

Artificial Intelligence for Humans

Katowice, 9th of October 2019

Expectation vs Reality

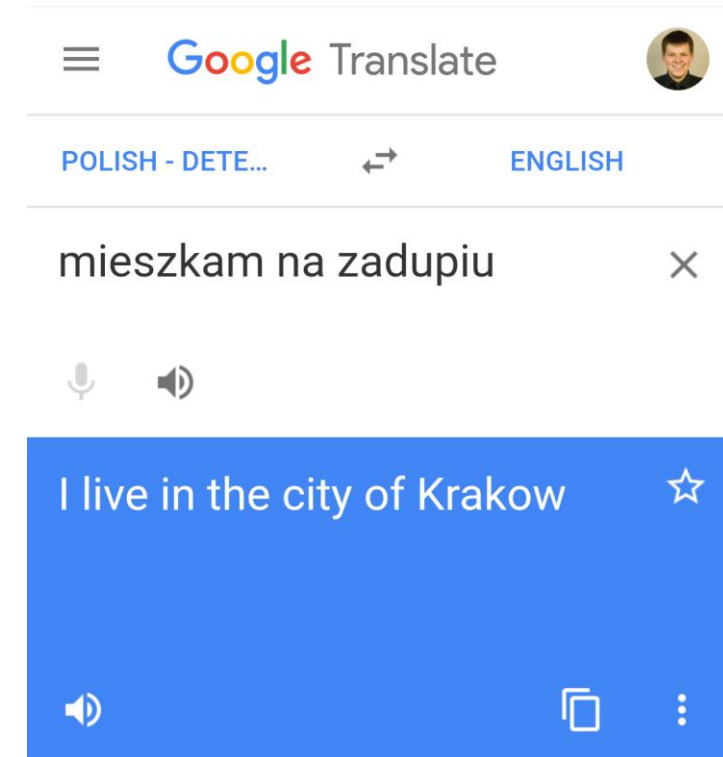


Expectation



Source: bit.ly/2I6sSAN

Reality





ARTIFICIAL INTELLIGENCE

MACHINE LEARNING

ROBOTICS

BOOKS



The New AI Toilets Will Scan Your Poop To Diagnose Your Ailments

 Navin Bondade  7 Comments  Artificial Intelligence, Data Science, Deep Learning, Machine Learning

News



Elon Musk's AI project to replicate the human brain receives \$1 billion from Microsoft

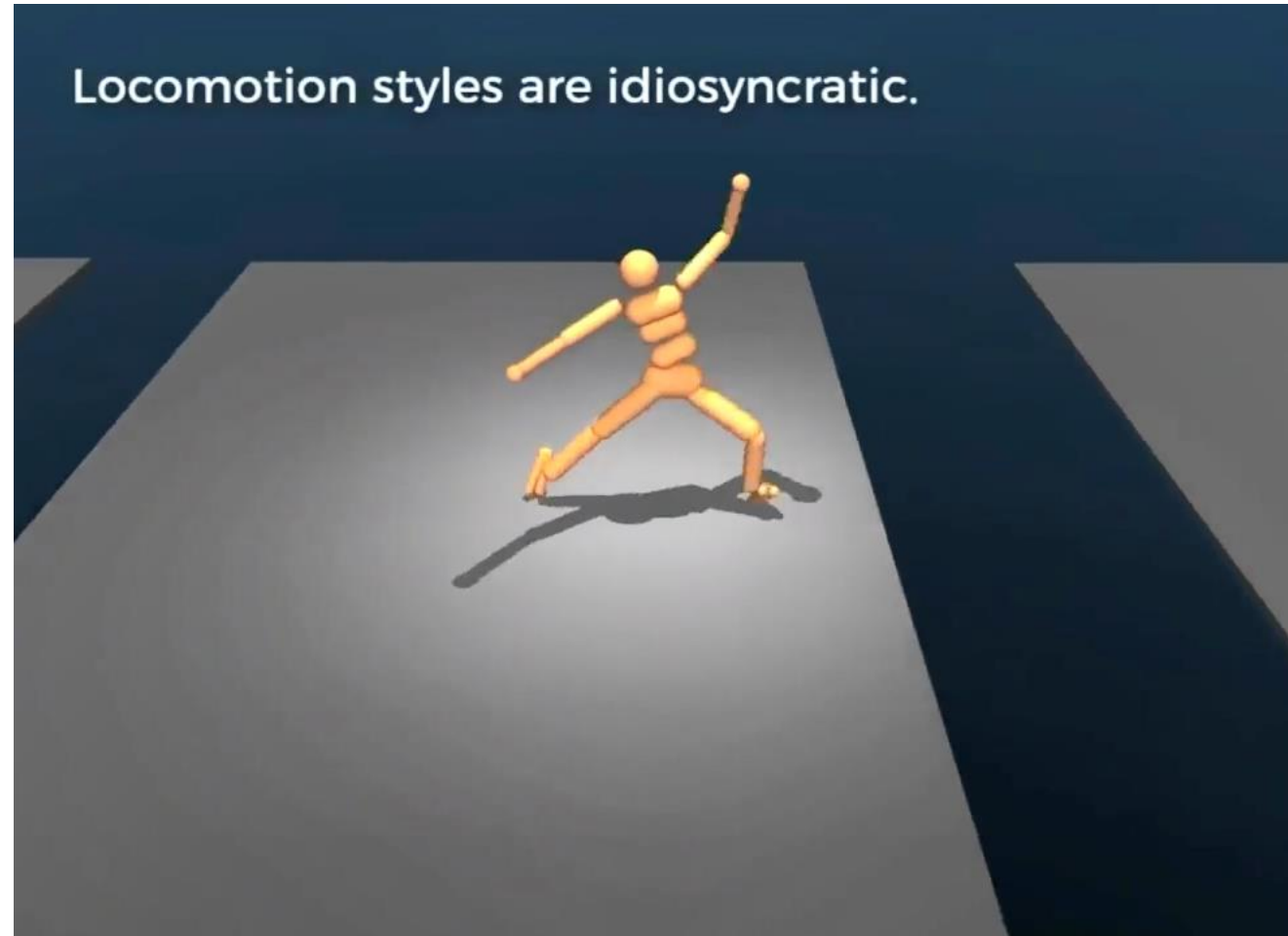
 Navin Bondade  0

Microsoft and Elon Musk's OpenAI are teaming up to improve the way AI works and use to solve real-world problems.



The Seven Legit Deep Learning Courses To Become DL Expert

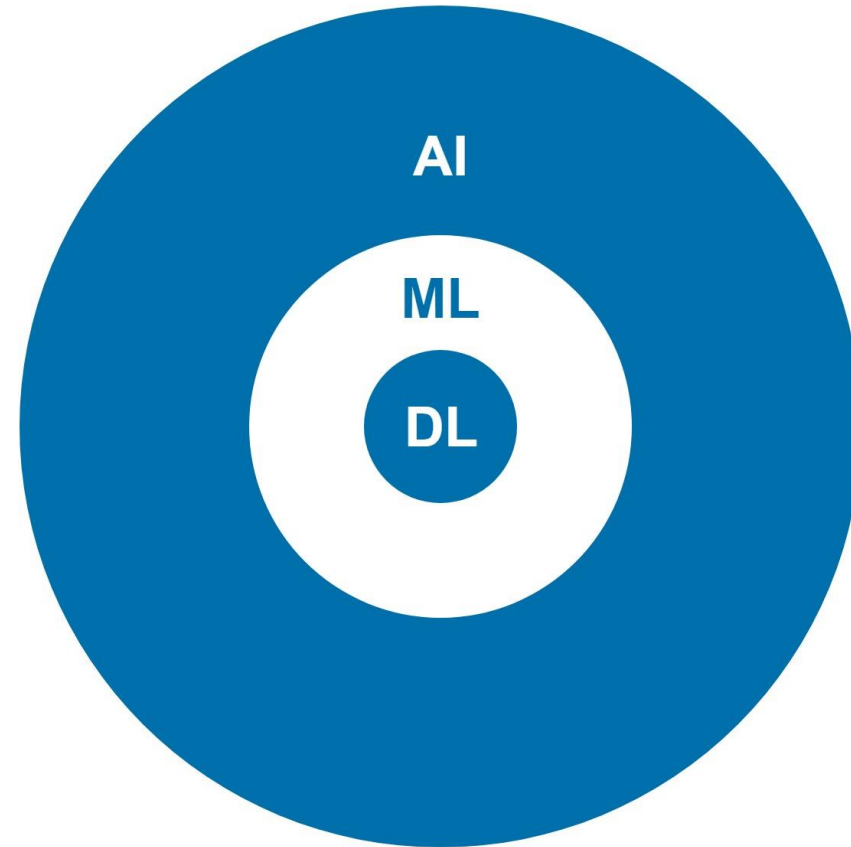
Expectation vs Reality



Source: bit.ly/2P0nqTi

Terminology

Artificial Intelligence vs Machine Learning



Artificial Intelligence vs Machine Learning



AI

Artificial Intelligence

Capability of a machine to imitate intelligent human behavior

ML

Machine Learning

Process used to achieve Artificial Intelligence

DL

Deep Learning

Algorithms that try to mimic the brain

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



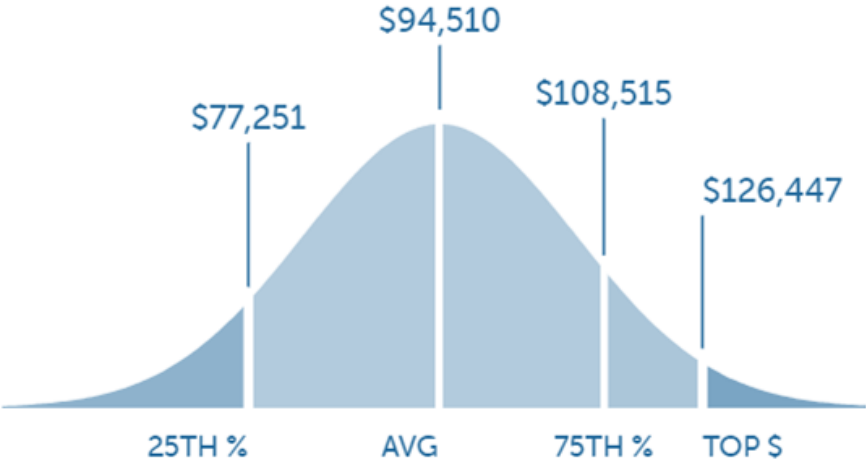
💬 8,467 people are talking about this



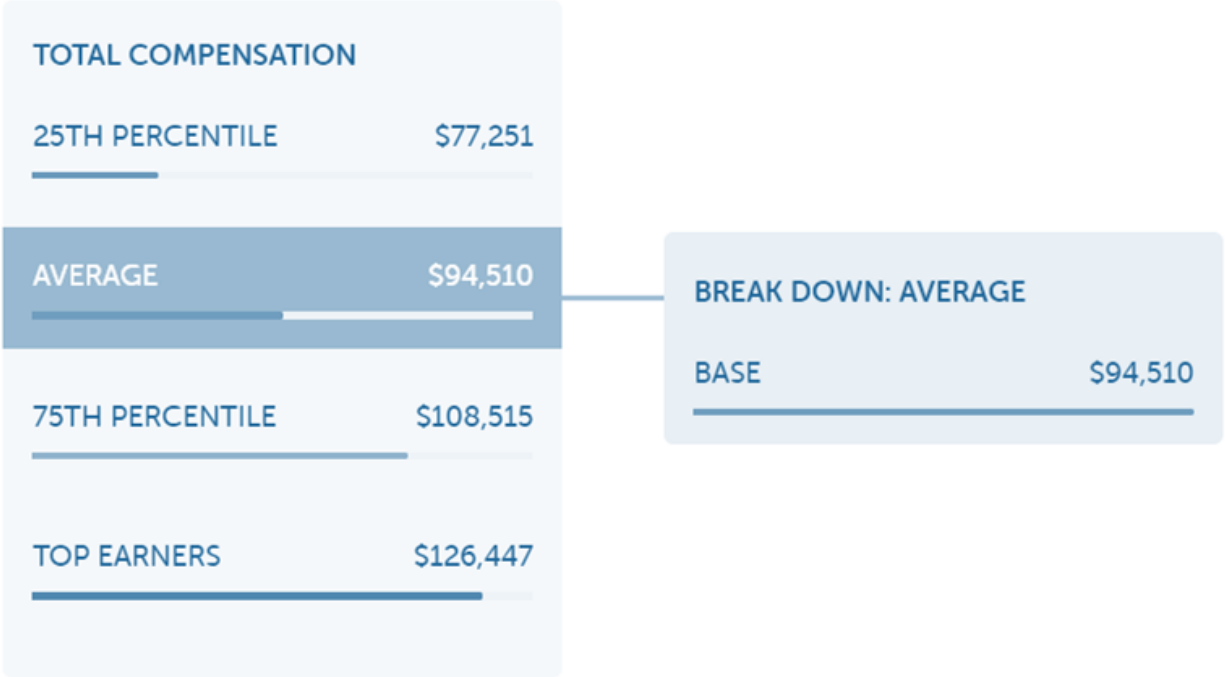
Artificial Intelligence vs Machine Learning



Compensation



Salaries for Machine Learning Engineers

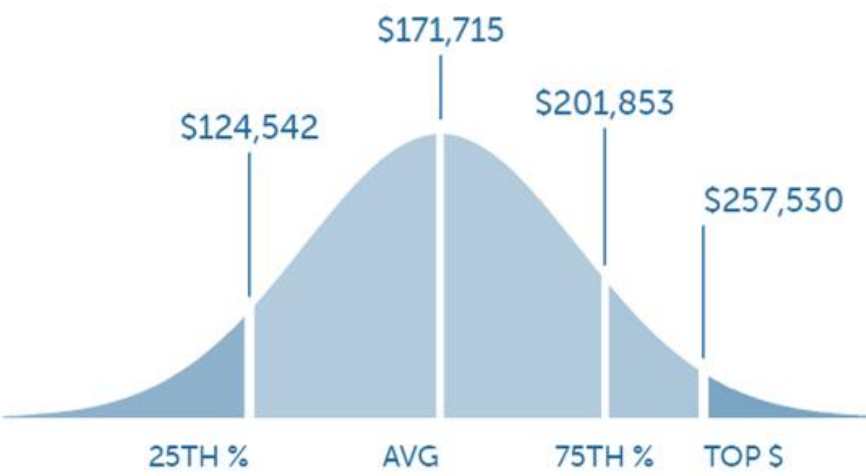


Source: bit.ly/30I1Pq2

Artificial Intelligence vs Machine Learning



Compensation

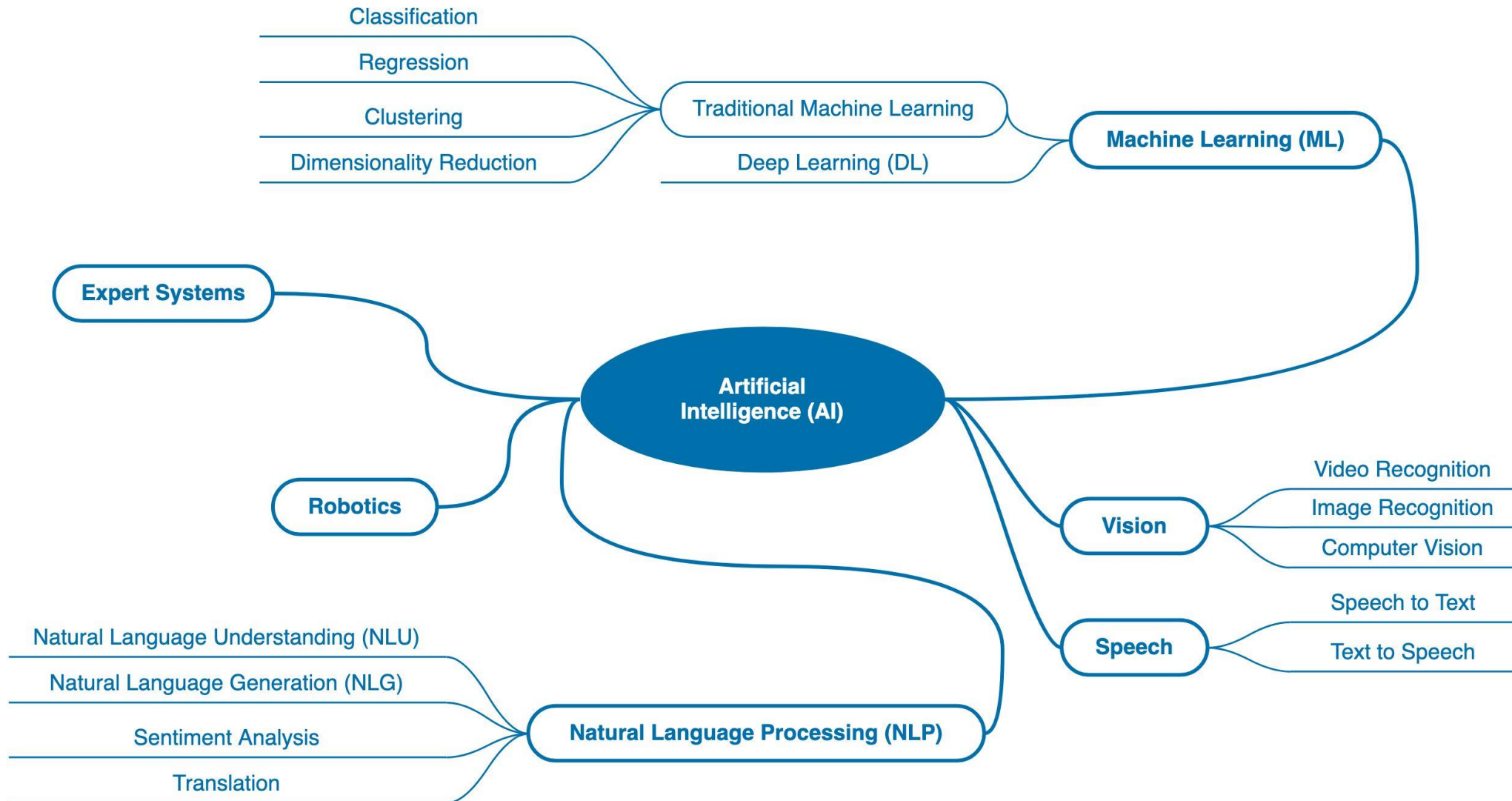


Salaries for Artificial Intelligence Engineers

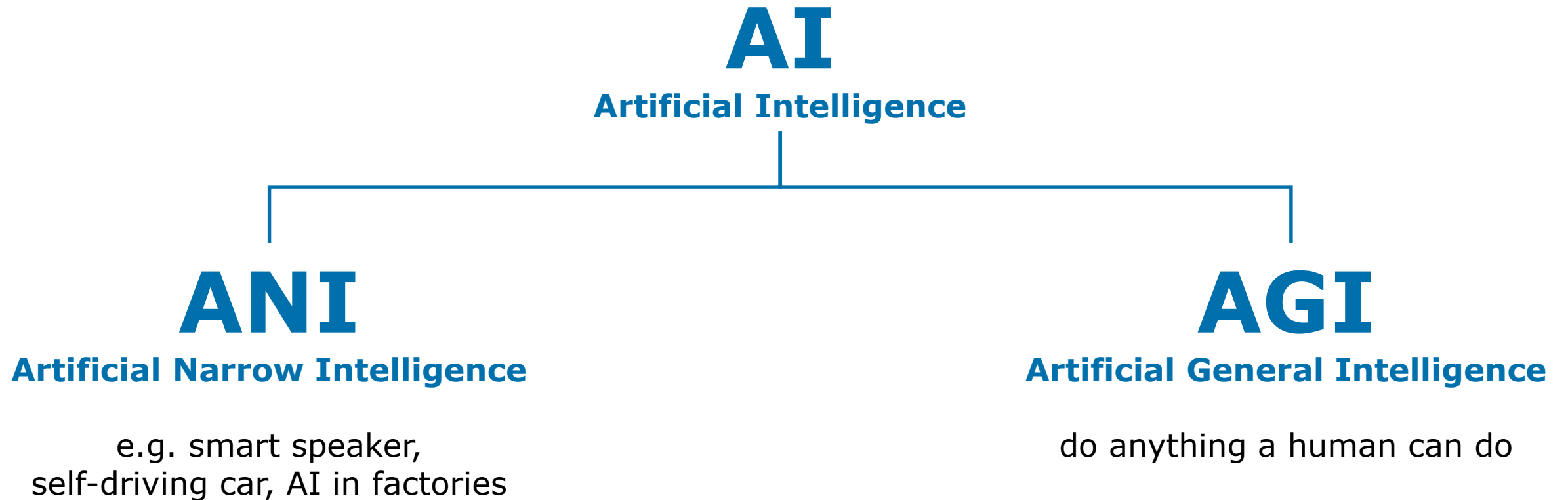
TOTAL COMPENSATION	
25TH PERCENTILE	\$124,542
AVERAGE	\$171,715
75TH PERCENTILE	\$201,853
TOP EARNERS	\$257,530

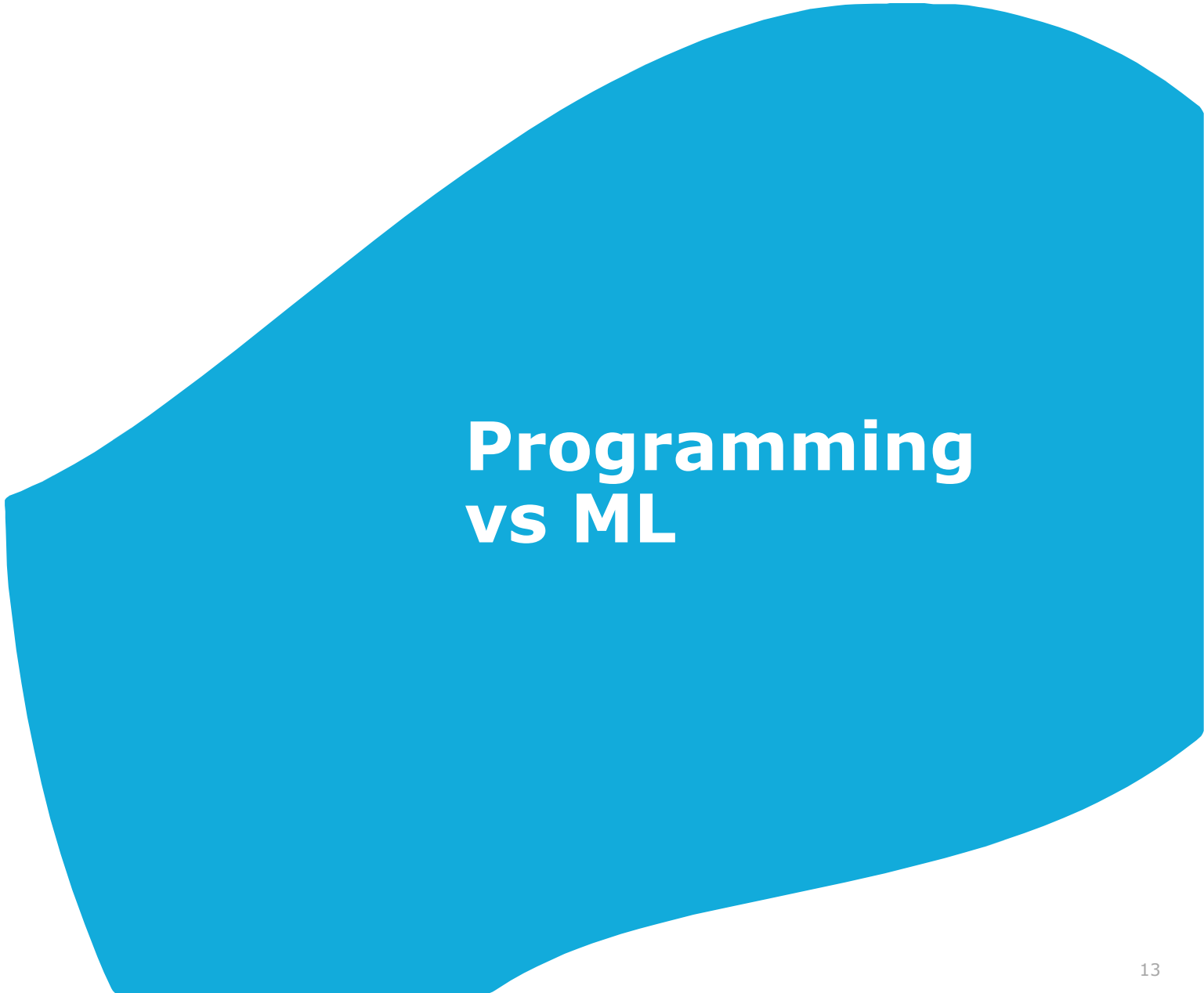
BREAK DOWN: AVERAGE	
BASE	\$114,857
EQUITY	\$39,666
BONUS	\$17,191
SIGNING BONUS	\$9,268

Source: bit.ly/2M9egHU



ANI vs AGI



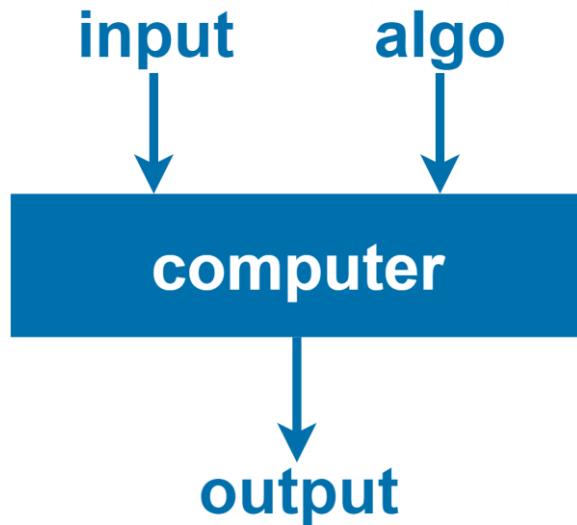


Programming vs ML

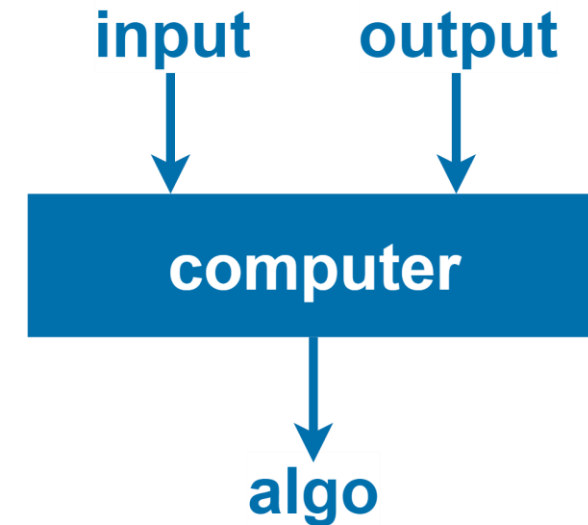
Traditional Programming vs Machine Learning



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

$$1 \square 1 = 2$$

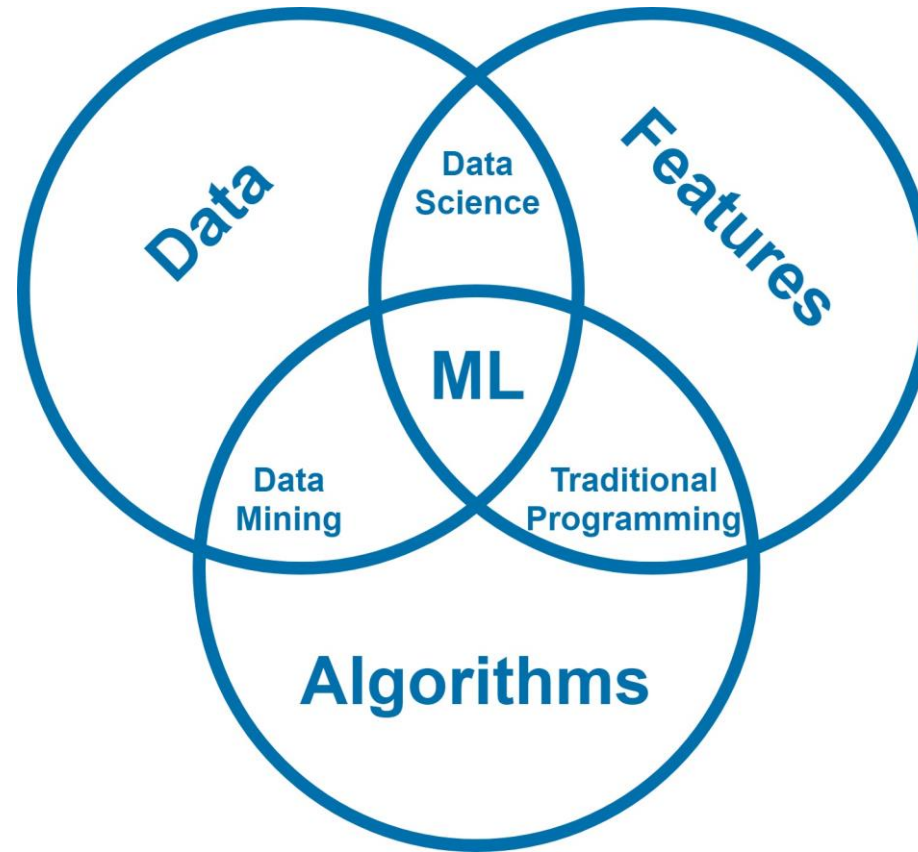
$$1 \square 2 = 3$$

$$0 + 1*1 + 1*3 = 4$$



Data Science vs Data Mining

Data Science vs Data Mining



Source: bit.ly/2kFi4Uz

Job roles

Data science job roles

Part 1



Data Scientist

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



Artificial Intelligence Engineer

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



Data Architect

- Cloud computing
- Data warehouse
- PowerPoint
- Draw.io
- Excel



Data science job roles

Part 2



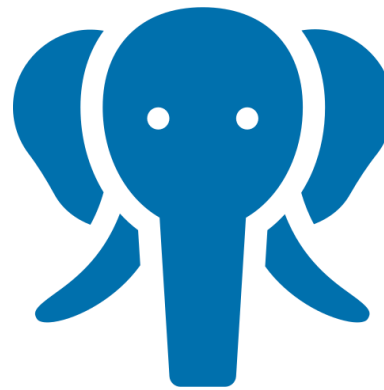
Data Engineer

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



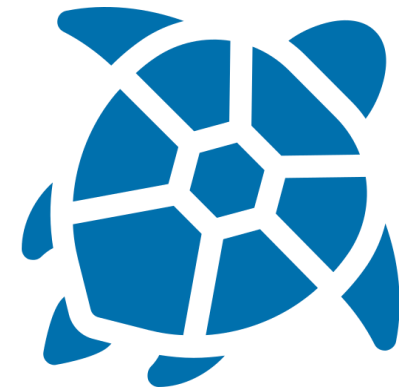
Big Data Specialist

- Java
- Hadoop
- Linux
- Git



Data Analyst

- BI tools
- SQL
- Excel
- PowerPoint





ML tasks

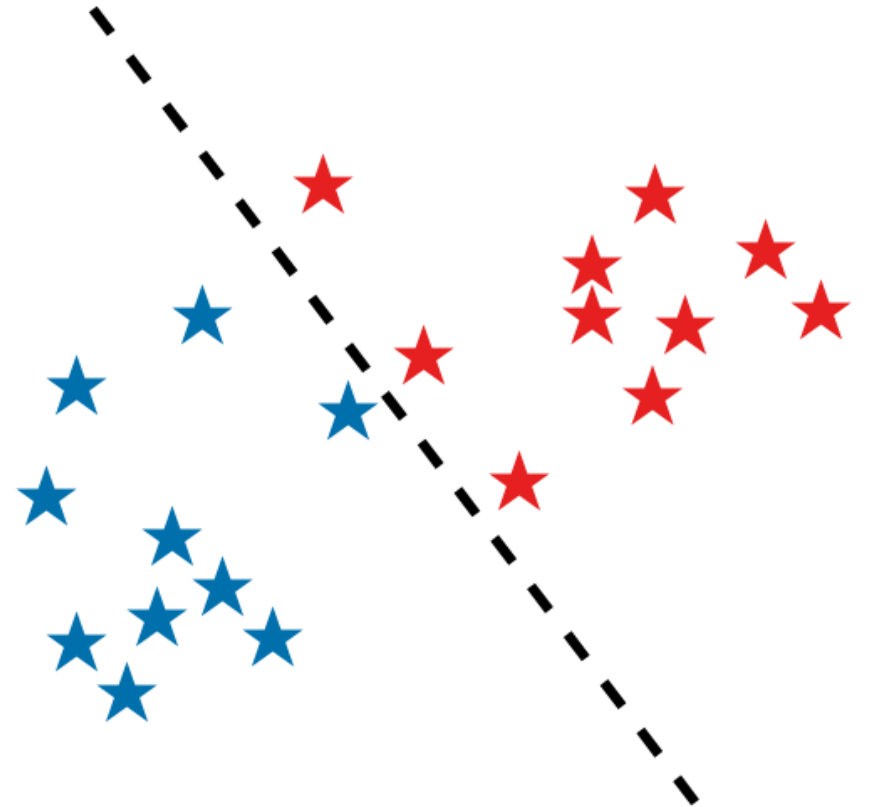
Classification



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

Examples:

- Spam filter.
- Language detection.
- Credit scoring.



Credit scoring



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

Features:

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



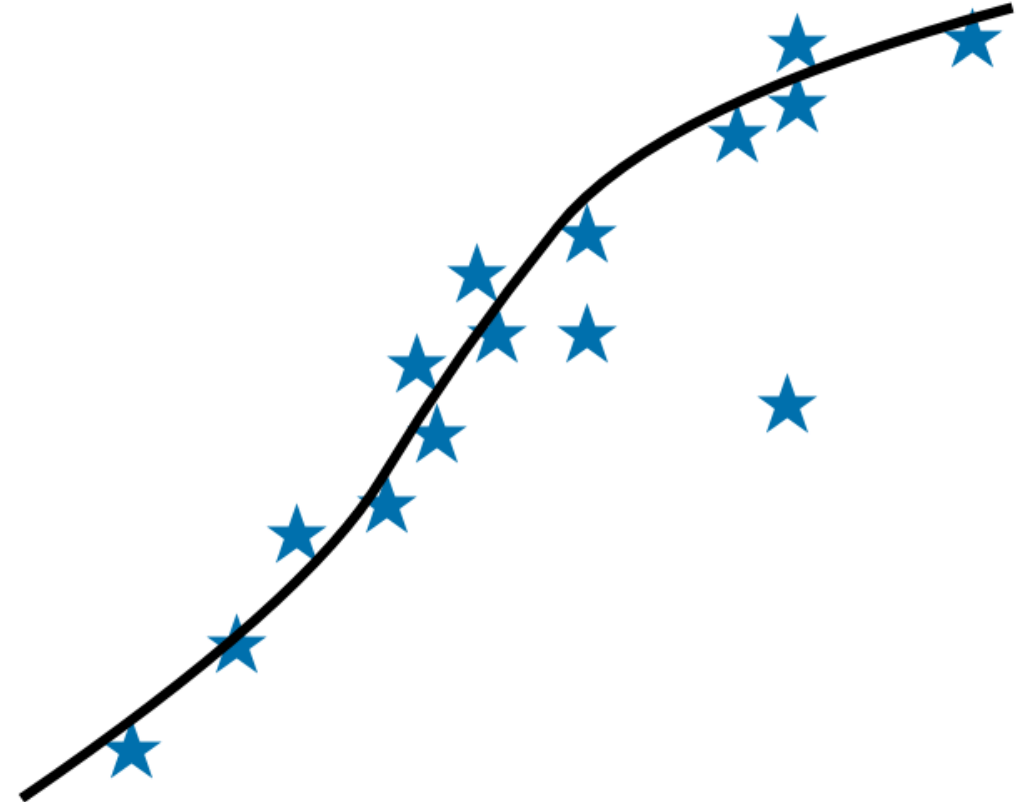
Regression



Prediction value as continuous value.

Examples:

- Predicting house and car price.
- Job salary prediction.
- Stock market prediction.



Stock market prediction



Output: daily price of share (close price).

Features:

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



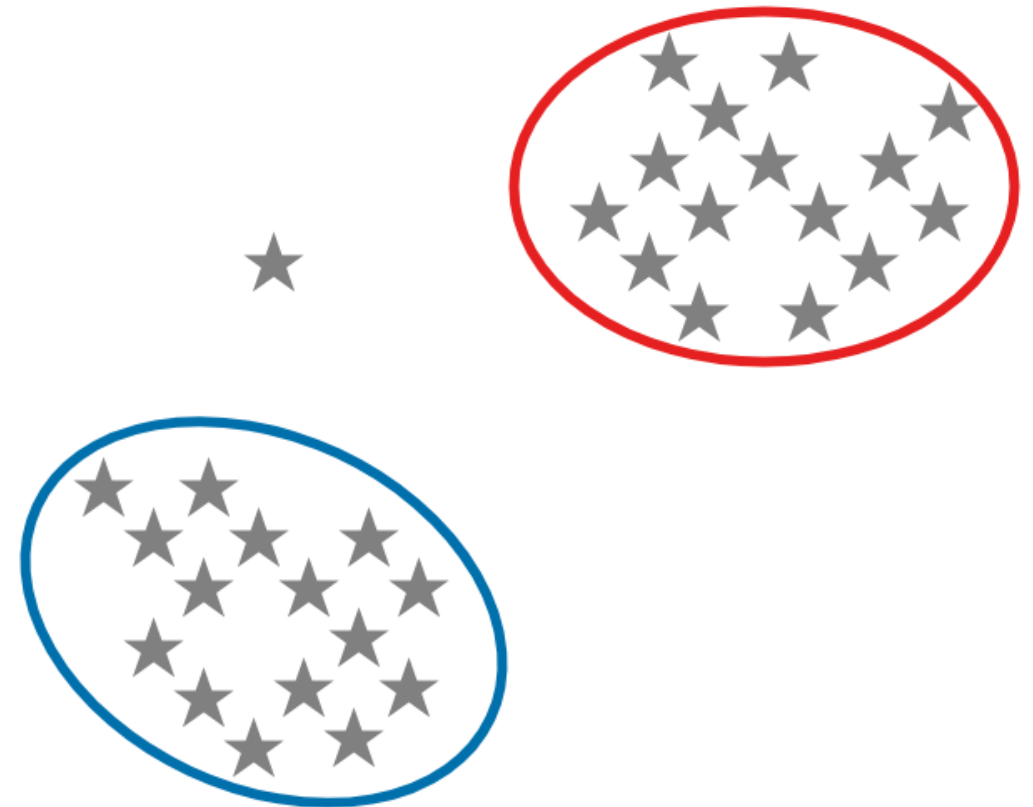
Clustering



Grouping a set of points to clusters.

Examples:

- Image clustering.
- Customer segmentation.
- Fraud detection.



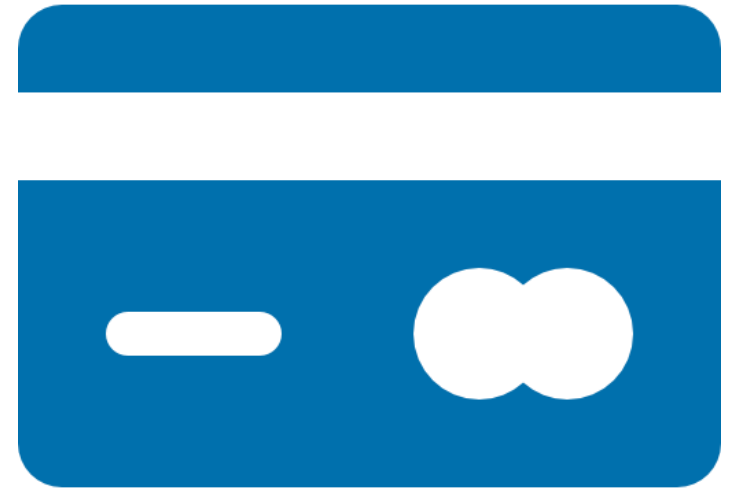
Fraud detection



Output: money transfer approve or reject.

Features:

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



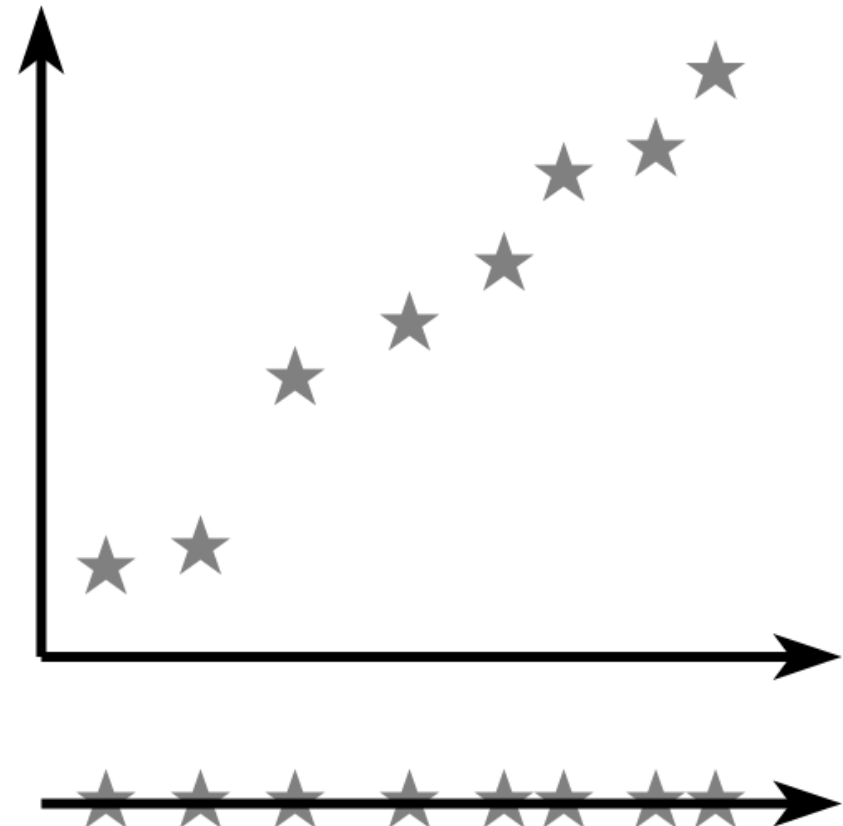


Dimensionality reduction

Reducing the number of features.

Examples:

- Data visualization.
- Fake image detection.
- Topic Modelling.



BREAK

Test

Part 1



- Anomaly detection.
- Cancer prediction.
- Champions League winner prediction.
- Character recognition.
- Company's yearly revenue prediction.
- E-commerce business forecasting.
- Employee attrition prediction.
- Foreign exchange market prediction.
- Human activity recognition using smart bands.
- Map points combining.
- Market basket analysis.
- One-class classification.
- Sentiment analysis.



More use cases



More use cases

Manufacturing

- Predictive maintenance
- Warranty reserve estimation
- Propensity to buy
- Demand forecasting
- Process optimization
- Telematics

Retail

- Predictive inventory planning
- Recommendation engines
- Upsell and cross-channel marketing
- Market segmentation and targeting
- Customer ROI and LTV

Healthcare and life sciences

- Real-time alerts and diagnostics
- Disease identification and risk stratification
- Patient triage optimization
- Proactive health management
- Healthcare provider sentiment analysis

Financial services

- Risk analytics and regulation
- Credit worthiness evaluation
- Customer segmentation
- Cross-selling and upselling
- Sales and marketing campaign management

Travel and hospitality

- Aircraft scheduling
- Dynamic pricing
- Feedback and interaction analysis
- Customer complaint resolution
- Traffic patterns and congestion management

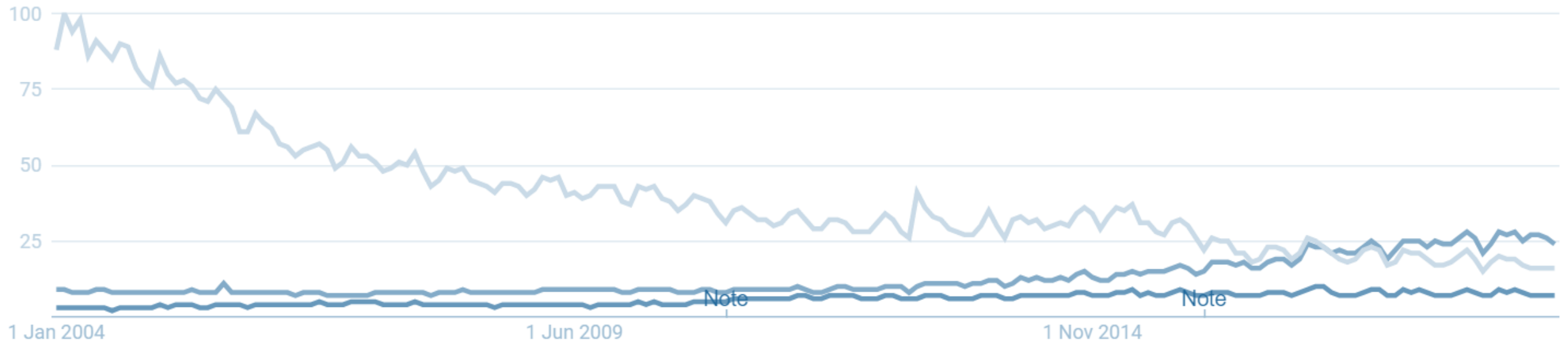
Energy, feedstock and utilities

- Power usage analytics
- Seismic data processing
- Carbon emissions and trading
- Customer-specific pricing
- Smart grid management
- Energy demand and supply optimization

Source: bit.ly/2INPdh6

Python vs R

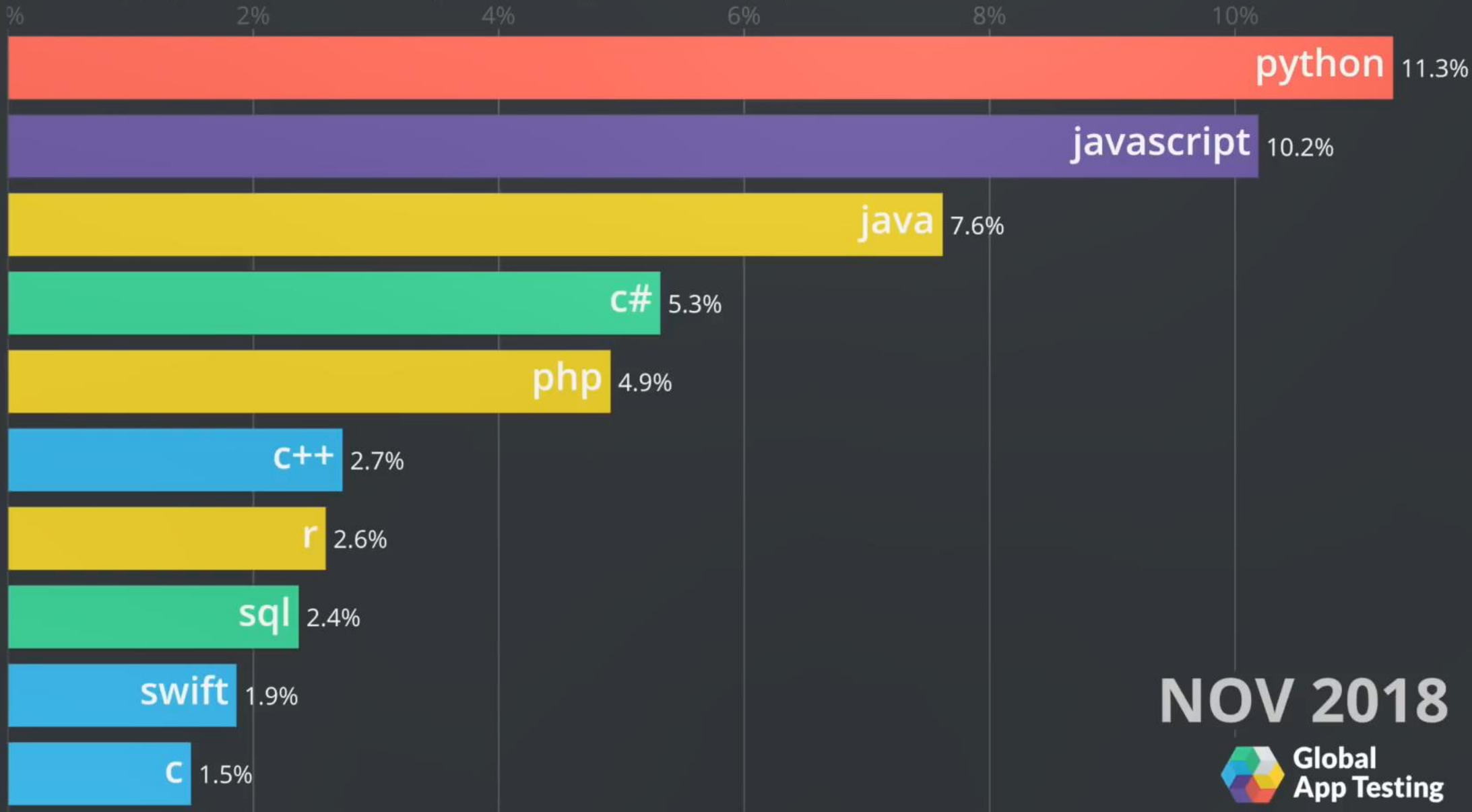
Java vs Python vs R



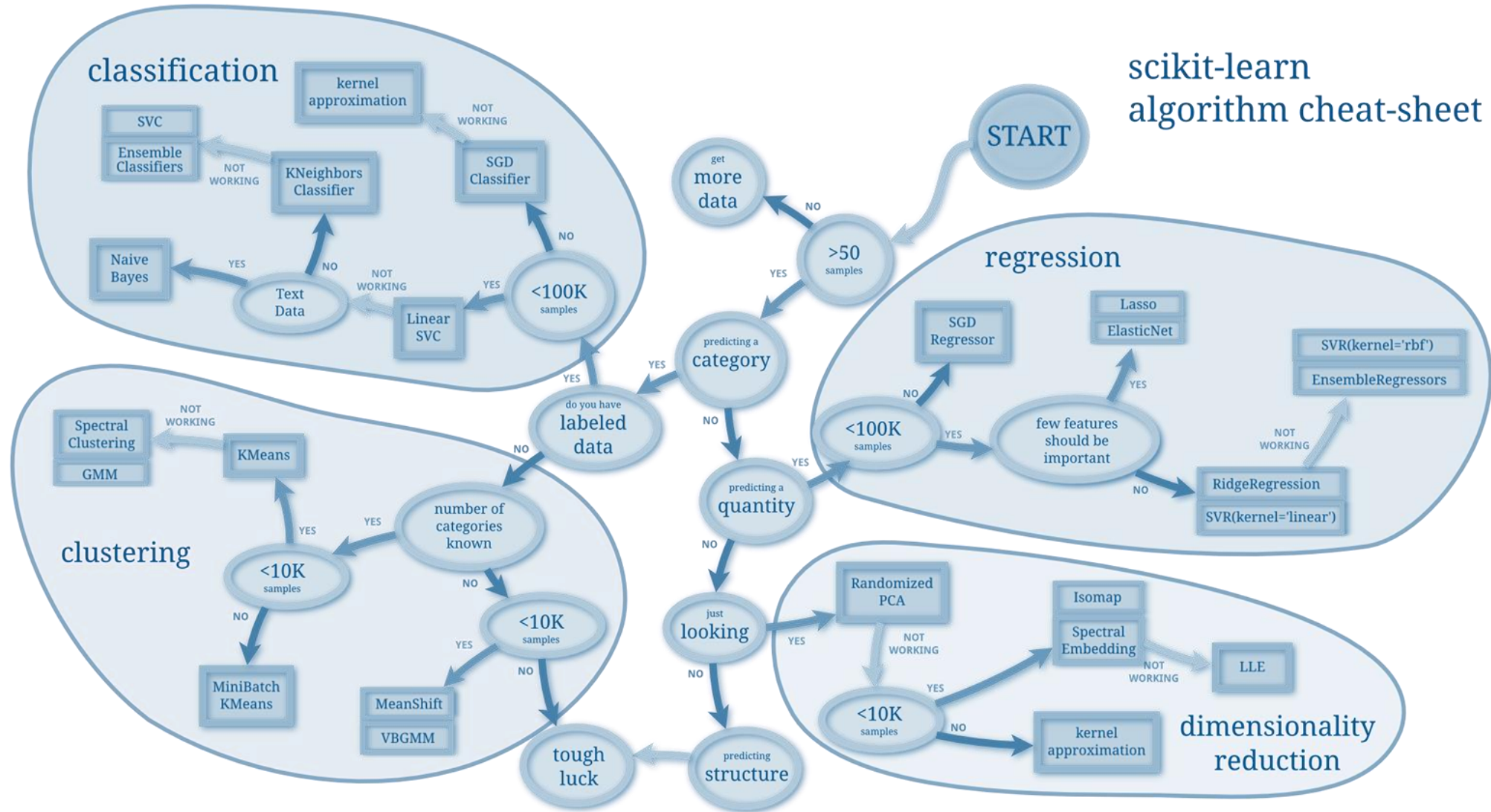
Source: bit.ly/2Ojajhs

Most popular programming languages on Stack Overflow.

Percentage (%) of all Stack Overflow questions every month since September 2008.



Algorithms



Source: bit.ly/2HuB6II



Let's start

Classification in Python

Predict Diabetes



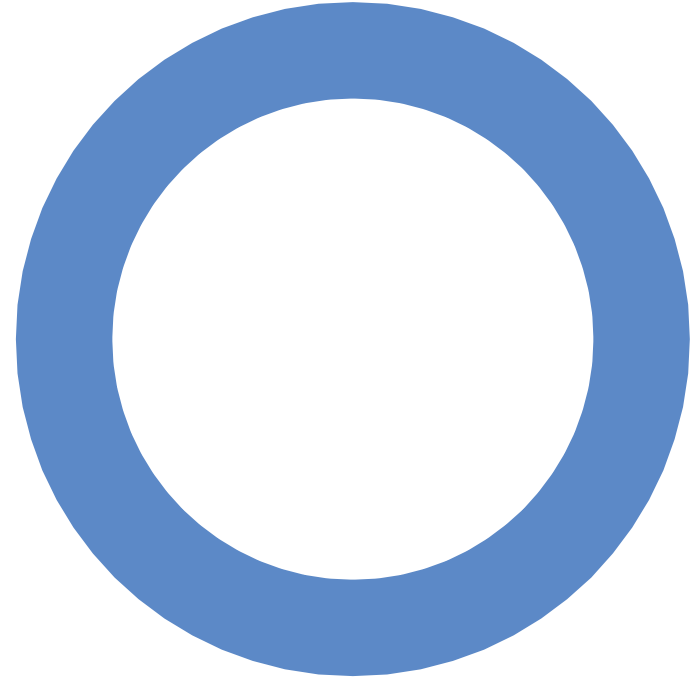
Classes: *1* – diabetic, *0* – non-diabetic.

Features:

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).

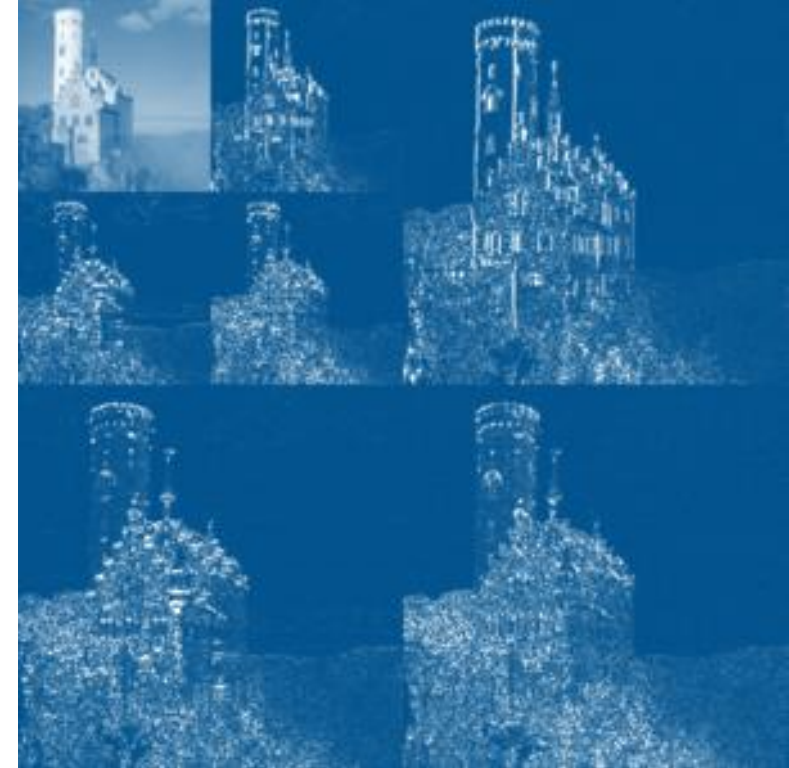
Features:

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



bit.ly/EX1CAP

Tips and Tricks

by badly-behaved Data Scientist

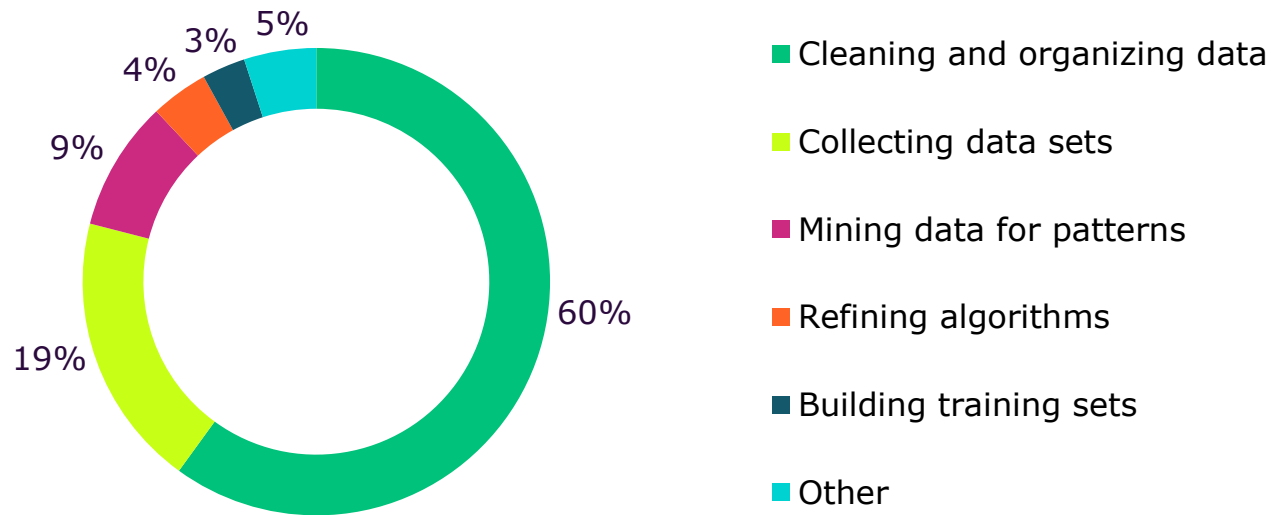
1/5 Data preparation



**90% data
preparation
10%
analysis**

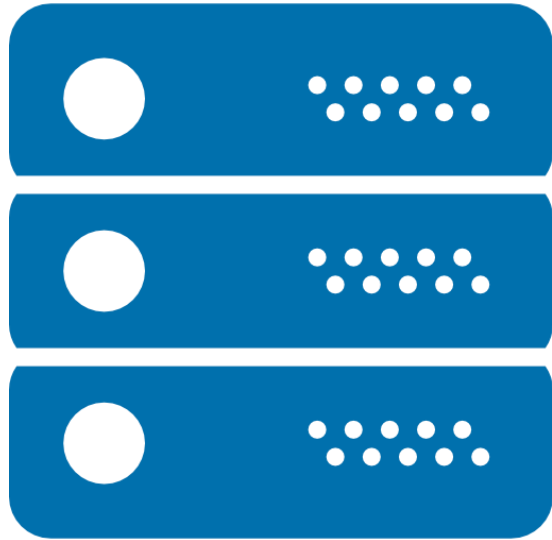


1/5 Data preparation



Source: bit.ly/2kHWM8L

**Data
preparation
accounts for
about 80% of
the work**



**# of
transistors
x2 every
two years**

3/5 Domain knowledge



**Domain
knowledge
is important**

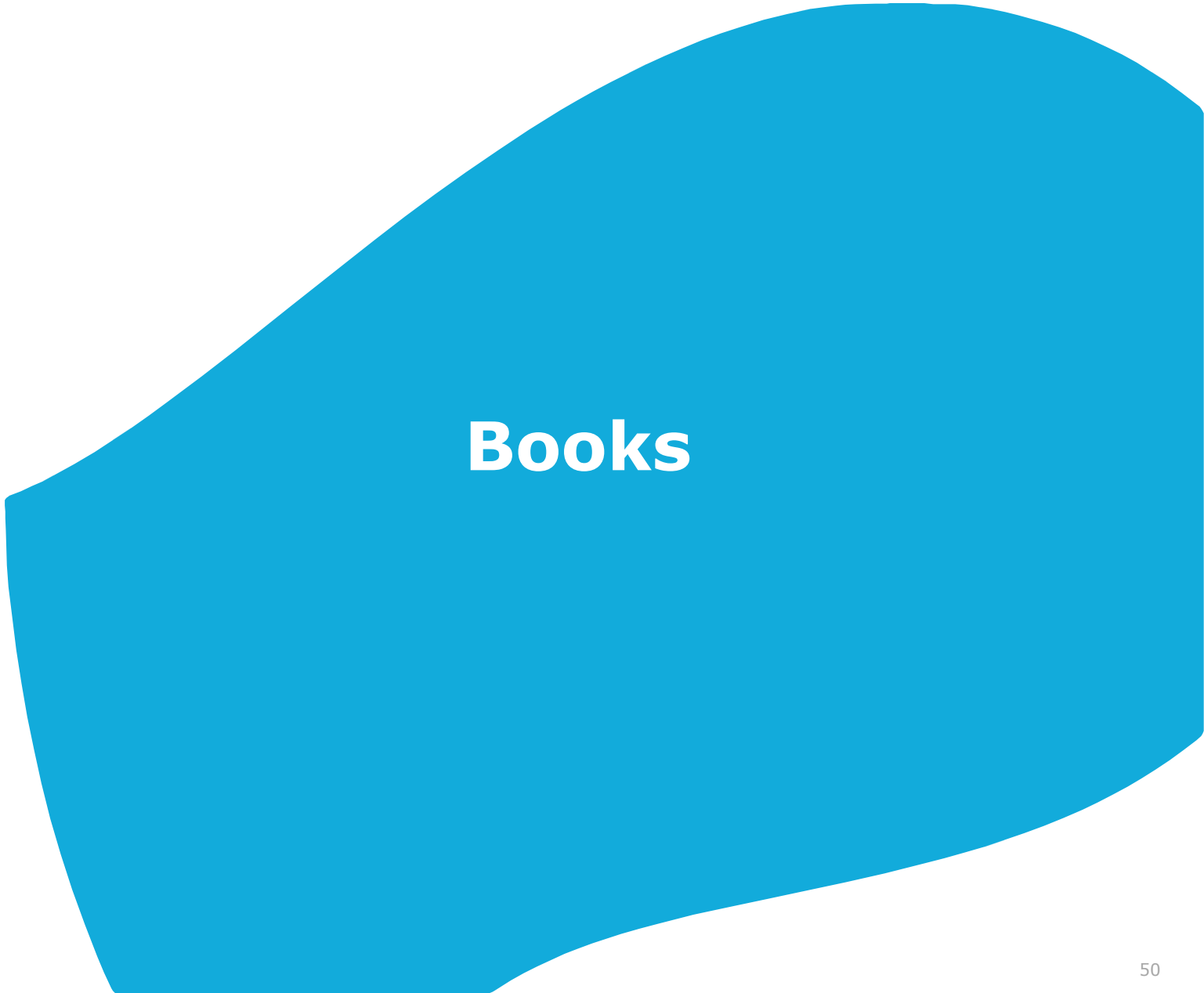
4/5 Magic numbers



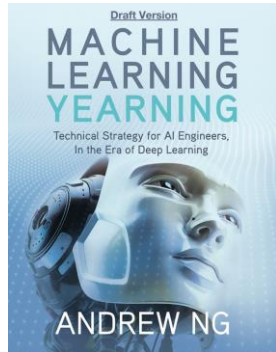
70% / 30%
train / test



**Polish is the
hardest
language!**

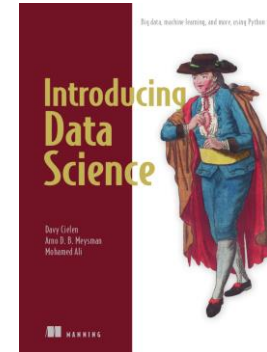


Books



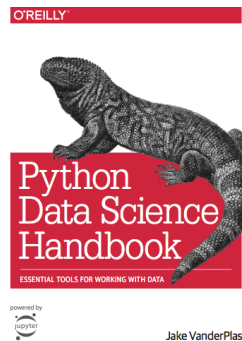
Machine Learning Yearning by Andrew Ng

- [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



Geoffrey Hinton

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



Yann LeCun

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



Yoshua Bengio

- 1964, France
- [Wikipedia](#)
- [Website](#)
- **Facebook:** yoshua.bengio
- **LinkedIn:** yoshuabengio
- yoshua.bengio@umontreal.ca

AI Leaders



Andrew Ng

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



Fei-Fei Li

- 1976, Beijing
- [Wikipedia](#)
- **Twitter:** drfeifei
- **Facebook:** feifei.li.372
- **LinkedIn:** fei-fei-li-4541247
- feifeili@cs.stanford.edu



Siraj Raval

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- [Website](#)
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- **Facebook:** sirajologyyy
- **LinkedIn:** sirajraval
- hello@sirajraval.com

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