AI Mastery Course

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Module

Artificial Intelligence Fundamental

Section

Artificial Intelligence

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AI

Learning Objectives

Pada akhir pembelajaran ini, diharapkan Anda untuk mampu:

- Memahami mengenai AI atau kecerdasan buatan dan evolusinya
- Memahami hubungan antara AI, Machine Learning and Deep Learning
- Dapat menghubungkan bidang lain seperti Data Science, Computer Vision and NLP with AI
- Dapat memahami konsep dibalik machine learning
- Dapat memahami proses standar dari machine learning

Agenda

01	ARTIFICIAL INTELLIGE	• Data and its sources • AI- system and structure • AI in everyday products
02	AI LANDSCAPE	• AI landscape • Applications of data science, computer vision and NLP
03	MACHINE LEARNING	• What is Machine Learning? • Machine Learning v/s traditional software
04	ML TOOLS	• Tools for Machine Learning • What to learn in Machine Learning?
05	CONCLUSION	• Quiz • Summary

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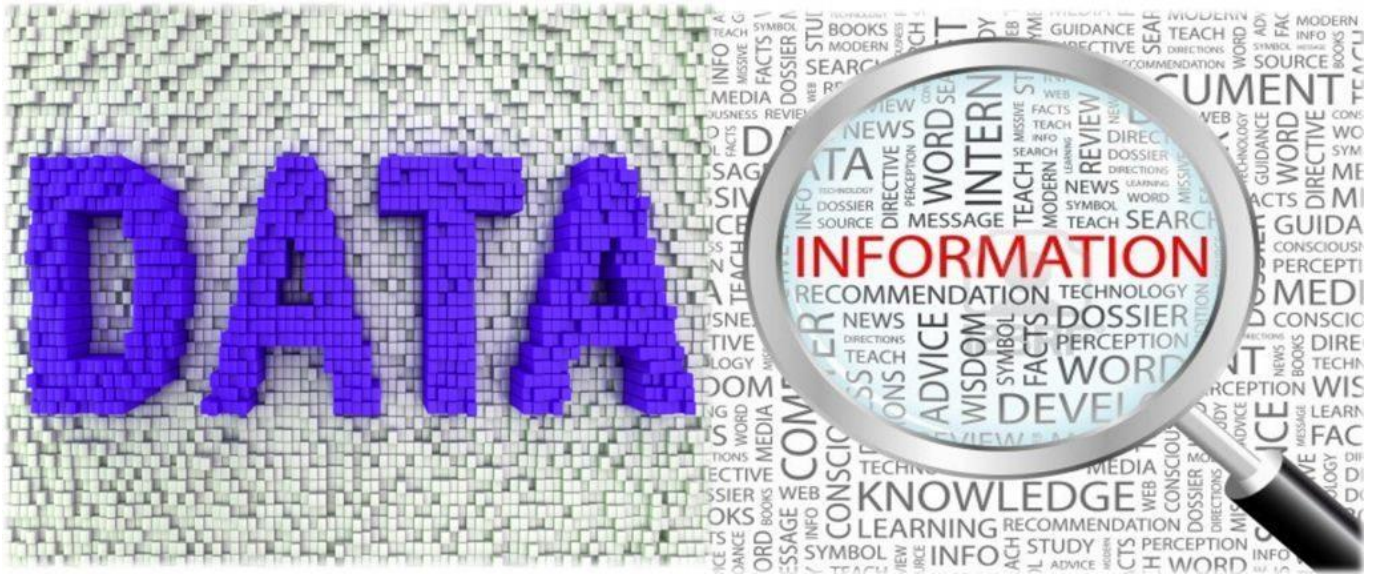
01 ARTIFICIAL INTELLIGENCE

- Data and its sources
- AI- system and structure
- AI in everyday products

What is Data?



Structured
- Business Data, Excel, CSV

Unstructured
- Text, Images and Speech

What is Data?

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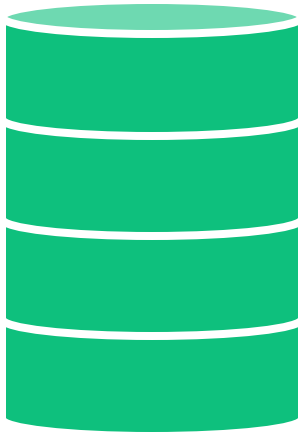
Data

- Kumpulan fakta-fakta yang ada disekitar kita
- Bentuk jamak dari kata ‘datum’
- Kumpulan fakta dan statistik dalam bentuk mentah atau tidak terorganisir
- Kumpulan fakta dan statistik yang digunakan untuk referensi dan analisis



Digital data

- Informasi yang diproses atau disimpan oleh komputer dalam bentuk dokumen teks, gambar, audio, video, dll.

Sources of Data

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COMMON SOURCES:

- Sensors/meters and activity records from electronic devices
- Social interactions
- Business transactions
- Electronic files
- Broadcastings

What is AI?

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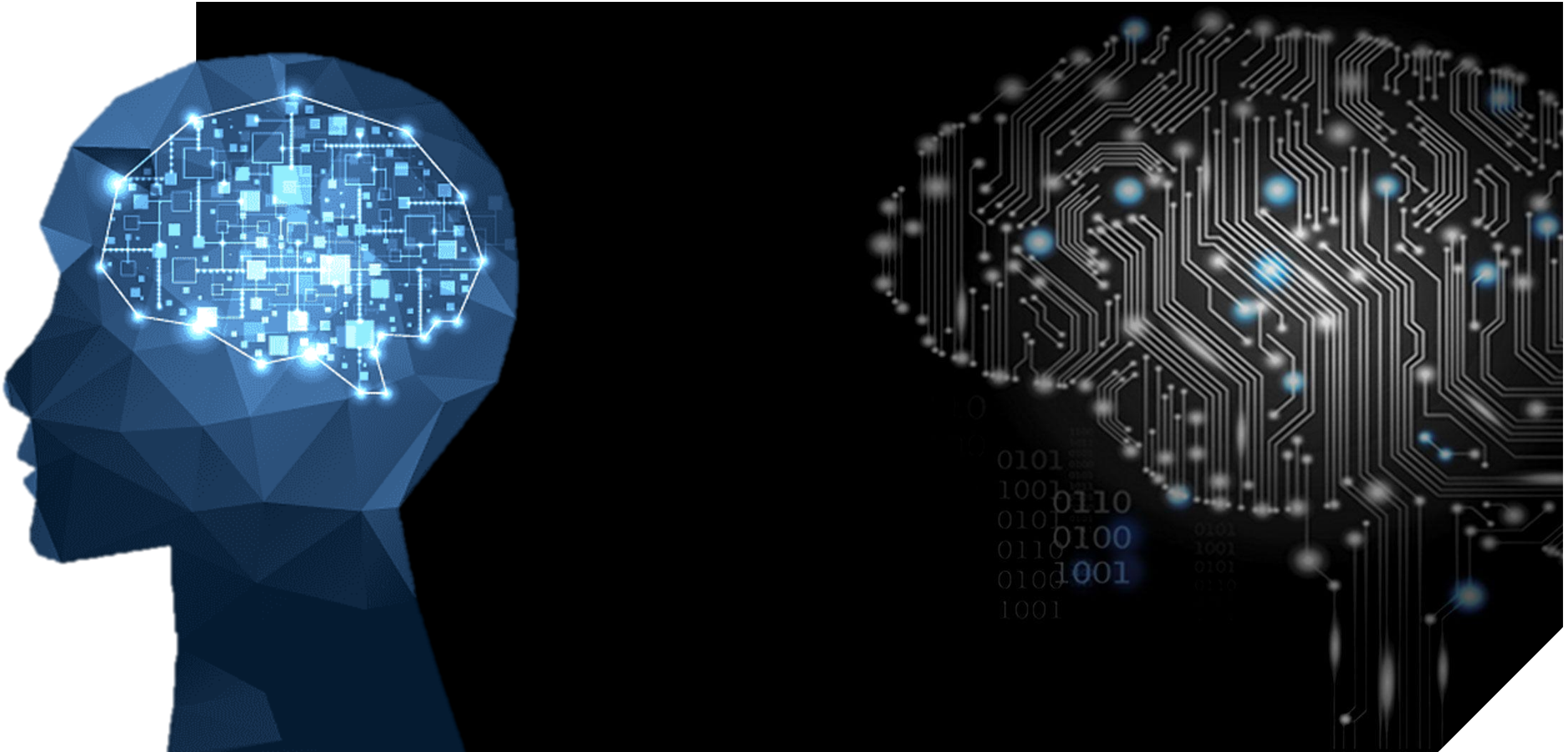
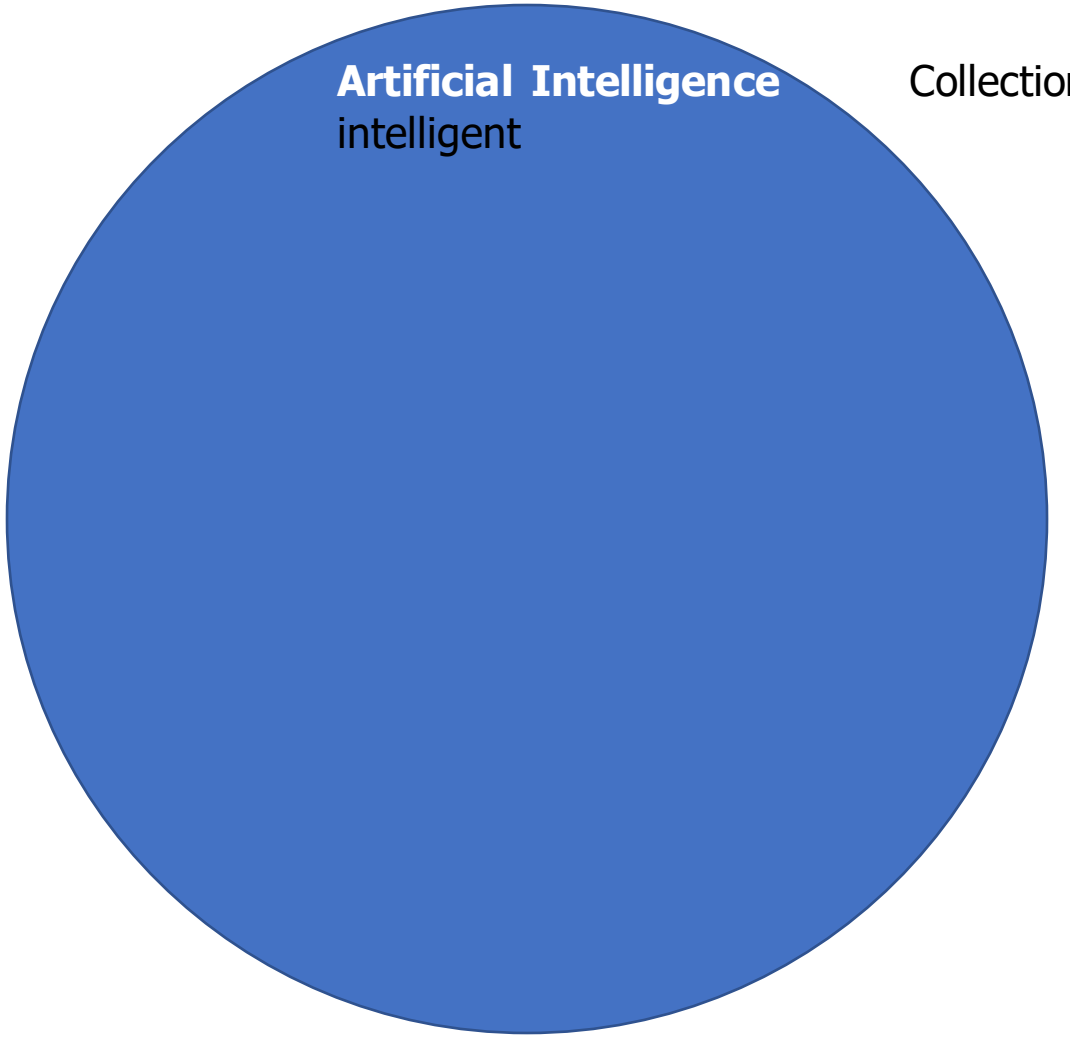


02

AI LANDSCAPE

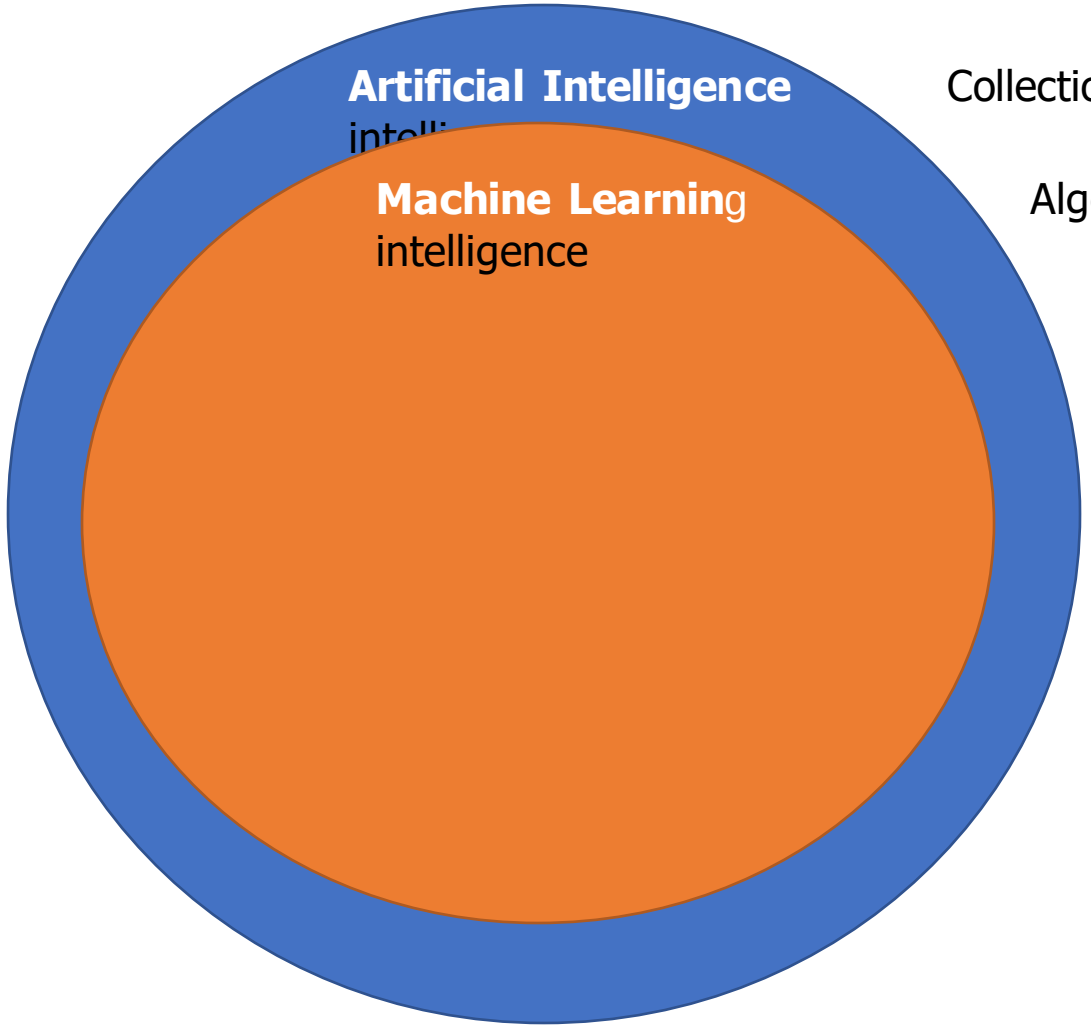
- AI landscape
- Applications of data science, computer vision and NLP

AI Landscape



Collection of algorithms used to build

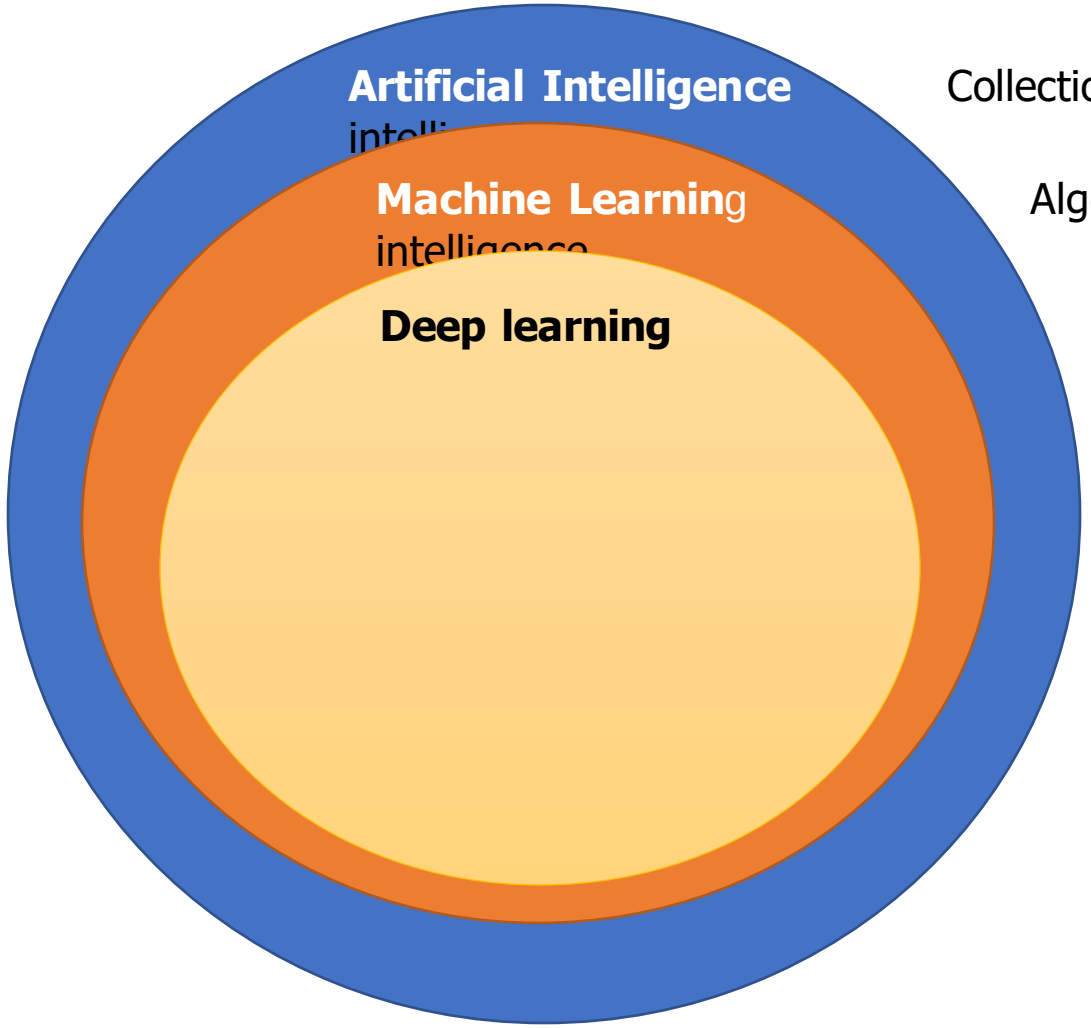
AI Landscape



Collection of algorithms used to build

Algorithms which use DATA to build

AI Landscape

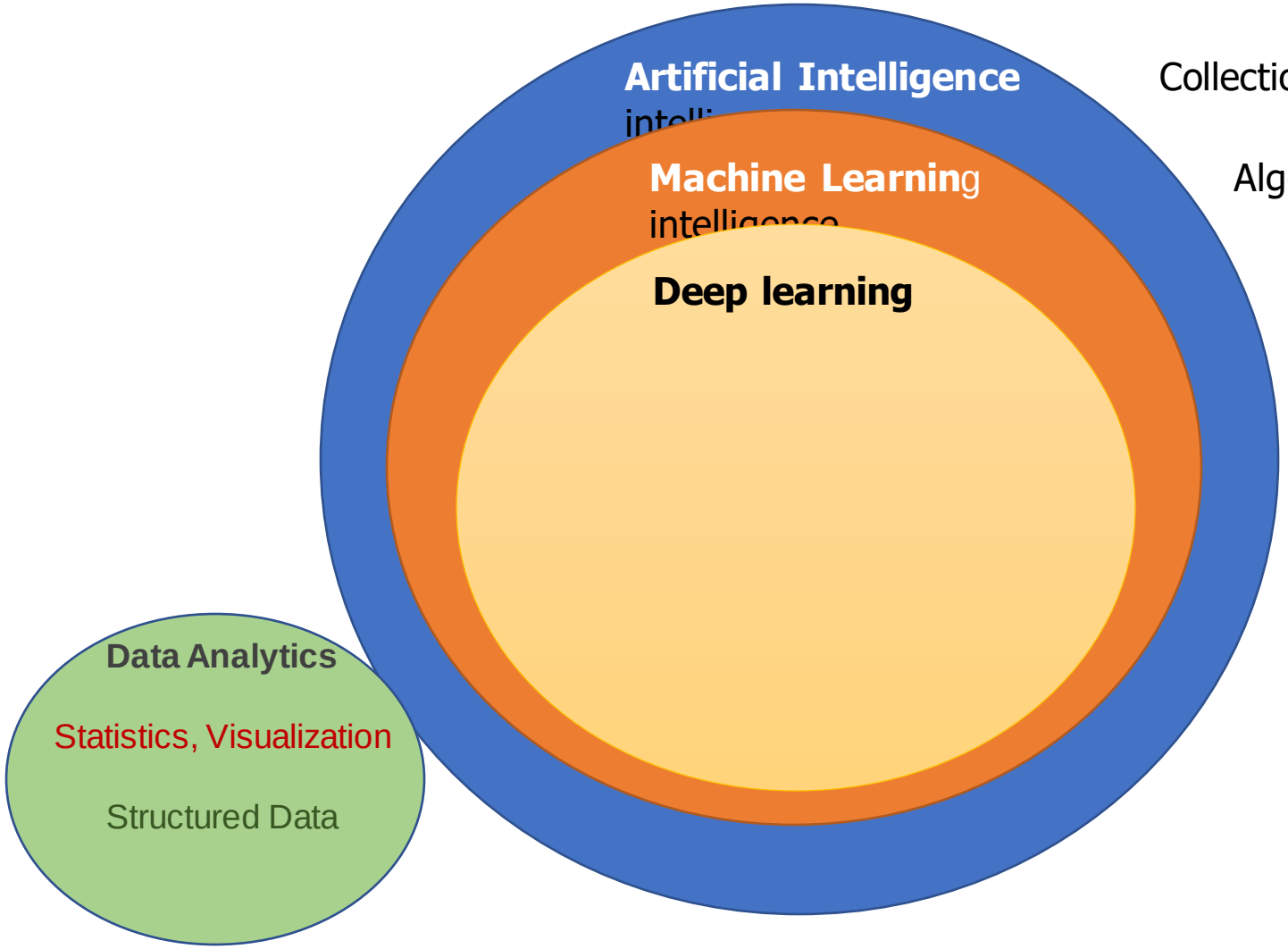


Collection of algorithms used to build

Algorithms which use DATA to build

Automated feature engineering

AI Landscape



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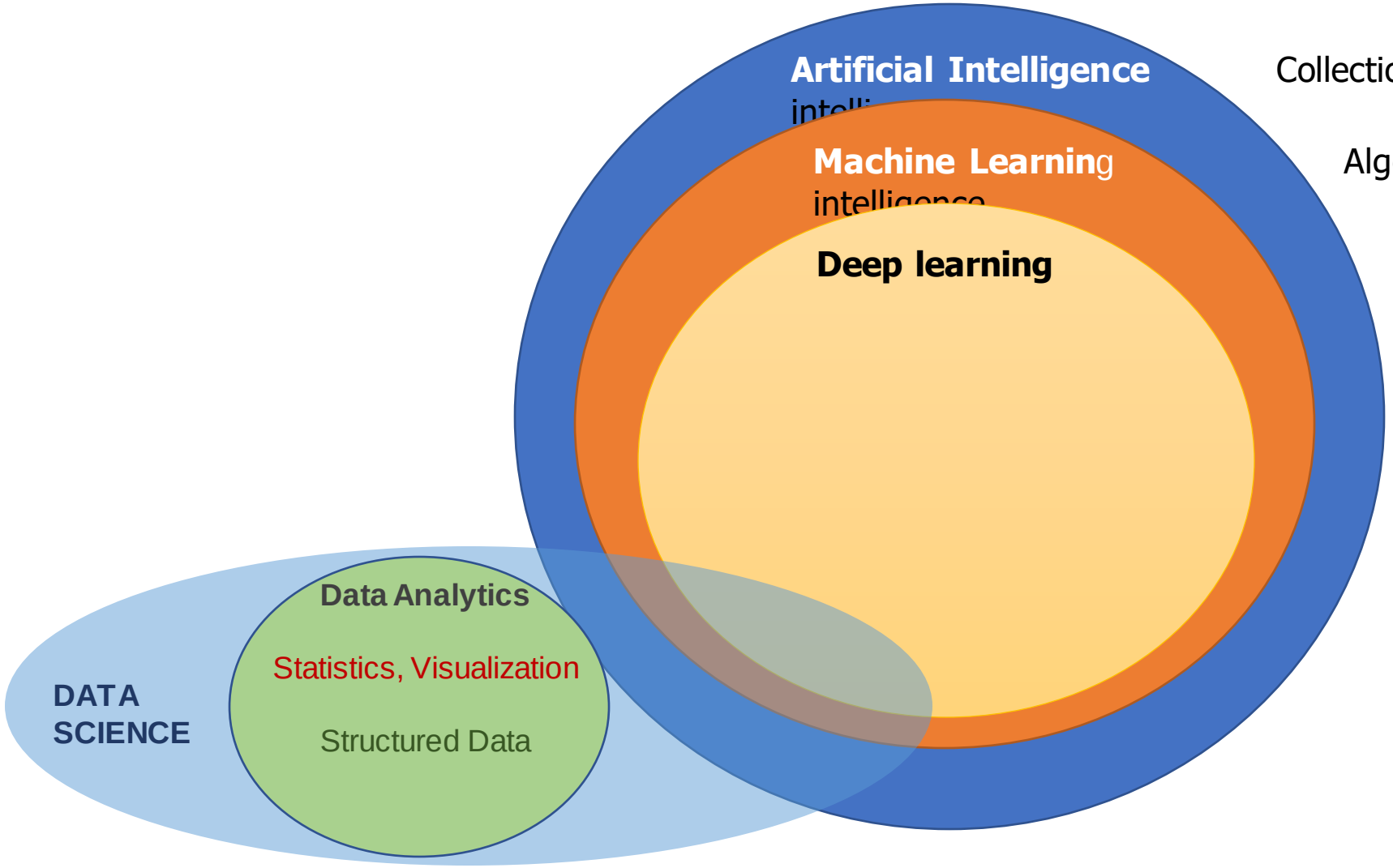

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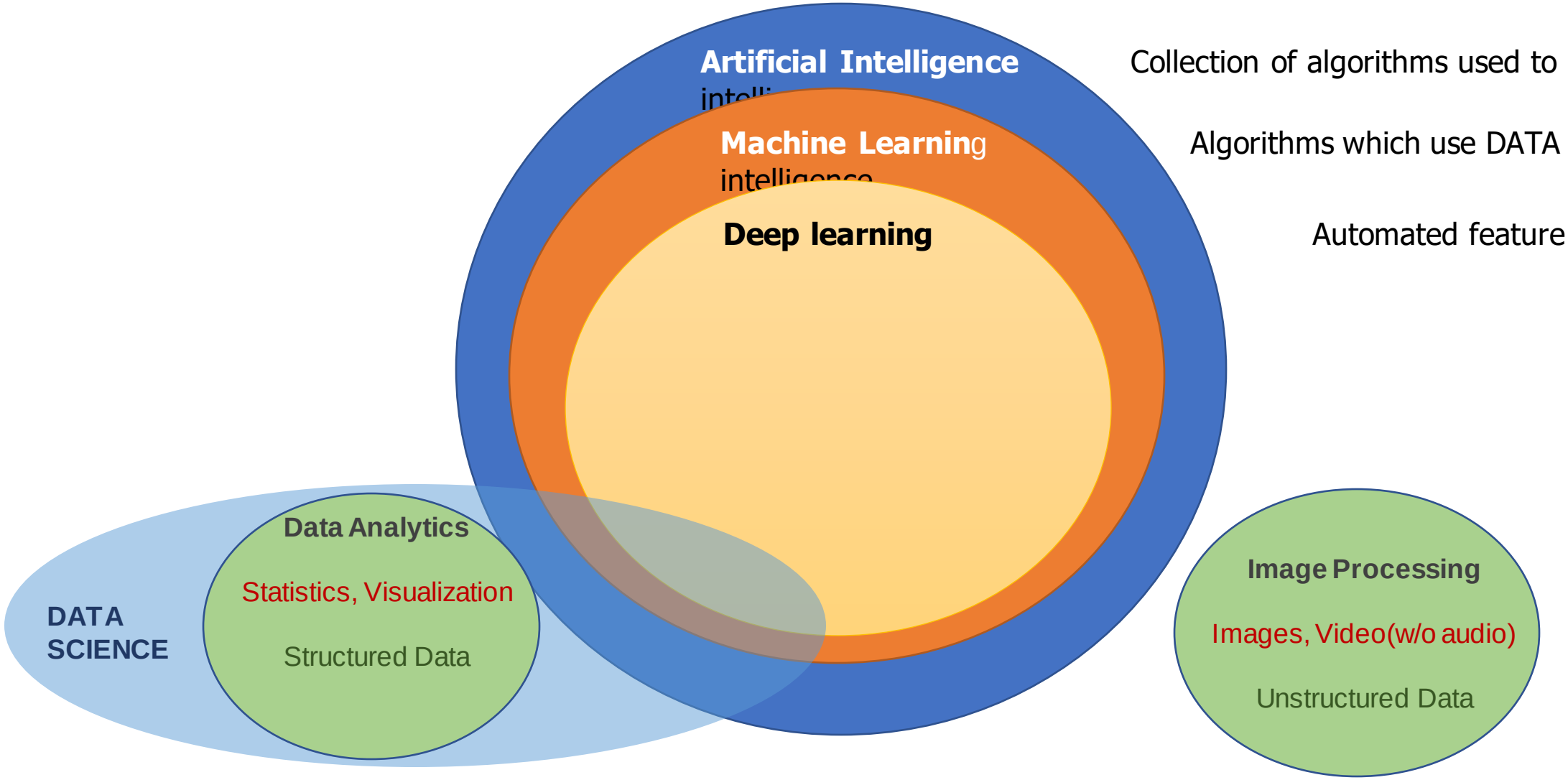

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AI Landscape

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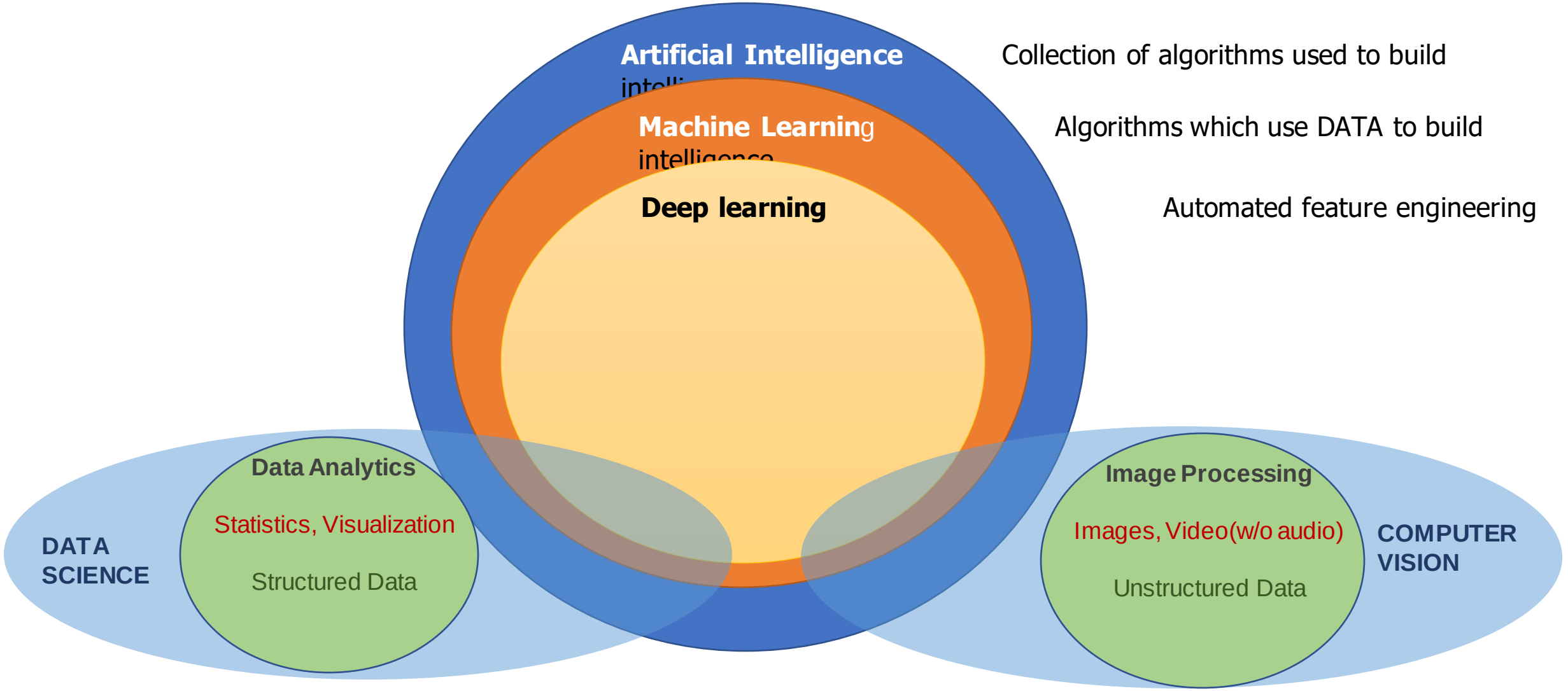

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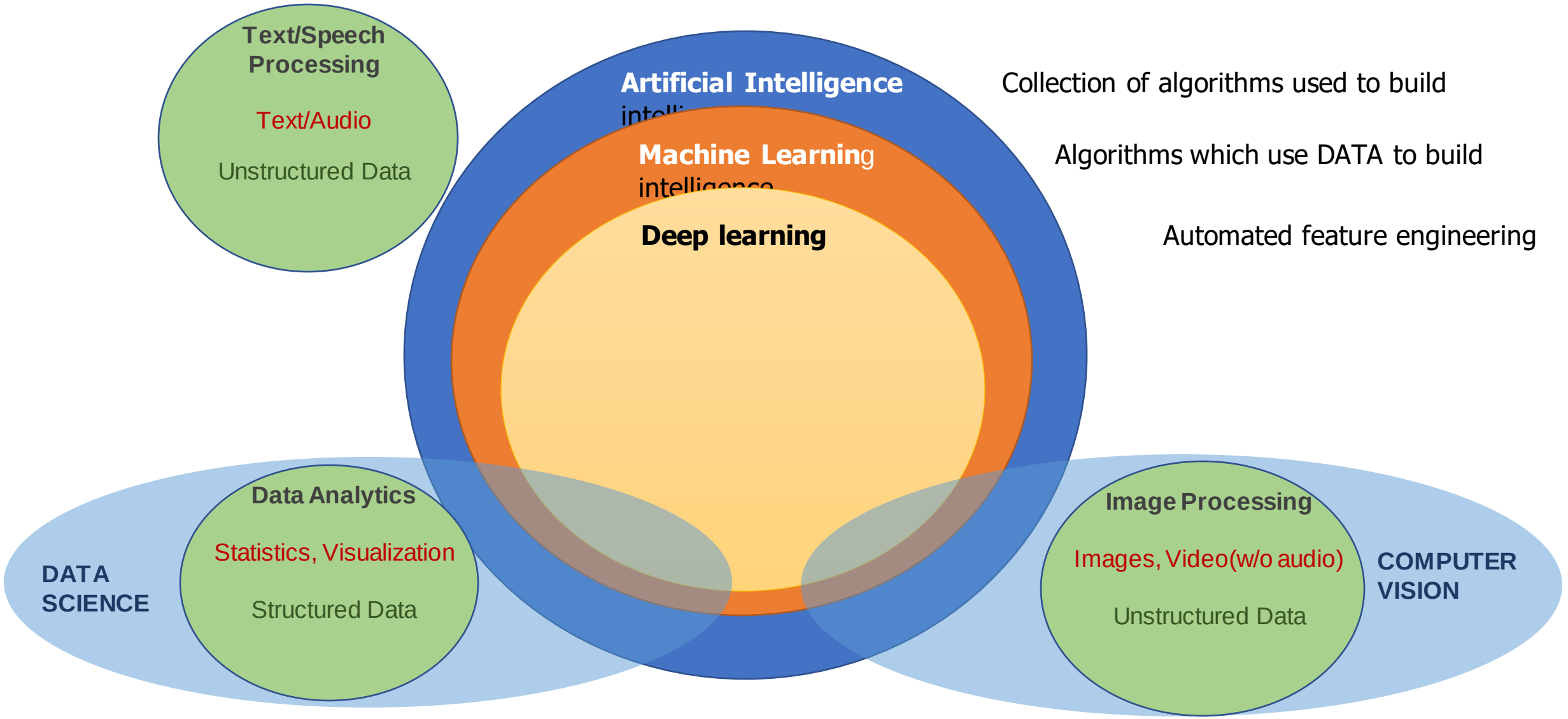

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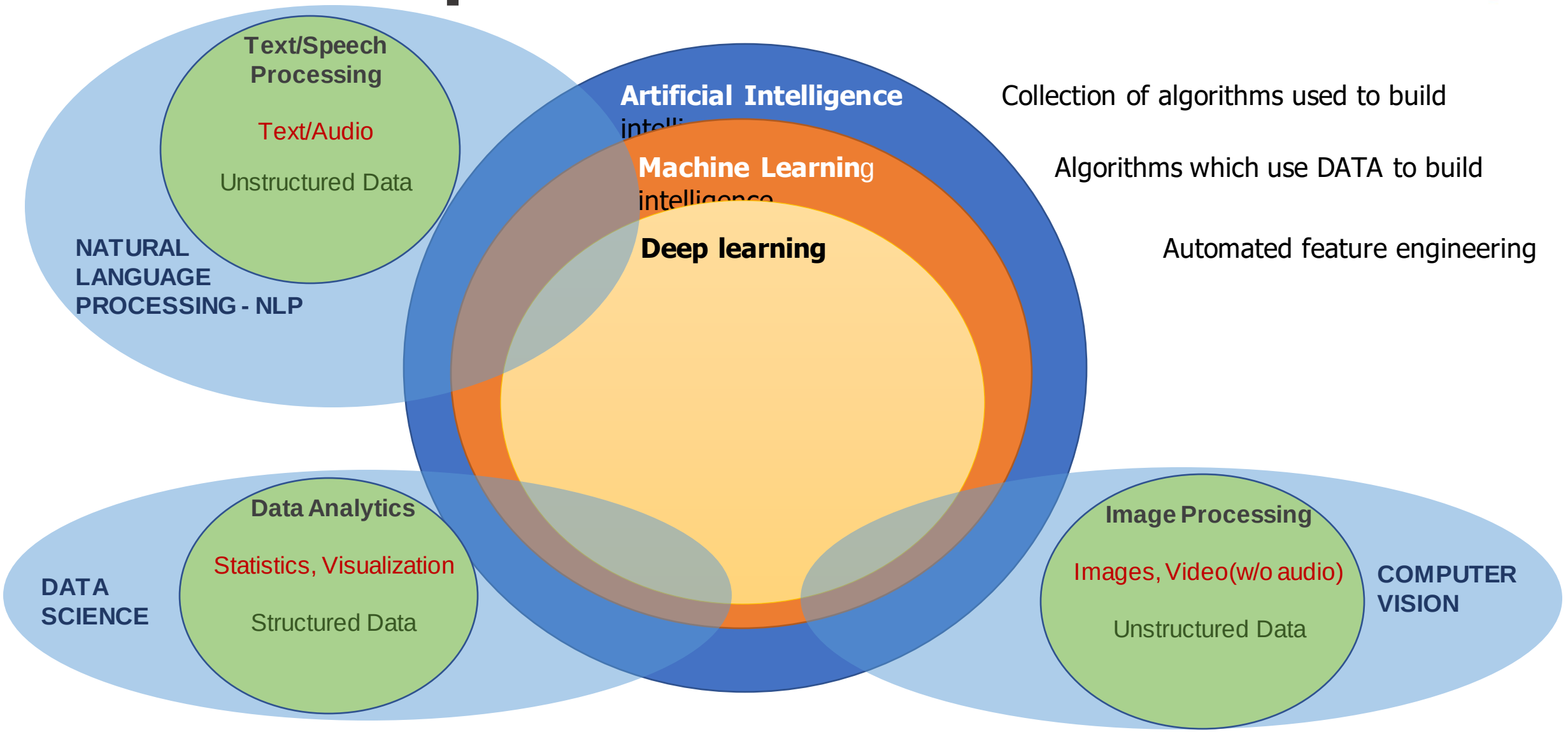

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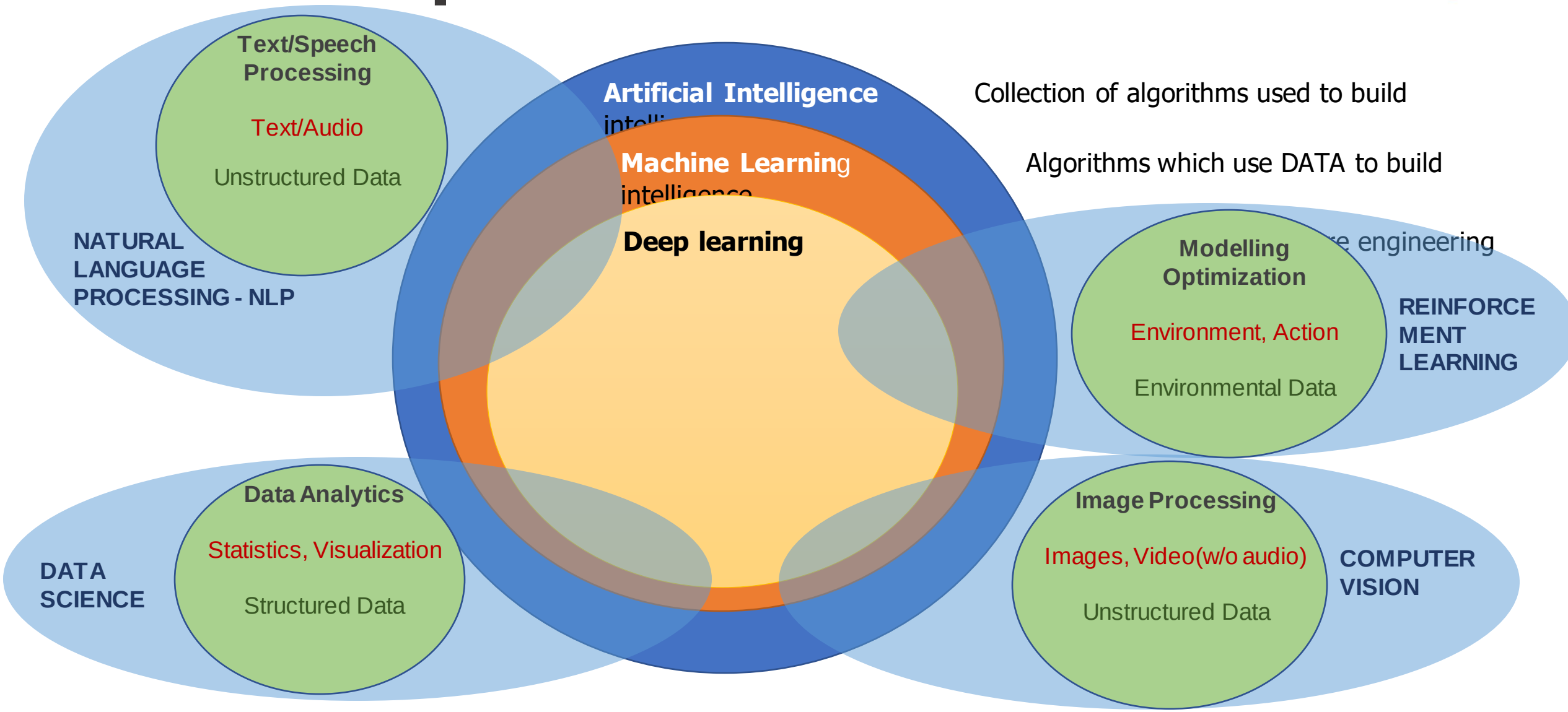

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Data Science

Computer Vision

Natural Language Processing

Artificial Intelligence

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Data Science

Computer Vision

Natural Language Processing

- Predicting Stock prices, housing prices or any other item prices based on historical data
- Predicting whether customer will buy a product or not, customer will churn or not
- Classifying the customers in different known groups
- Risk predictions for financial transactions.
- Fraud Detection from transactional data
- Segmentation of customers, stocks and server logs
- Predicting patient readmission into hospital
- Detecting anomalies in access management, data control
- Building product recommendation systems

Artificial Intelligence

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Data Science

Computer Vision

Natural Language Processing

- Face Recognition, Emotion Recognition
- Optical Character Recognition
- Document verification, authentication
- Object Detection and Classification from images
- Identifying forgery in the images
- Vehicle number plate, type recognition
- Self Driving Cars – lane detection, traffic sign classification, Behavioural Cloning
- Motion Estimation from videos
- Image restoration, colouring and pattern transfer
- Action Prediction

Artificial Intelligence

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Data Science

Computer Vision

Natural Language Processing

- Text/document classification
- Social Media Text mining and Analysis
- Speech to Text and Text to Speech conversion
- Caption generation
- Machine Translation
- Sentiment analysis from text
- Chatbots
- Speaker recognition
- Personal Assistant, Sentence Correction
- Text Generation, Similarity Matching, Topic Modelling

Artificial Intelligence

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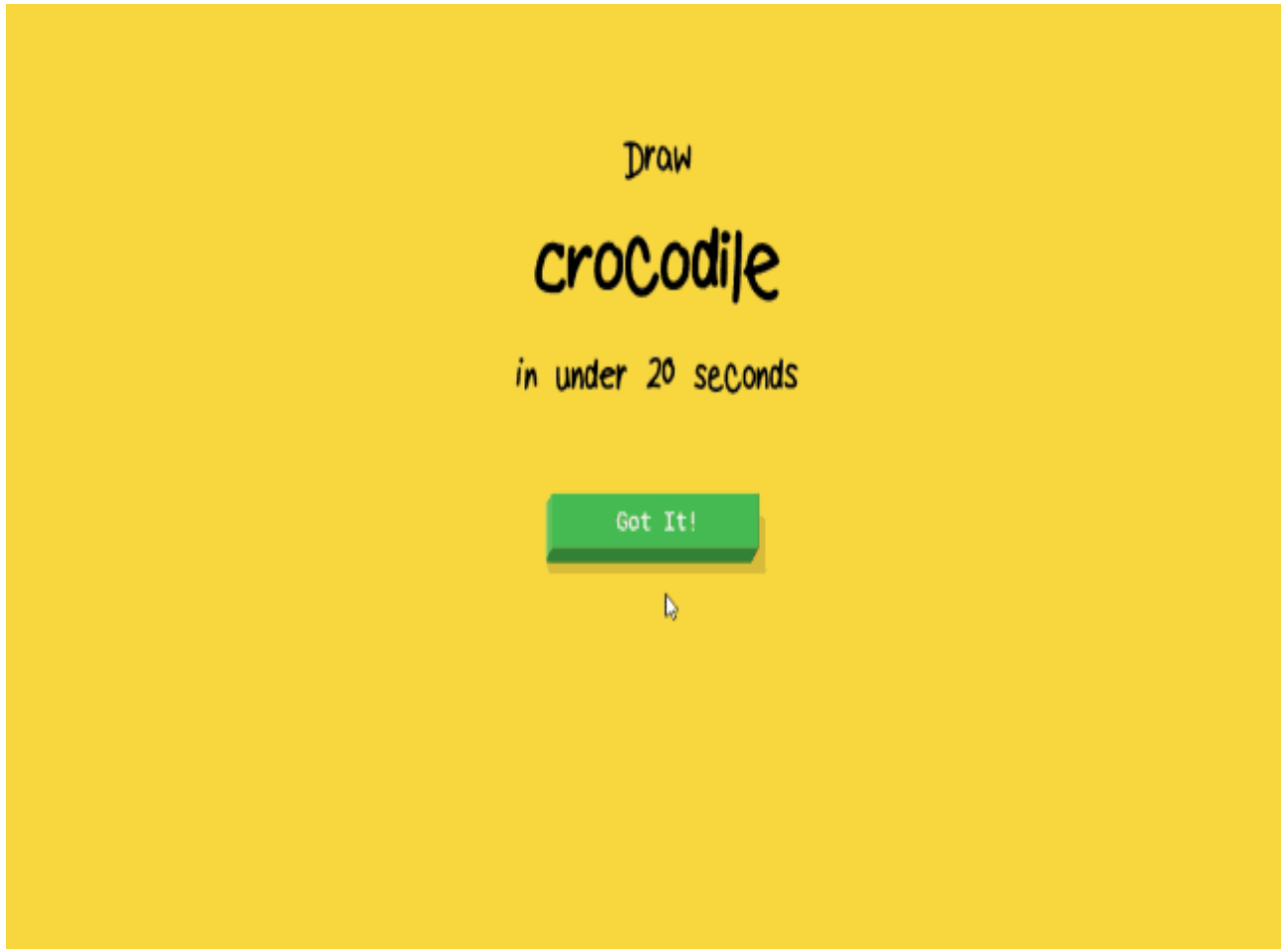
Reinforcement Learning

- Playing game (Okay this is a joke, but serious!)
- Self Driving Car
- Artificial Sun Environmental control
- Warehouse Robot control
- Education
- Social Media
- Marketing and Ads

Game AI

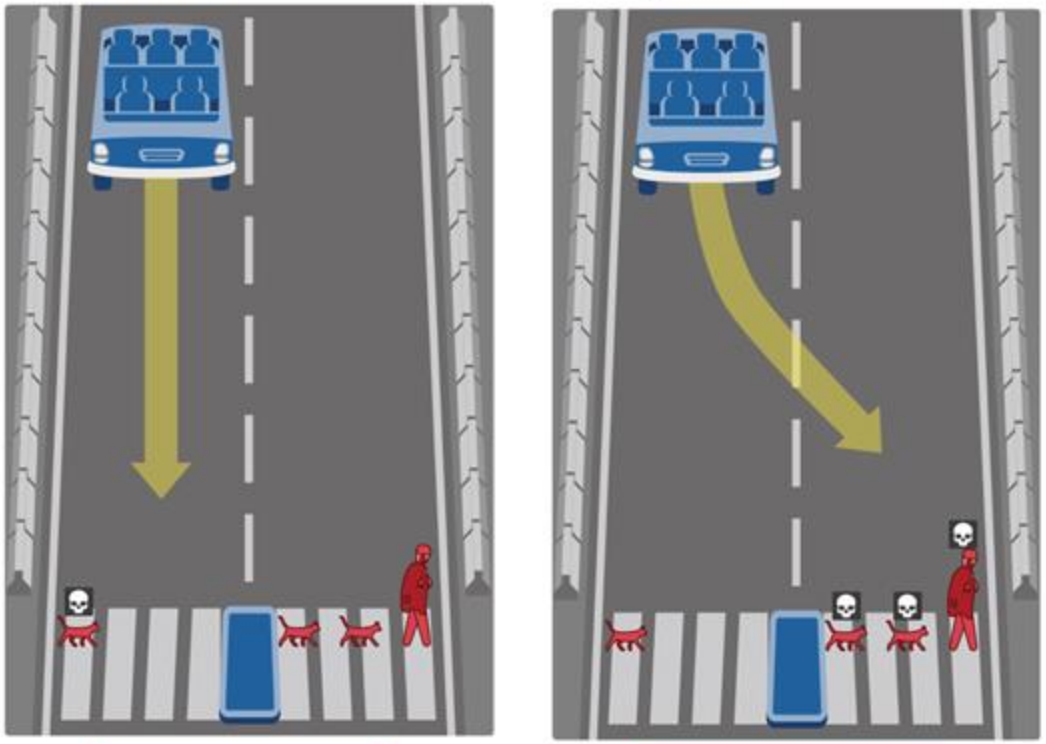

Guitar
Pirate
Ocean
King
Hair
Electricity
Day
Eye
Farm
Sleep


Draw
crocodile
in under 20 seconds
Got It!

Game AI: Moral Machine

What should the self-driving car do?

1 / 13



Show Description

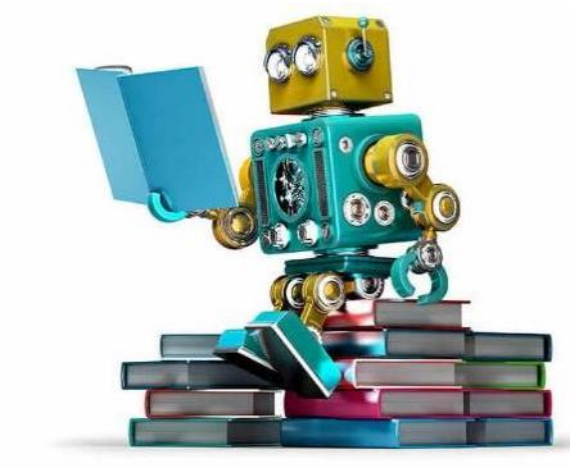
Show Description

03 MACHINE LEARNING

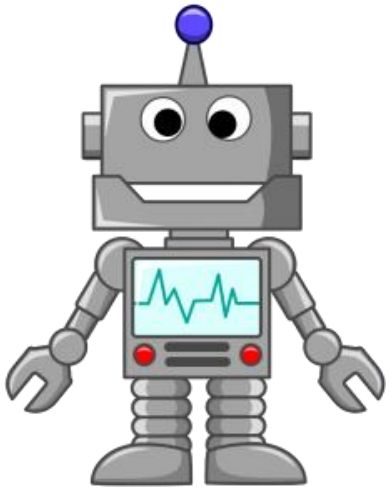
- What is Machine Learning?
- Machine Learning v/s traditional software

Humans learn from experiences

Machine Learning – making machines learn from experiences aka data.



Machines follow instructions



What is Machine Learning?

Machine Learning is the field of study that gives computers the ability to learn without being explicitly programmed.

Why Machine Learning?

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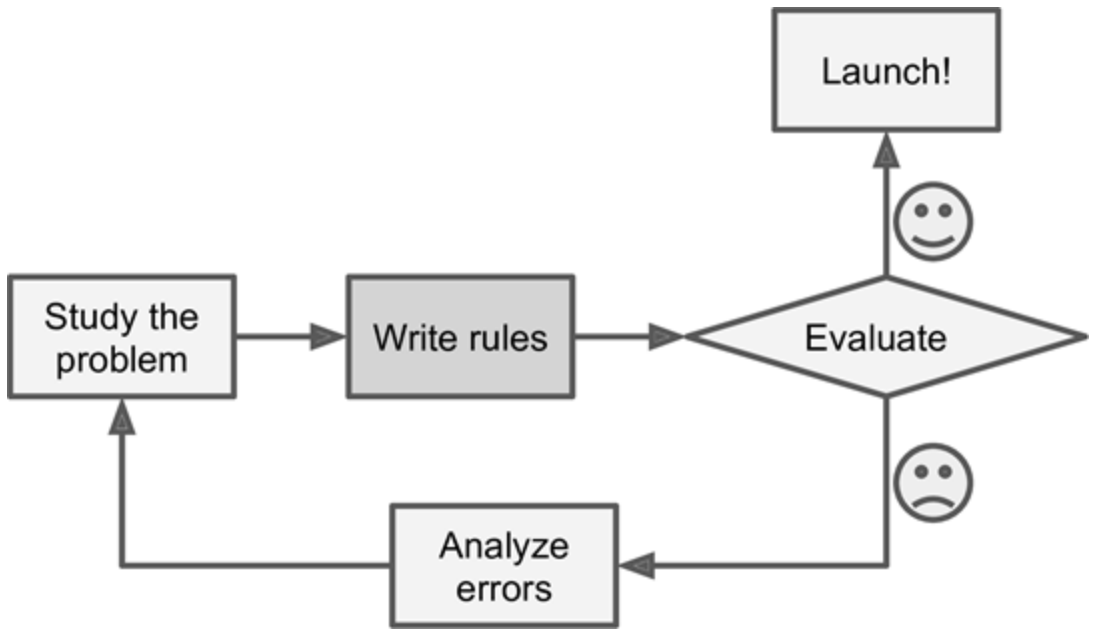
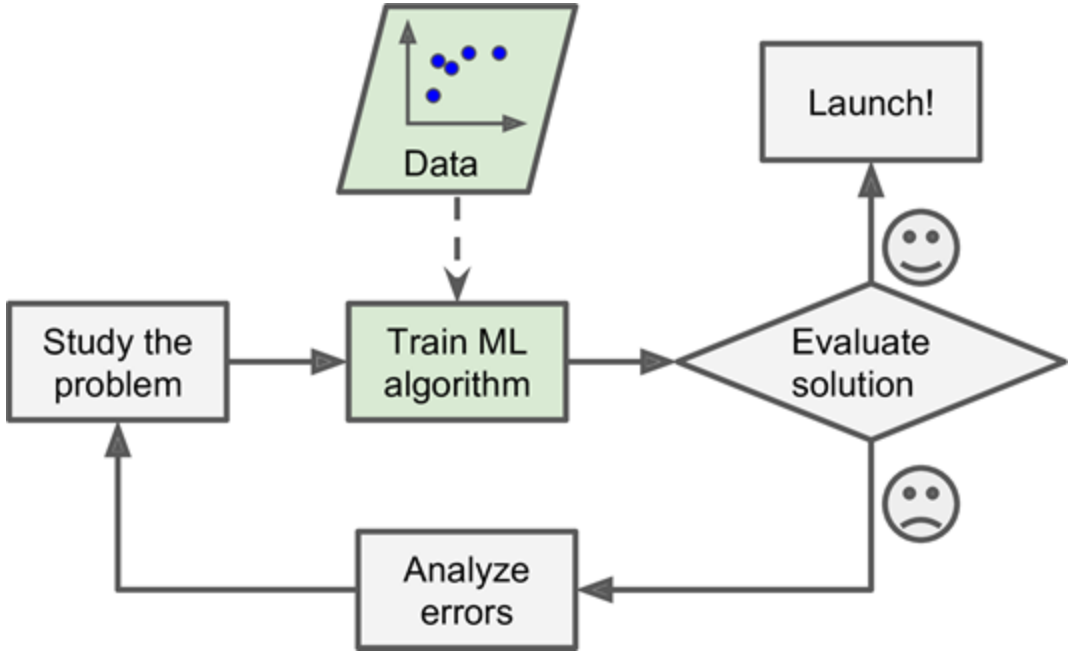
TRADITIONAL APPROACH



MACHINE LEARNING APPROACH



Applications of Machine Learning

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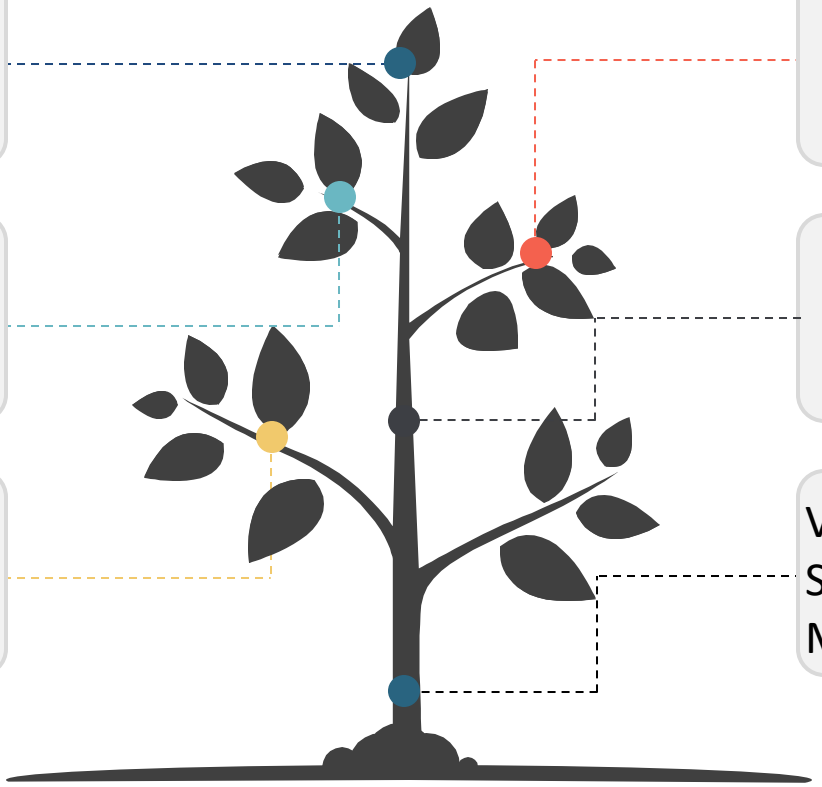
- Financial Predictions, Fraud Detections Loan Approval
- Predictive Maintenance Ad plus user information
- Churn Prediction, Customer Segmentation, Sales Forecasting



- Data Mining – Web Click Data, Medical Records, Diagnosis
- Computer Vision – Face Recognition, Self Driving Cars, OCR
- Voice recognition, Chatbots, Sentiment Analysis, Machine Translation

Applications of Machine Learning

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Manufacturing	Retail	Financial Services
❖ Predictive maintenance or condition monitoring ❖ Warranty reserve estimation Propensity to buy ❖ Demand forecasting ❖ Process optimization	❖ Predictive inventory planning ❖ Recommendation engines ❖ Upsell and cross-channel marketing ❖ Market segmentation and targeting ❖ Customer ROI and lifetime value	❖ Risk Analytics and Regulations ❖ Customer Segmentation ❖ Cross-selling and up-selling ❖ Sales and marketing campaign management ❖ Credit worthiness evaluation

Travel and Hospitability	Health Care and Life Sciences	Energy, Feedstock and Utility
❖ Aircraft scheduling ❖ Dynamic pricing ❖ Social media — consumer feedback and interaction analysis ❖ Customer complaint resolution ❖ Traffic patterns & congestion management	❖ Alerts and diagnostics from real-time patient data ❖ Disease identification and risk stratification ❖ Patient triage optimization ❖ Proactive health management	❖ Power usage analytics ❖ Seismic data processing ❖ Carbon emissions and trading ❖ Customer-specific pricing ❖ Smart grid management ❖ Energy demand and supply optimization

04 ML TOOLS

- Tools for Machine Learning
- What to learn in Machine Learning?

Programming Languages

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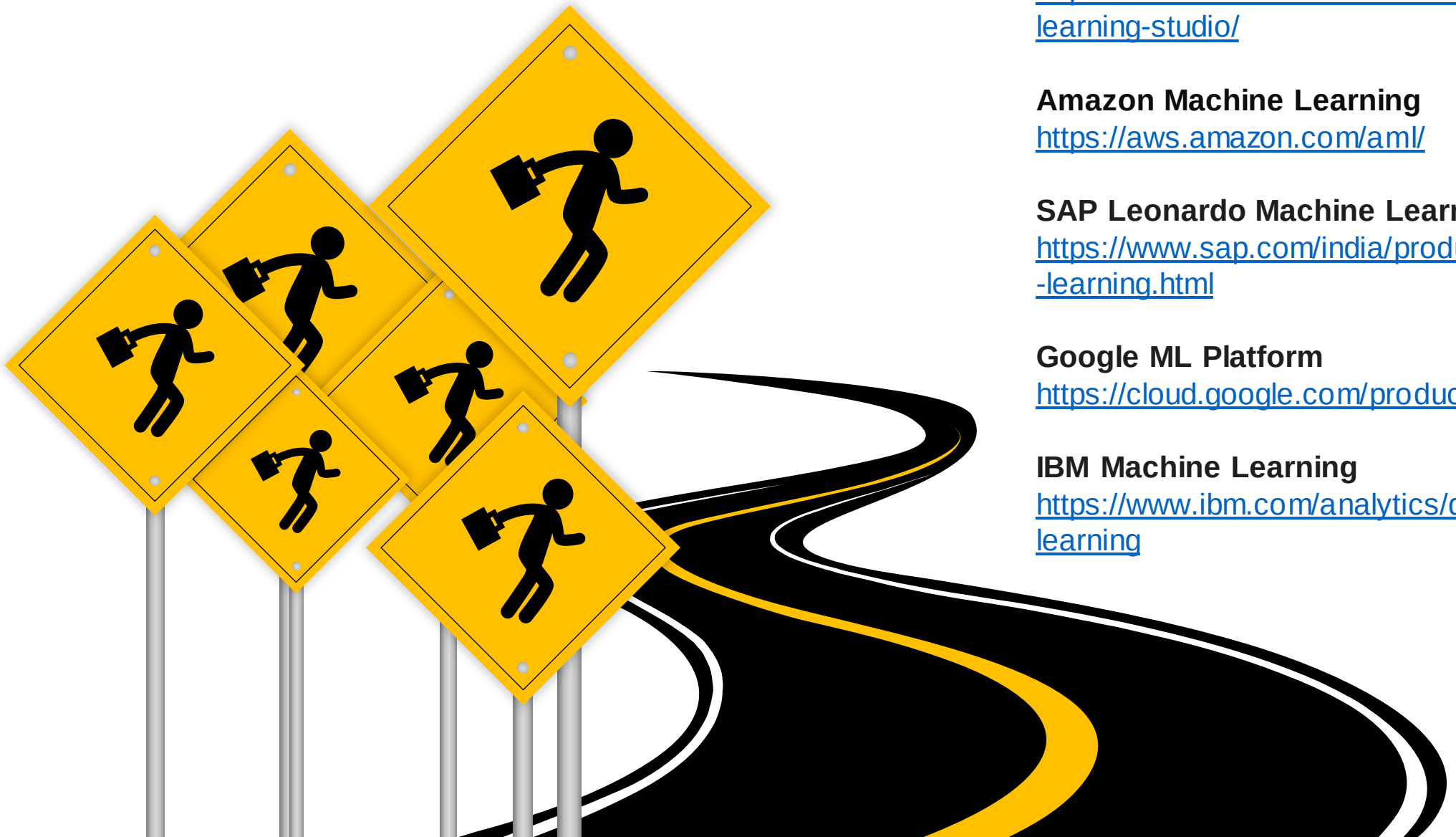
Python	R

Machine Learning Cloud Platforms -



Microsoft Azure ML Studio
https://azure.microsoft.com/en-us/services/machine-learning-studio/

Amazon Machine Learning
https://aws.amazon.com/aml/

SAP Leonardo Machine Learning
https://www.sap.com/india/products/leonardo/machine-learning.html

Google ML Platform
https://cloud.google.com/products/machine-learning/

IBM Machine Learning
https://www.ibm.com/analytics/data-science/machine-learning

What to learn in Machine Learning?

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Programming and Tools

Python/R, spark etc.

30%

70%

The Math behind Machine Learning

Probabilistic Theory, Statistics and Linear Algebra

What to learn in Machine Learning?

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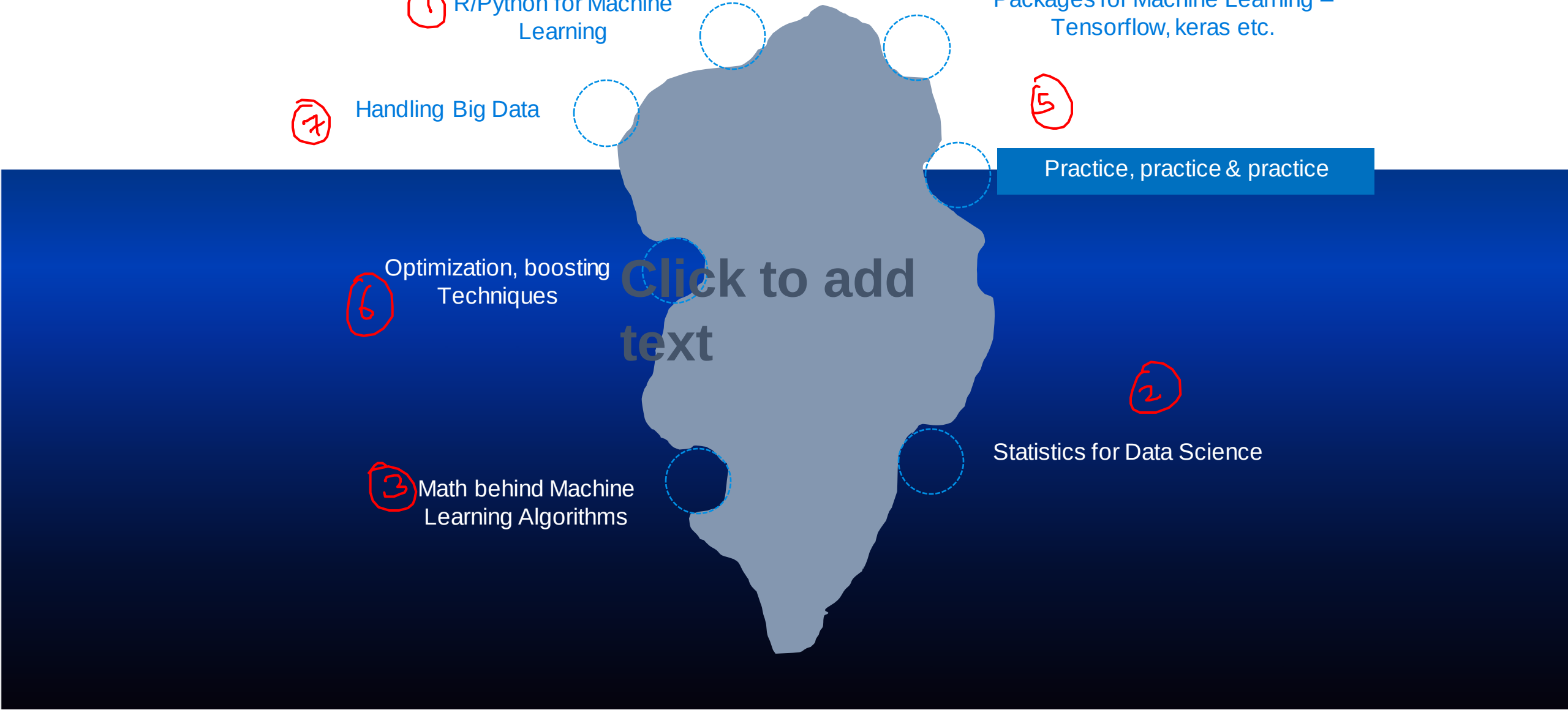
1 R/Python for Machine Learning

4 Packages for Machine Learning – Tensorflow, keras etc.

7 Handling Big Data

5

Practice, practice & practice



6 Optimization, boosting Techniques

2

Statistics for Data Science

3 Math behind Machine Learning Algorithms

05 CONCLUSION

- Quiz
- Summary

Quiz

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Question

Which of the following is not an application of ML?

A. Descriptive analysis of sales and profit

B. Predicting future sales

C. Estimating customer's willingness to buy a product based on past data

D. Developing emotion recognition solution using image data

Quiz

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Question

Which of the following is not an application of ML?

A. Descriptive analysis of sales and profit

B. Predicting future sales

C. Estimating customer's willingness to buy a product based on past data

D. Developing emotion recognition solution using image data

Answer: A

TERIMA KASIH

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