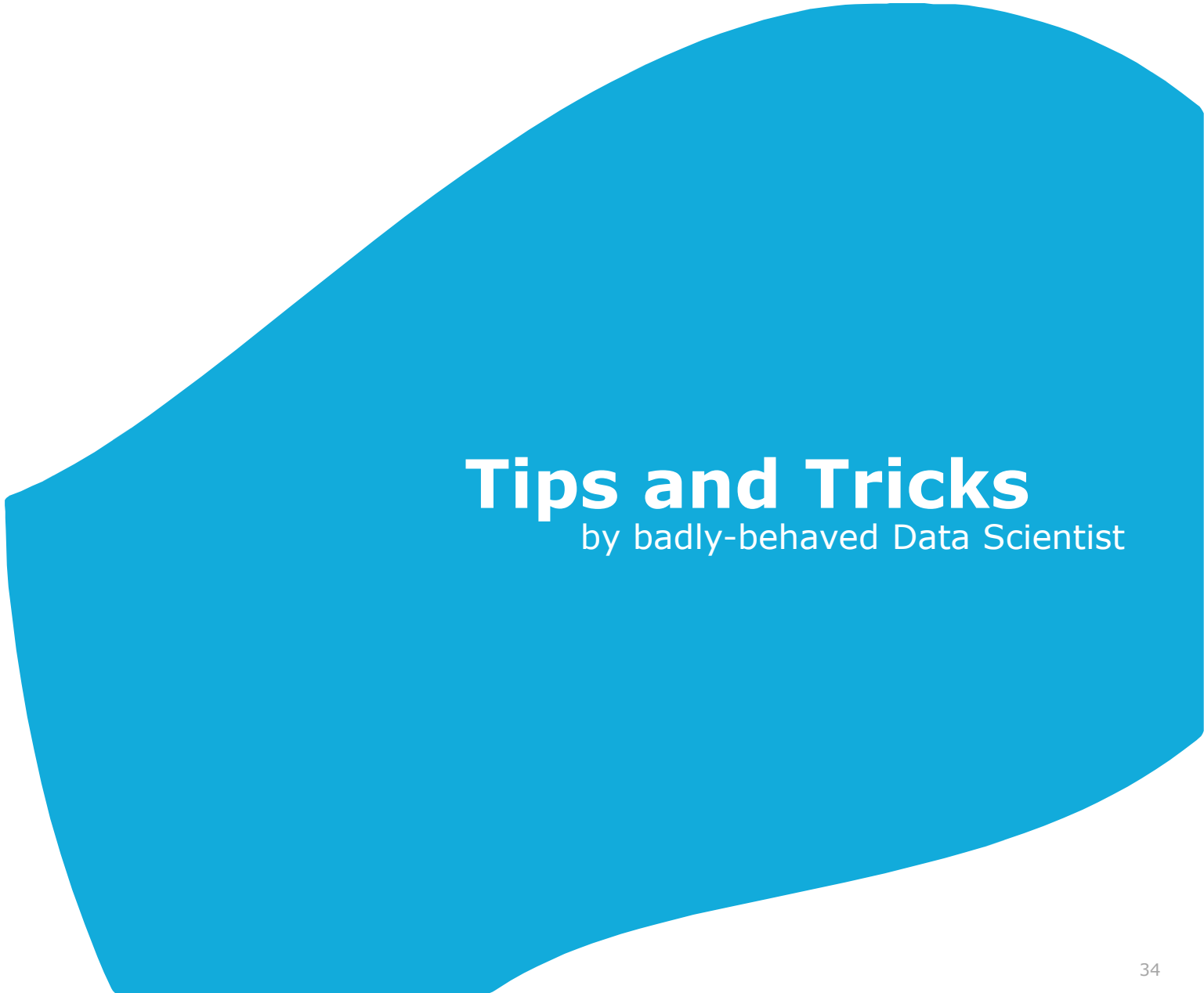
Image source: bit.ly/2kWjwyw



Algorithms



Source: bit.ly/2HuB6lI



Tips and Tricks

by badly-behaved Data Scientist

1/5 Data



Iceberg



The 90/10 Rule

10%
analysis

90% data

2/5 Magic numbers



Magic



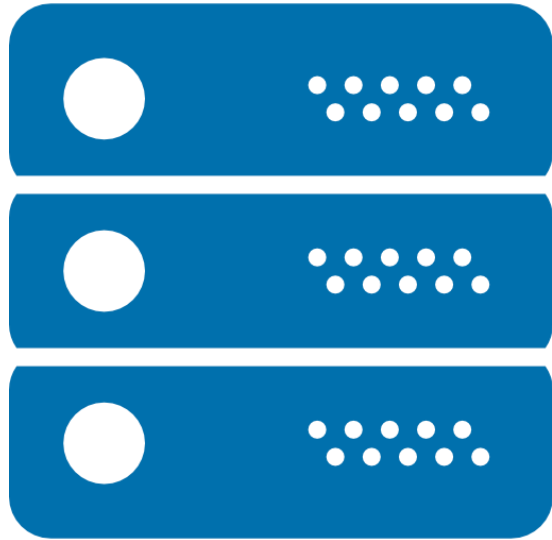
Is Machine Learning Magic?

70% / 30%
train / test
split

3/5 Equipment



Server



Moore's Law

**# of
transistors
x2 every
two years**

4/5 Domain knowledge



Books



The Role of Domain Knowledge

**Domain
knowledge
is important**

5/5 Polish language

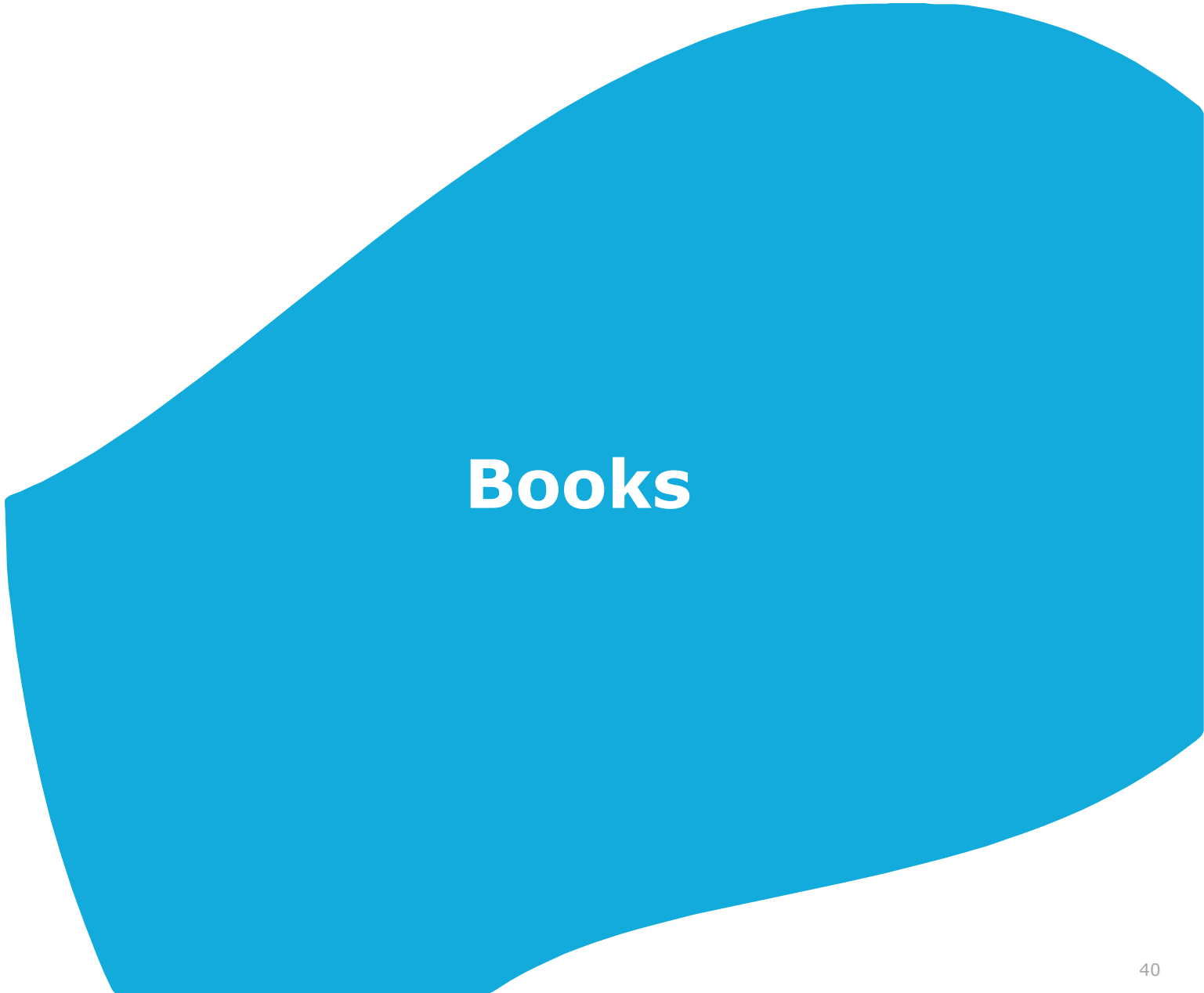


Poland

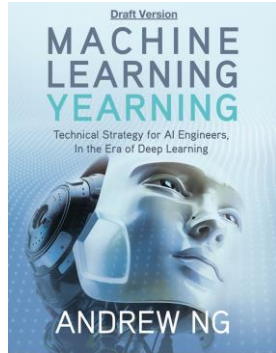


Language Difficulty Ranking

**Polish is the
hardest
language!**

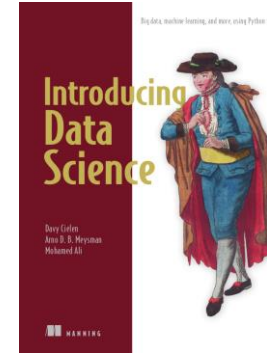


Books



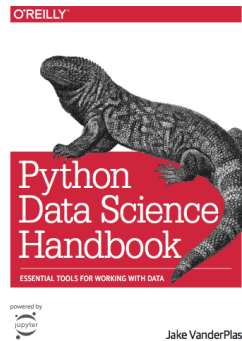
Machine Learning Yearning by Andrew Ng

- [in English](#)
- [in Russian](#)



Introducing Data Science by Davy Cielen, Arno Meysman, and Mohamed Ali

- in English
- in Russian



Python Data Science Handbook by Jake VanderPlas

- [in English](#)
- in Russian



AI Leaders

AI Leaders



Andrew Ng

- 1976, UK
- [Wikipedia](#)
- [Website](#)
- **Twitter:** @AndrewYNg
- **Facebook:** andrew.ng.96
- **LinkedIn:** andrewyng
- ang@cs.stanford.edu



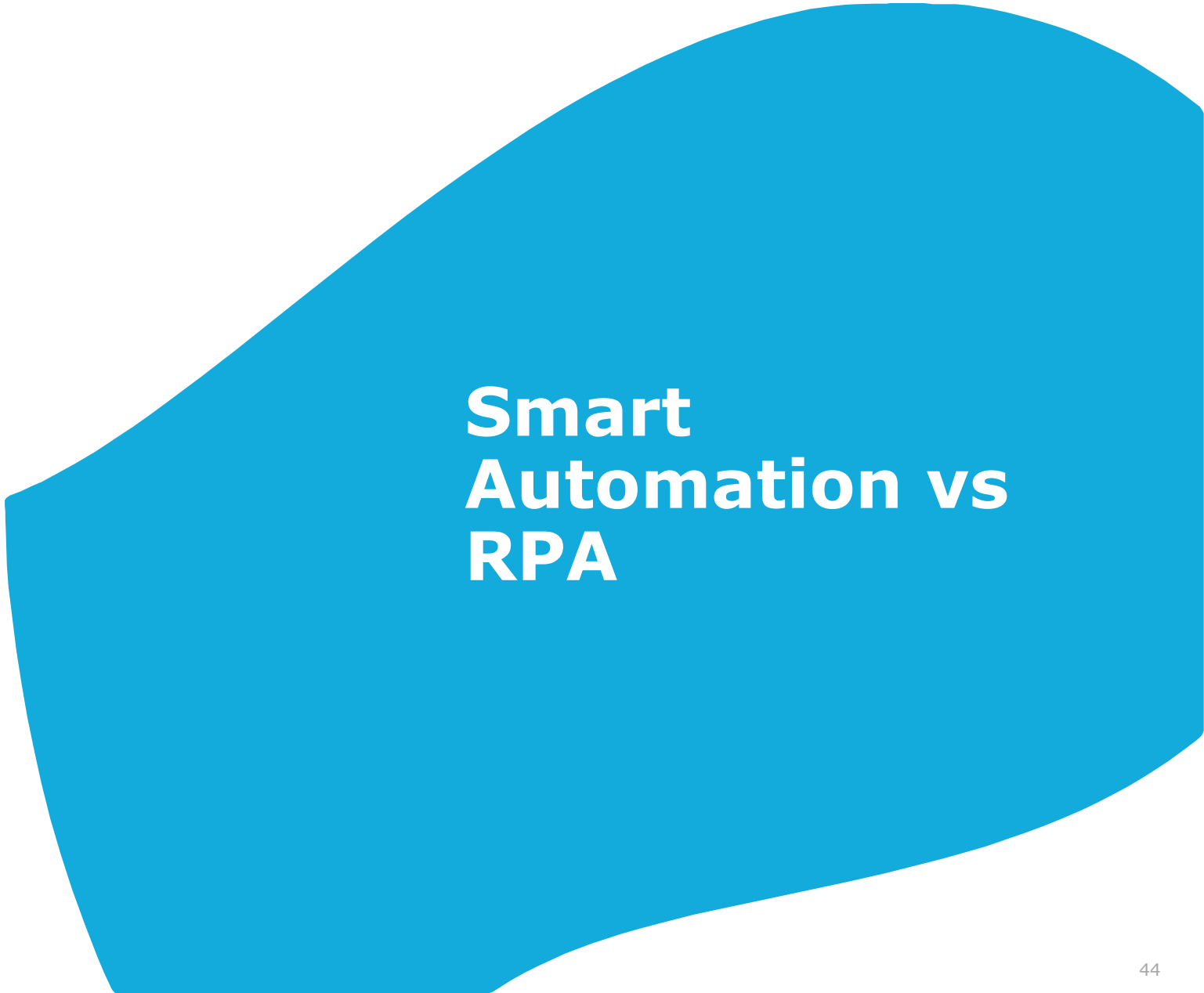
Yann LeCun

- 1960, France
- [Wikipedia](#)
- [Website](#)
- **Twitter:** @ylecun
- **Facebook:** yann.lecun
- **LinkedIn:** yann-lecun-0b999
- yann@fb.com



Geoffrey Hinton

- 1947, UK
- [Wikipedia](#)
- [Website](#)
- **Twitter:** @geoffreyhinton
- geoffrey.hinton@gmail.com



Smart Automation vs RPA



RPA (**Robotic Process Automation**) tools perform "if, then, else" statements on structured data, typically using a combination of user interface (UI) interactions, or by connecting to APIs to drive client servers, mainframes or HTML code.

An RPA tool operates by mapping a process in the RPA tool language for the software "robot" to follow, with runtime allocated to execute the script by a control dashboard.

Source: [Gartner](#)

RPA tool vendors



Specialist RPA software providers

- AutomationEdge
- **Automation Anywhere**
- **Blue Prism**
- Contextor
- EnableSoft
- Epiance
- Kryon Systems
- OpenConnect
- Softomotive
- **UiPath**

Software providers with multiple software products, including RPA

- AntWorks
- HelpSystems
- Infosys (EdgeVerve Systems)
- Jacada
- Kofax
- Nice
- Pegasystems
- Perpetuuti
- Verint
- Redwood Software
- Servicetrace
- SpiceCSM
- Winshuttle
- **WorkFusion**

IT or BPO service providers that provide proprietary RPA software platforms

- Another Monday
- Cognizant
- Conduent
- Sutherland
- Syntel
- Tech Mahindra

Smart Automation



Smart Automation accomplishes a task repeatedly without human intervention.

Smart Automation includes technologies such as machine learning, natural language processing/understanding, optical character recognition.





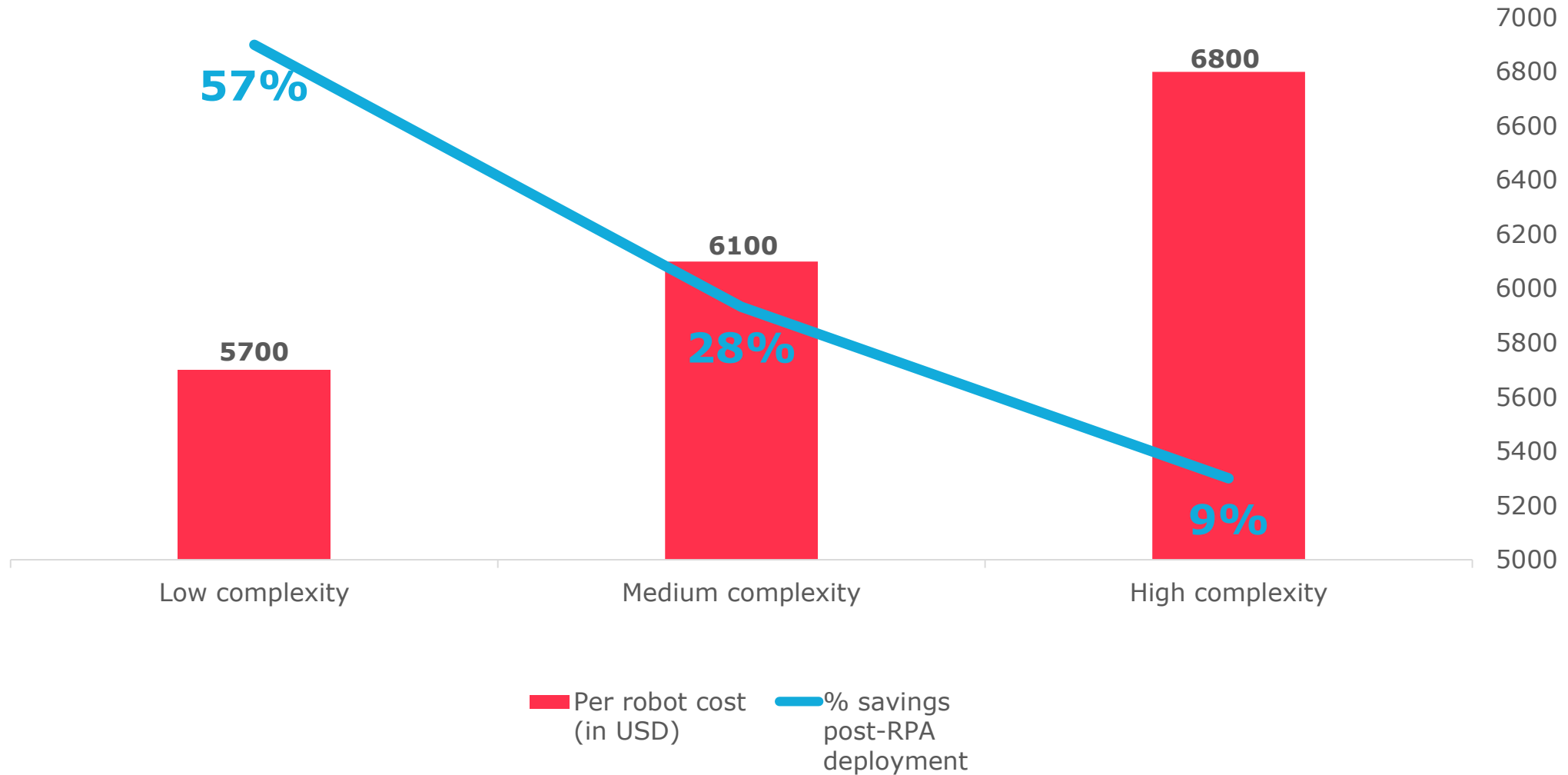
Smart Automation vs RPA

Process complexity and automation opportunities in financial services

Payment processing	Tax calculation & filing	Reconciliations	Invoice processing	Trade processing & settlements	Funds transfer & review	Account closure	Loan account & credit line setup
Customer account opening	Interest payments	Setting credit limits	Periodic accounting books closure	Loan disbursements	KYC/AML process	Loan applications processing	Updating accounts details
Regulatory reporting	Card account interchange & settlement	Trade confirmations & settlements	Transactions authorization	Tax claims management	Document processing	Overdraft/ advances provision management	Credit underwriting
Foreclosure audit review & resolution	Collateral review	Personalized offers & promotions	Risk exposure monitoring	Internal comm monitoring	Fraudulent transaction detection	Customer queries	Personalized financial advice

RPA

Variation of cost and savings



Scenario: Process with 100 FTEs pre-RPA deployment

About Capgemini

A global leader in consulting, technology services and digital transformation, Capgemini is at the forefront of innovation to address the entire breadth of clients' opportunities in the evolving world of cloud, digital and platforms. Building on its strong 50-year heritage and deep industry-specific expertise, Capgemini enables organizations to realize their business ambitions through an array of services from strategy to operations. Capgemini is driven by the conviction that the business value of technology comes from and through people. It is a multicultural company of over 200,000 team members in more than 40 countries. The Group reported 2018 global revenues of EUR 13.2 billion.

Learn more about us at

www.capgemini.com



People matter, results count.

Ruslan Korniiichuk

Senior Consultant

Capgemini

ruslan.korniichuk@capgemini.com

+48 791 065 877