

Data and AI

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Agenda

- What is Data Science
- Business Analytics
- Demystifying DS,AI,ML,DL
- Data Science Applications
- Life Cycle of a Data Science Appn
- Machine Learning Types
- Platforms & Tools
- Roles & Career
- Demo

What is Data Science

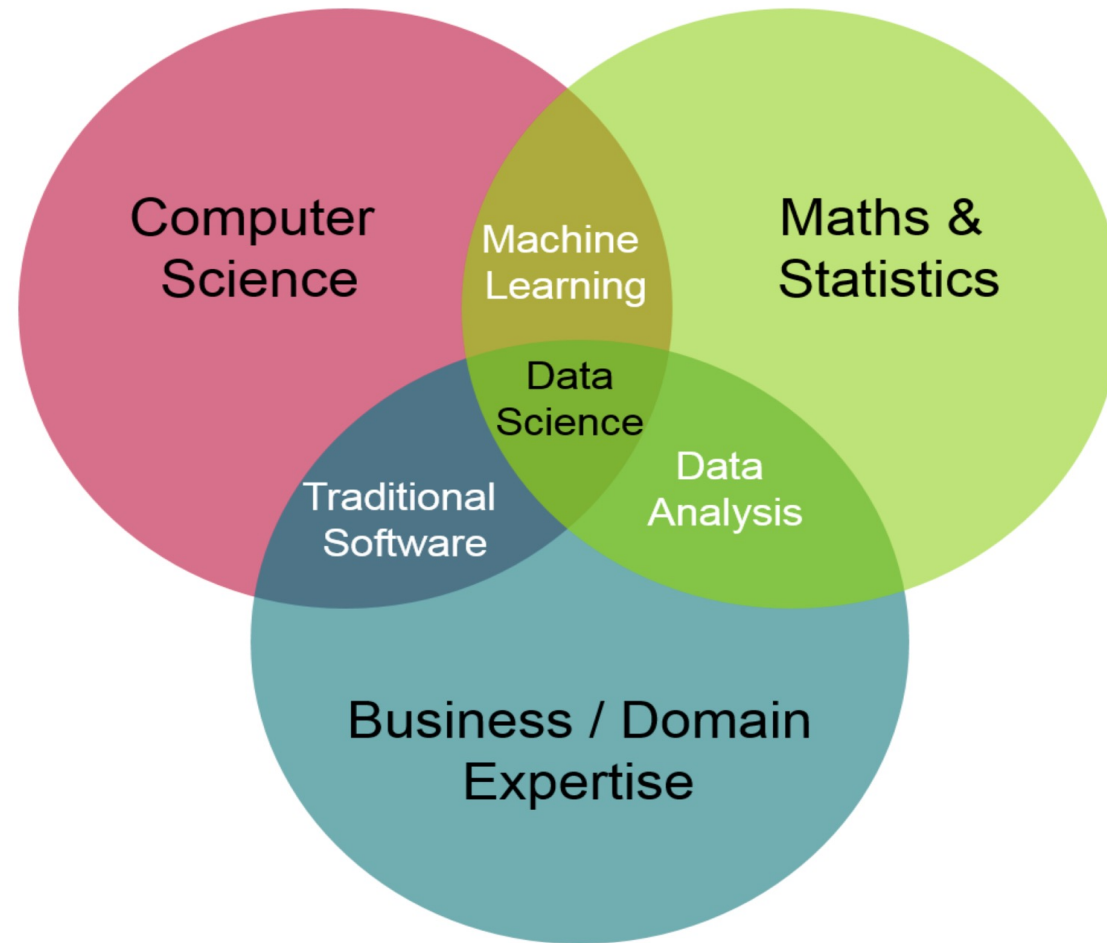
- Data Science is a **multidisciplinary** field that combines skills in **software engineering** and **statistics** with **domain experience** to support the **end-to-end analysis** of **large** and **diverse data** sets, ultimately uncovering **value** for an organization and then communicating it to stake holders as **actionable results**

Who is a Data Scientist?

They are half hacker, half analyst,
They use data to build products and find insights.

Person who is better at statistics than any software engineer and
better at software engineering than any statistician.

Data Science Venn Diagram



Evolution of Data Science



Types of Business Analytics

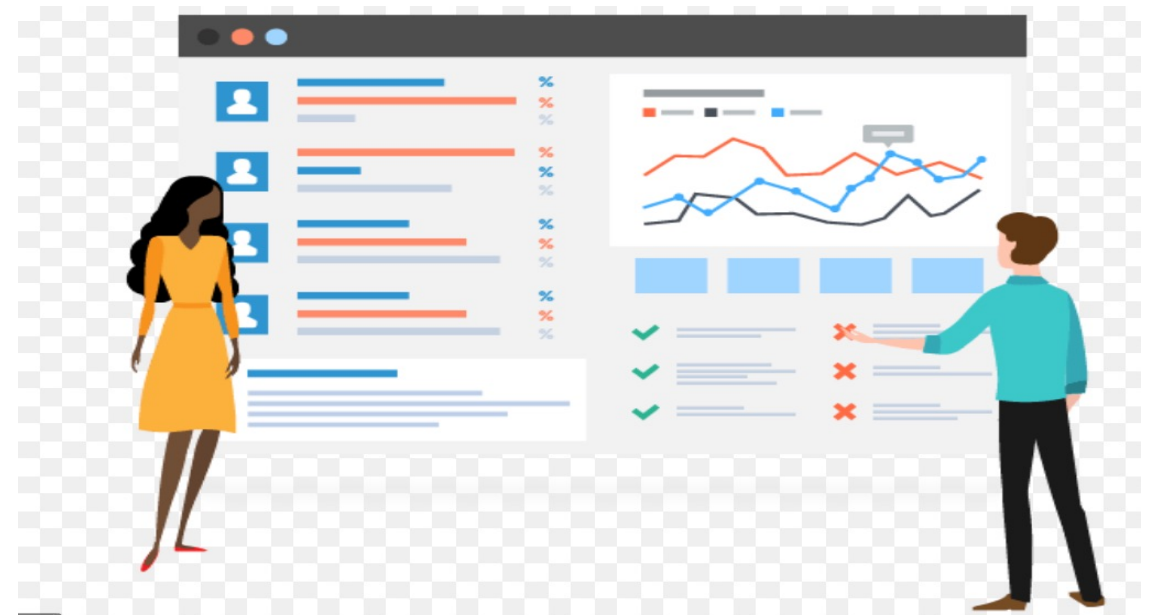
- Descriptive analytics
- Predictive analytics
- Prescriptive Analytics

Descriptive Analytics

Descriptive analytics is the interpretation of historical data to better understand changes that have occurred in a business. **Descriptive analytics** describes the use of a range of historic data to draw comparisons

Examples of Descriptive Analytics

- Summarizing past events such as regional sales, customer attrition, or success of marketing campaigns.
- Tabulation of social metrics such as Facebook likes, Tweets, or followers. Reporting of general trends like hot travel destinations or news trends.

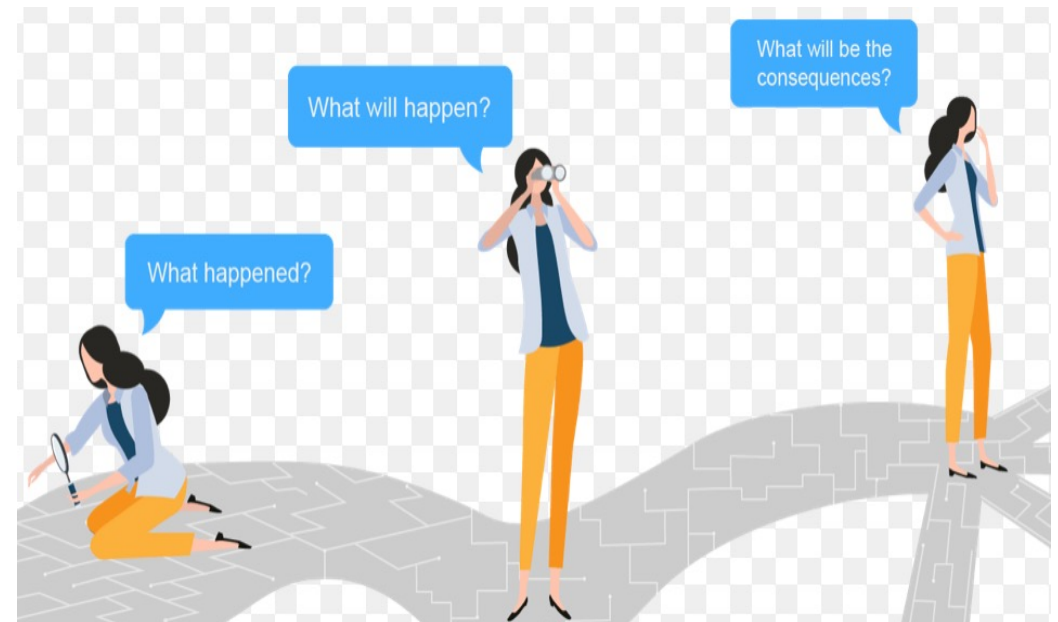


Predictive Analytics

- **Predictive analytics** is the branch of the advanced **analytics** which is used to make predictions about unknown future events. **Predictive analytics** uses many techniques from **data** mining, statistics, modelling, machine learning, and artificial intelligence to analyse current **data** to make predictions about future.

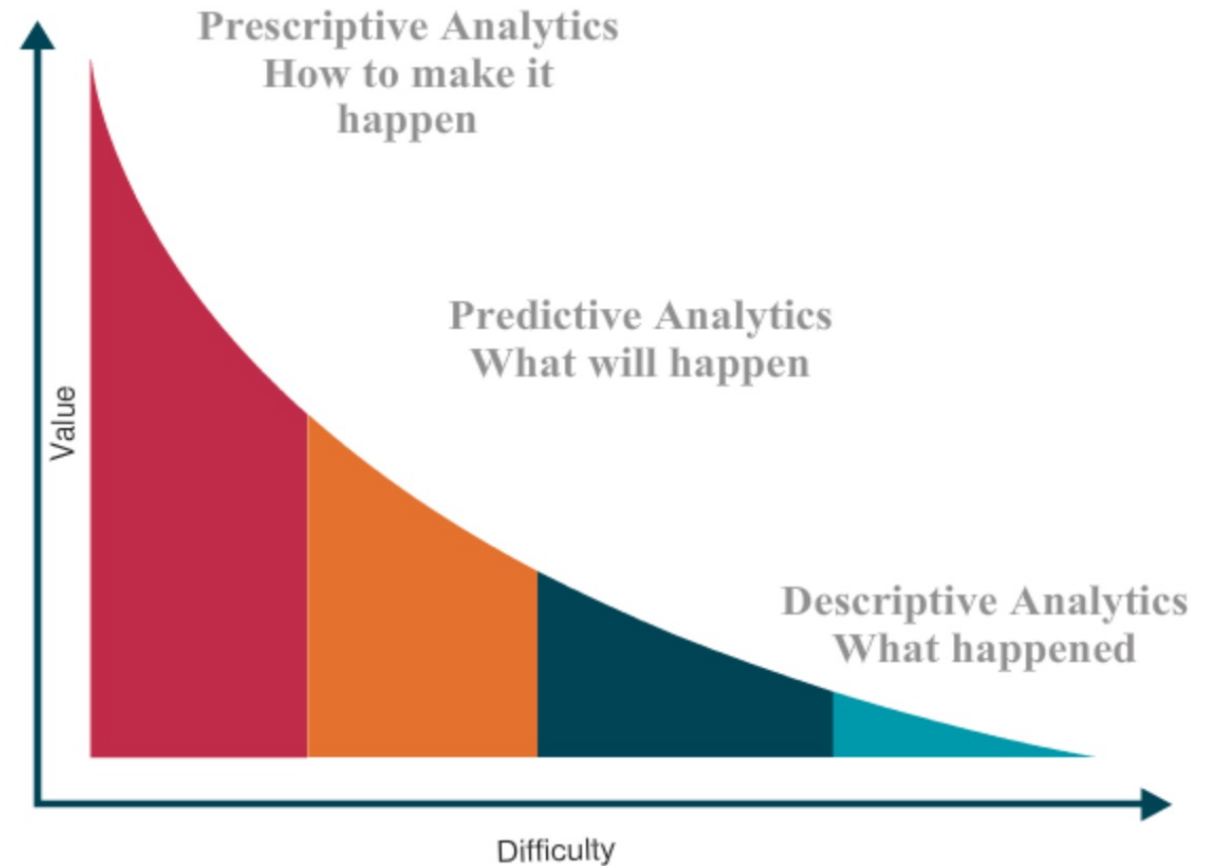
Examples of Predictive Analytics

- Identify customers that are likely to abandon a service or product
- Send marketing campaigns to customers who are most likely to buy
- Improve customer service by planning appropriately



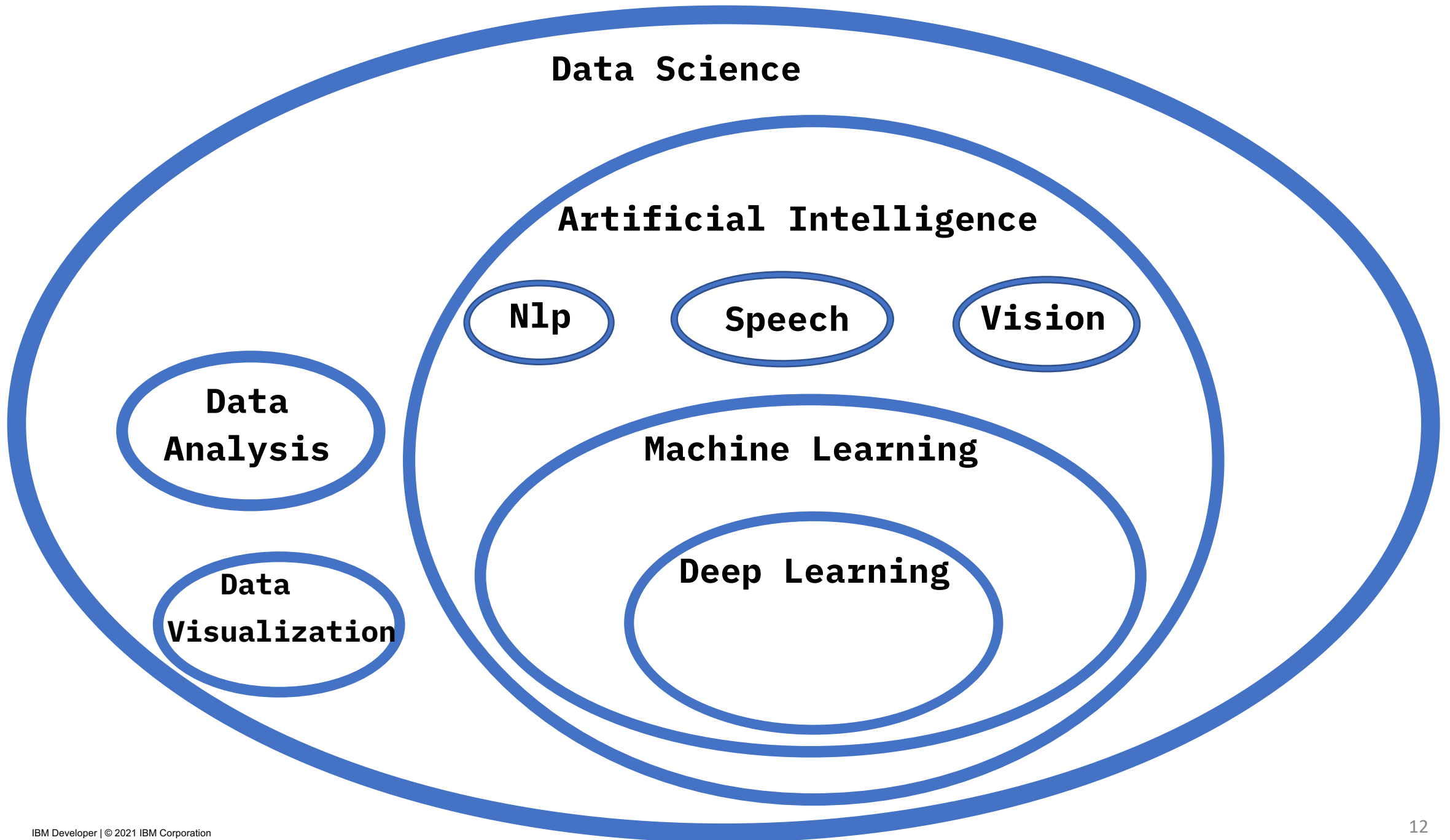
Prescriptive Analytics

- **Prescriptive analytics** makes use of machine learning to help businesses decide a course of action based on a computer program's predictions.
- **Prescriptive analytics** works with predictive **analytics**, which uses data to determine near-term outcomes.

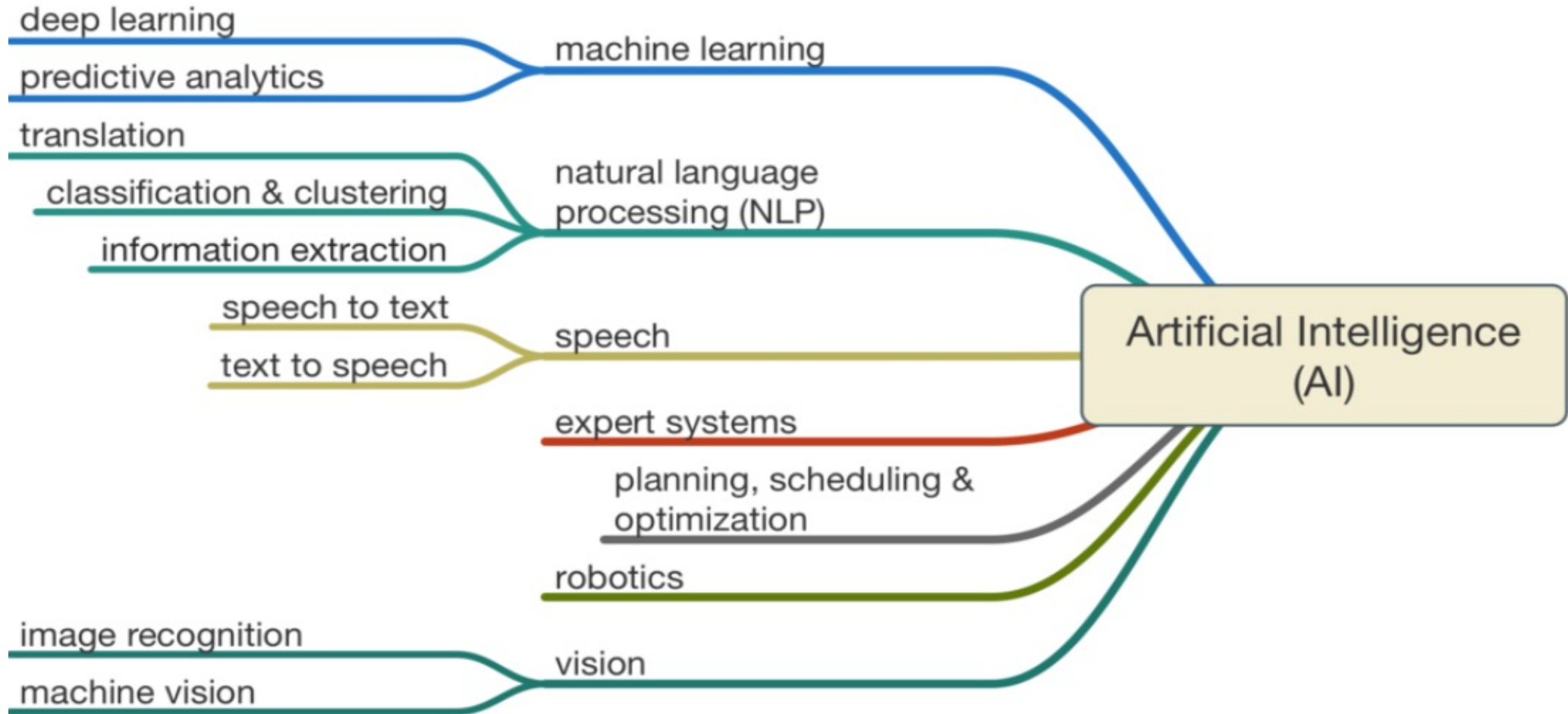


DS, AI, ML, DL





AI Tree

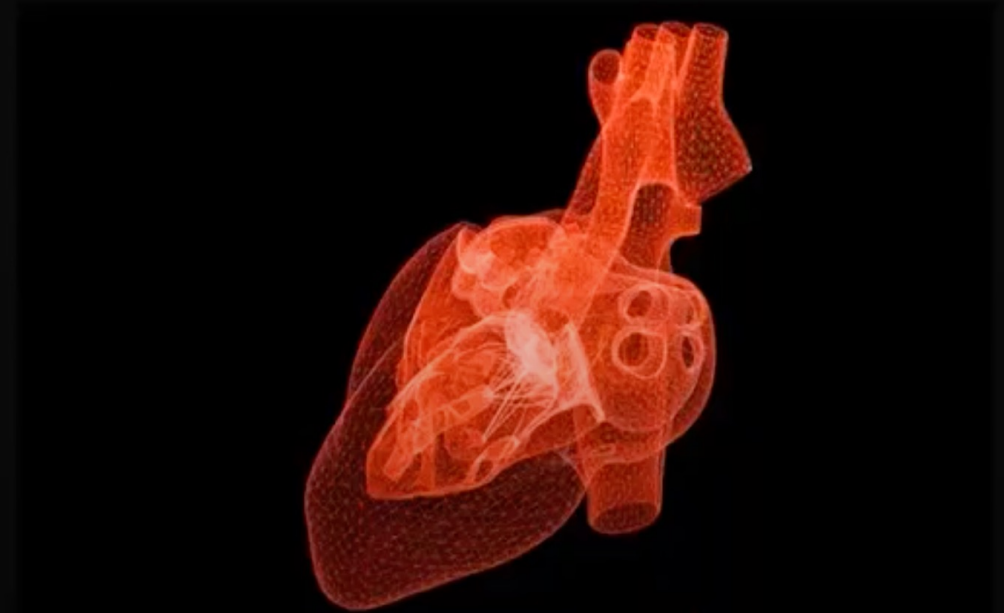


Data Science Application 1

successfully predicting cardiovascular problems such as heart attacks and strokes simply from images of the retina, with no blood draws or other tests necessary.

<https://www.nature.com/articles/s41551-018-0195-0>

AI Predict Heart Attack Better Than Doctors



Data Science Application 2

Finding Criminals

The police officials of Durham, UK are slated to roll out an AI system designed to help authorities determine whether or not a suspect should be kept in police custody. The system, known as the Harm Assessment Risk Tool (HART) will classify suspects as low, medium or high-risk offenders

<https://www.policyconnect.org.uk/appgda/research/crime-prevention-through-artificial-intelligence>



Data Science Application 3



Data Science Application 4

- Most of the customers who Purchased socks also purchased shoe polish cream/brush
- Most of the customers who Purchased Sanitizer bottlers Also purchased N95 masks

[Your Account](#) > [Your Orders](#)

Your Orders

Search all orders

Orders

[Buy Again](#)

[Open Orders](#)

[Cancelled Orders](#)

1 order placed in last 30 days

ORDER PLACED
23 October 2020

TOTAL
₹3,500.00

SHIP TO
[Yuktesh Chitamadaka](#)

Delivered Saturday

Package was handed directly to the customer.



Wacom One by CTL-472/K0-CX Small 6-inch x 3.5-inch Graphic Tablet (Red/Black)

Sold by: Appario Retail Private Ltd

Replacement may be possible through 03-Nov-2020

₹3,500.00

Recommended based on your purchase Sponsored



The Face Shop The Faceshop Jeju Volcanic Lava Volcanic Ash Nose Strips,
★★★★☆ 170
₹ 240.00



SLAY X Freshly Roasted and Ground 100% Pure Robusta Coffee Powder
★★★★☆ 92
₹ 323.00



SLAY X Pour Over Coffee Brew Bag
★★★★☆ 26
₹ 360.00



NUTS ABOUT YOU Pumpkin Seeds Pouch, 250 g
★★★★☆ 29
₹ 189.00



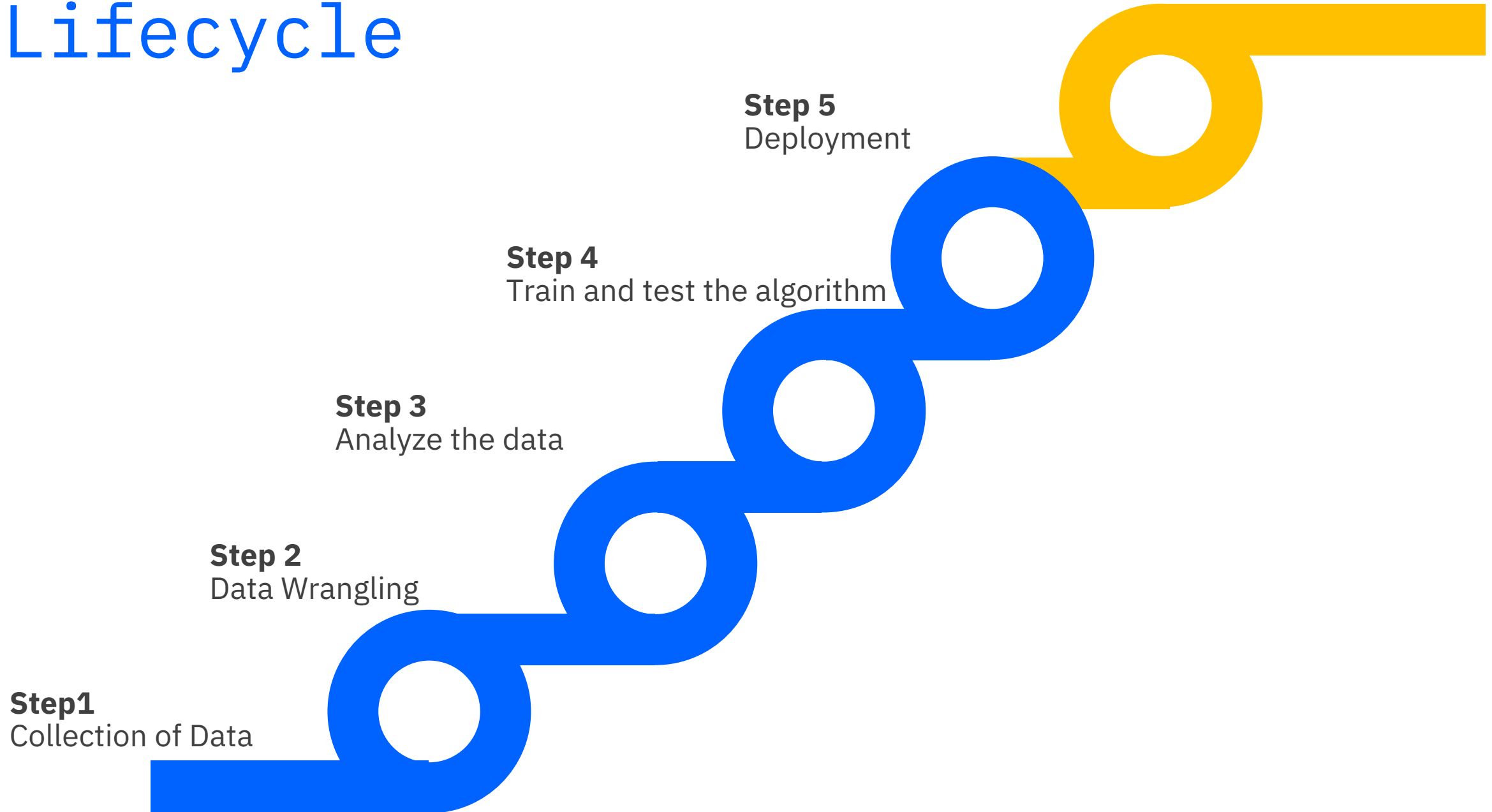
Belkin High Speed HDMI Cable Supports Ethernet, 4K Gold Plated Audio Return (6.6 Feet, Black)
★★★★☆ 1,255
₹ 439.00 17

Data Science Application 5

Facial Recognition



Lifecycle



Types of Machine Learning



Makes machine learns explicitly

Data with Clearly Defined
Output is given

Predicts Futures/outcome

Resolves regression and
classification problems

Supervised Learning



Machine understands the data

Evaluation is qualitative or indirect

Does not find or predict anything

Unsupervised Learning



An approach to AI

Reward based Learning

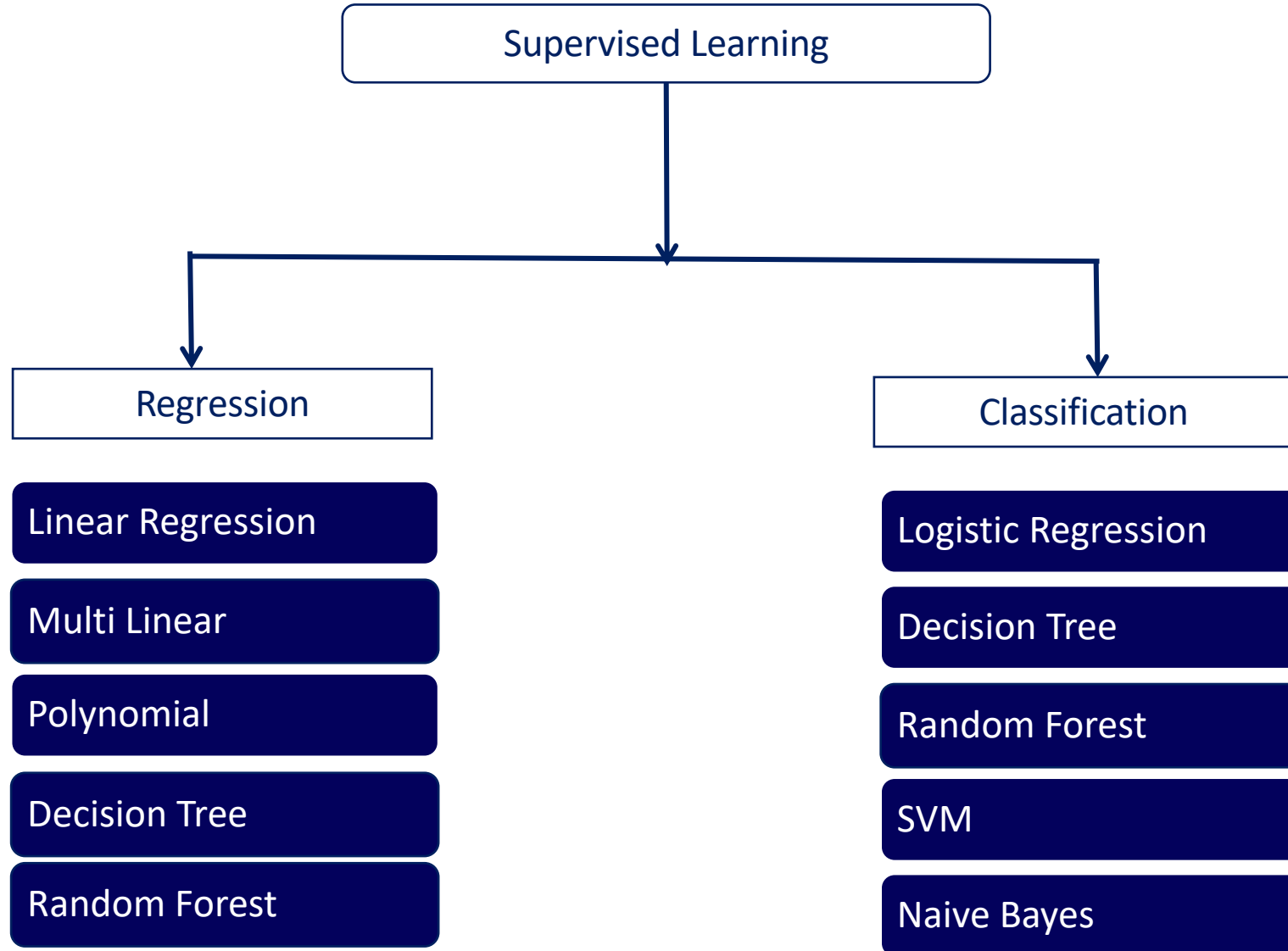
Learning from +ve to -ve
Reinforcement

Machine learns how to act
according to environment

Reinforcement Learning

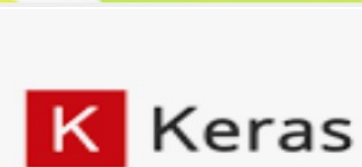
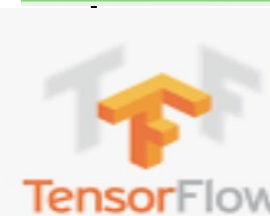
1(a)	Supervised - Regression					
	Size	Locality	Type of House	Price (TV) (DV)		
	1200sft	BLR	3BHK	10000000	Continuous or numerical	How much Kohli scores today?
	1000sft	HYD	2BHK	7000000		
	1400sft	MAA	3BHK	9500000		
				?		
1(b)	Supervised - Classification					
	Age	Height	Gender	Heart Attack (TV) (DV)		
	56	5.8	Male	Yes	Categorical	India is going to Win or Loss?
	45	5.6	Female	No		
	31	5.2	Female	No		
2	UnSupervised Learning					
	Custname	Custaccno	City	Salary	Who is best customer?	
	X	1001	BLR	80k	?	
	Y	1002	HYD	95k	?	
	Z	1003	MAA	65k	?	

Supervised Learning Algorithms



Platforms & Tools

- Python – Programming Language
- Anaconda – IDE (Notebook, Spyder)
- R – Programming Language
- R Studio - IDE
- Pycharm - IDE
- TensorFlow – Deep Learning Framework
- Keras – Deep Learning Framework
- Cloud – Platform as a service



Roles & Career



Roles & Career

- Data Analyst
- Data Engineer
- Machine Learning Engineer
- Data Scientist

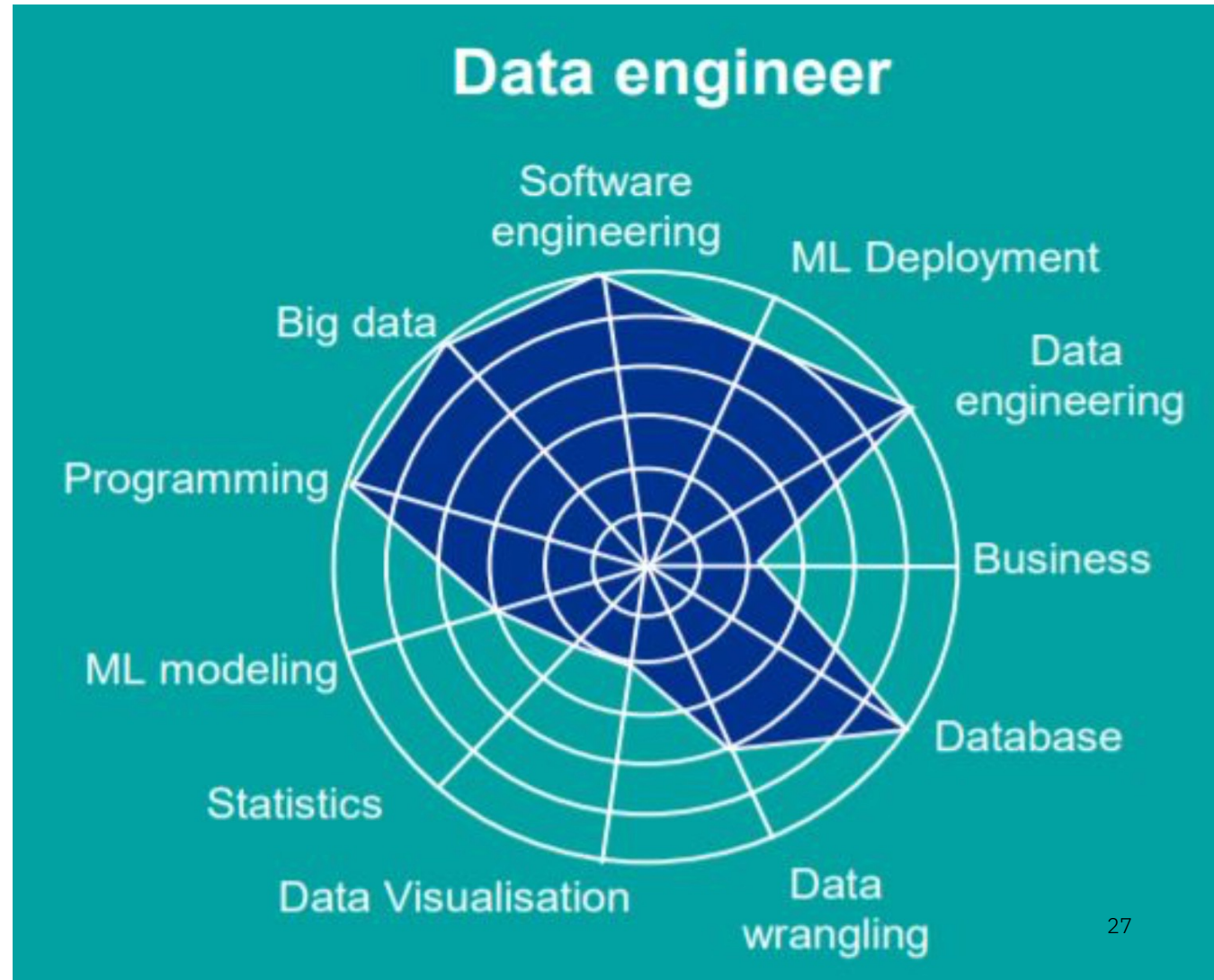
• Data Analyst

A **data analyst** is someone who collects, processes and performs statistical analyses of **data**. He or she can translate numbers and **data** into plain English in order to help organizations and companies understand how to make better business decisions.



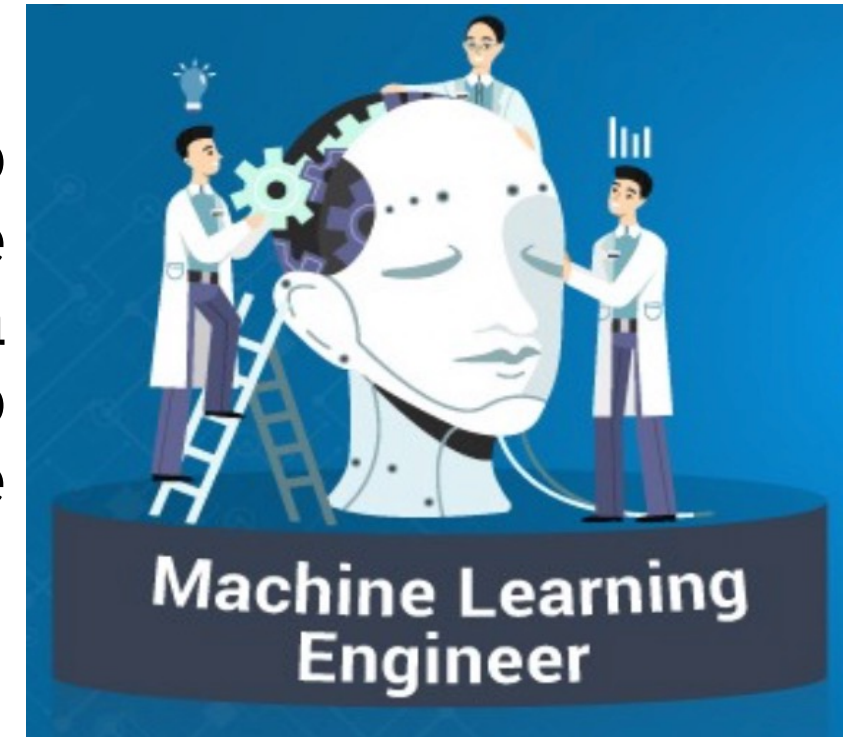
- **Data Engineer**

Data Engineers are the **data** professionals who prepare the “big **data**” infrastructure to be analysed by **Data Scientists**. They are software **engineers** who design, build, integrate **data** from various resources, and manage big **data**



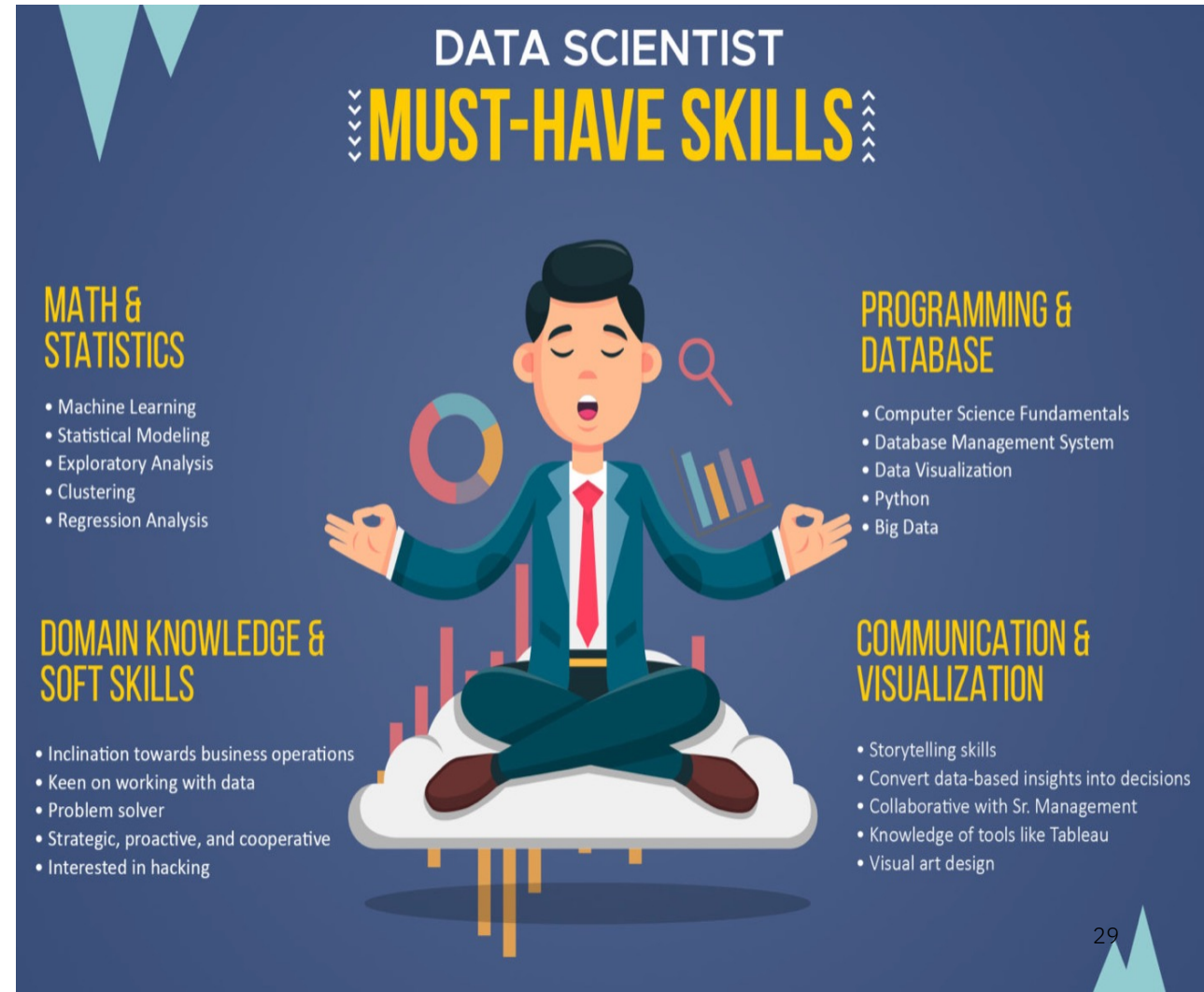
- **Machine Learning Engineer**

Machine learning engineers feed data into models defined by data scientists. They're also responsible for taking theoretical data science models and helping scale them out to production-level models that can handle terabytes of real-time data



• Data Scientist

More generally, a data scientist is someone who knows how to extract meaning from and interpret data, which requires both tools and methods from **statistics** and machine learning, as well as being human. He or She spends a lot of time in the process of collecting, cleaning, and munging data, because data is never clean.



Useful Resources:

IBM Cloud: Build for free.

Apps, AI, analytics, and more. Build with 40+ Lite plan services at no cost to you - ever.

<https://cloud.ibm.com>

Code Patterns

Complete solutions to problems that developers face every day.

<https://developer.ibm.com/patterns/>



Developer Community-India: Facebook Group
Brings coders together as a community and tap into
our collective innovative power.

<https://www.facebook.com/groups/2812932708919937>

Thank You!