

DATA LAB

GUARDA AVANTI

Big Data, nuove competenze
per nuove professioni.



Cofinanziato
dall'Unione europea



Sapere utile



Università
degli Studi
di Ferrara



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



UNIVERSITÀ
DI PARMA



POLITECNICO
MILANO 1863
POLO TERRITORIALE DI
PACENZA



UNIVERSITÀ
CATTOLICA
del Sacro Cuore

“Anticipare la crescita con le nuove competenze sui Big Data” Operazione Rif. PA 2023-19167/RER approvata con DGR
n° 843 del 29 maggio 2023 e co-finanziata dal Fondo Sociale Europeo Plus 2021-2027 Regione Emilia-Romagna

The background of the slide is an underwater scene. On the right side, there is a large, dense school of fish, possibly sardines, swimming in the same direction. On the left side, a scuba diver is visible, wearing a black wetsuit and yellow fins, holding a camera. Bubbles are rising from the diver. The water is a deep blue color.

ARTIFICIAL INTELLIGENCE & MACHINE LEARNING

Operazione Rif. PA 2023-19167/RER/10/1, "ANTICIPARE LA CRESCITA CON LE NUOVE COMPETENZE SUI BIG DATA", approvata dalla Regione Emilia-Romagna con DGR n° 843 del 29/05/2023 e co-finanziata dal Fondo Sociale Europeo Plus 2021-2027

DATA LAB 

Definizione di dati

- I dati sono rappresentazioni originarie, cioè non interpretate, di un fenomeno, evento, o fatto, effettuate attraverso simboli o combinazioni di simboli, o di qualsiasi altra forma espressiva legate a un qualsiasi supporto
- Dati sono rappresentazioni di eventi o fatti
 - Non interpretate (originarie)
 - Attraverso simboli (o combinazioni di simboli)
 - Contenute su supporti (forma espressiva)

Definizione di informazione

L'informazione deriva da un dato, o più verosimilmente da un insieme di dati, che sono stati sottoposti a un processo di interpretazione che li ha resi significativi per il destinatario

- L'informazione è:
 - insieme di dati
 - interpretati
 - comprensibili per il destinatario

Cosa e' il **MACHINE LEARNING** ?



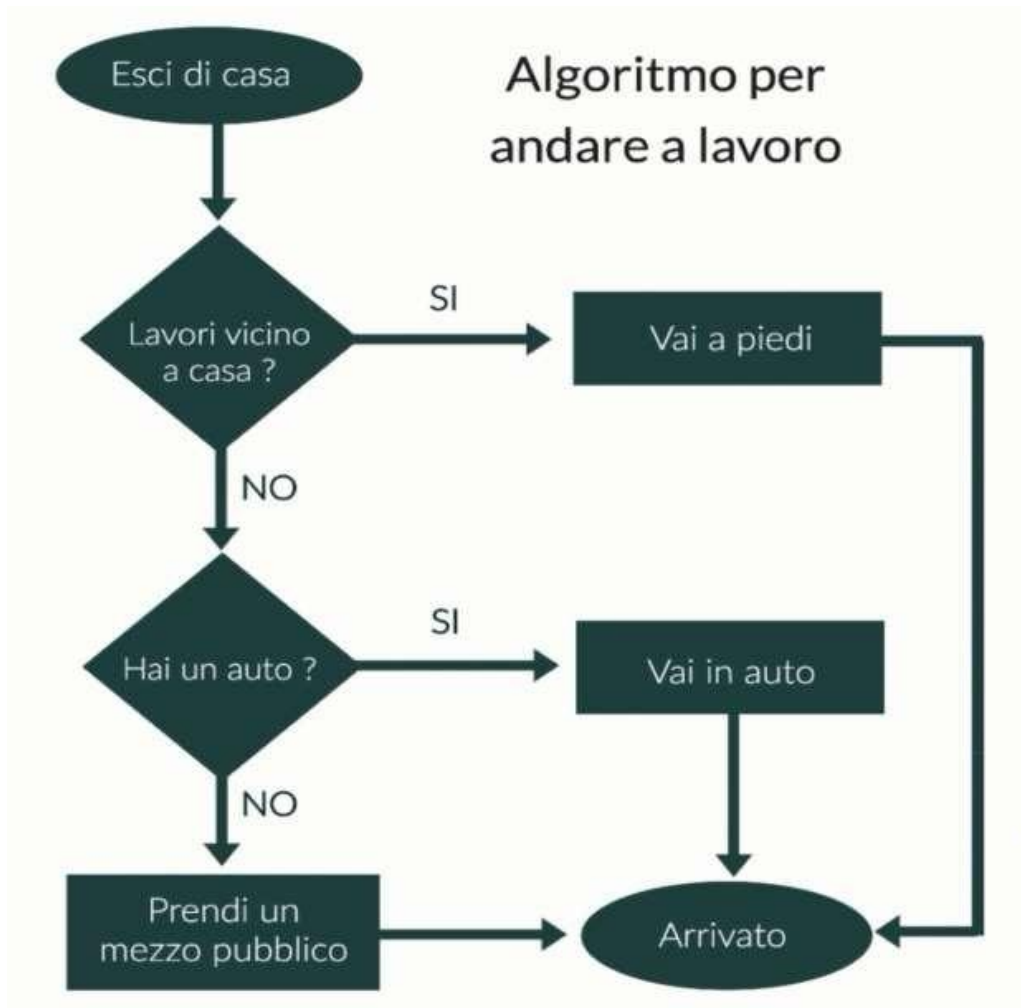
Cosa e' il machine learning

"E' il settore dell'intelligenza artificiale che studia come dare ai computer l'abilità di imparare senza essere esplicitamente programmati" - 1959



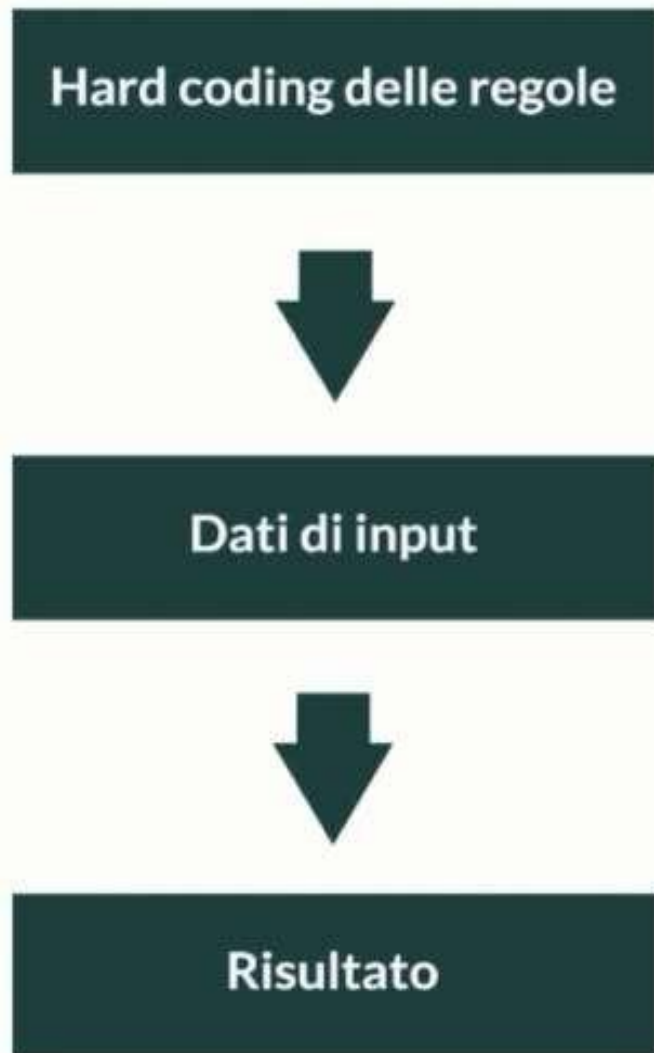
ARTHUR SAMUEL

Pioniere dell'AI
Inventore del termine "Machine learning"



E' un gatto 😊

Programmazione classica



Machine learning



Analisi di rischio

**Recommender
system**

**Elaborazione del
linguaggio parlato**

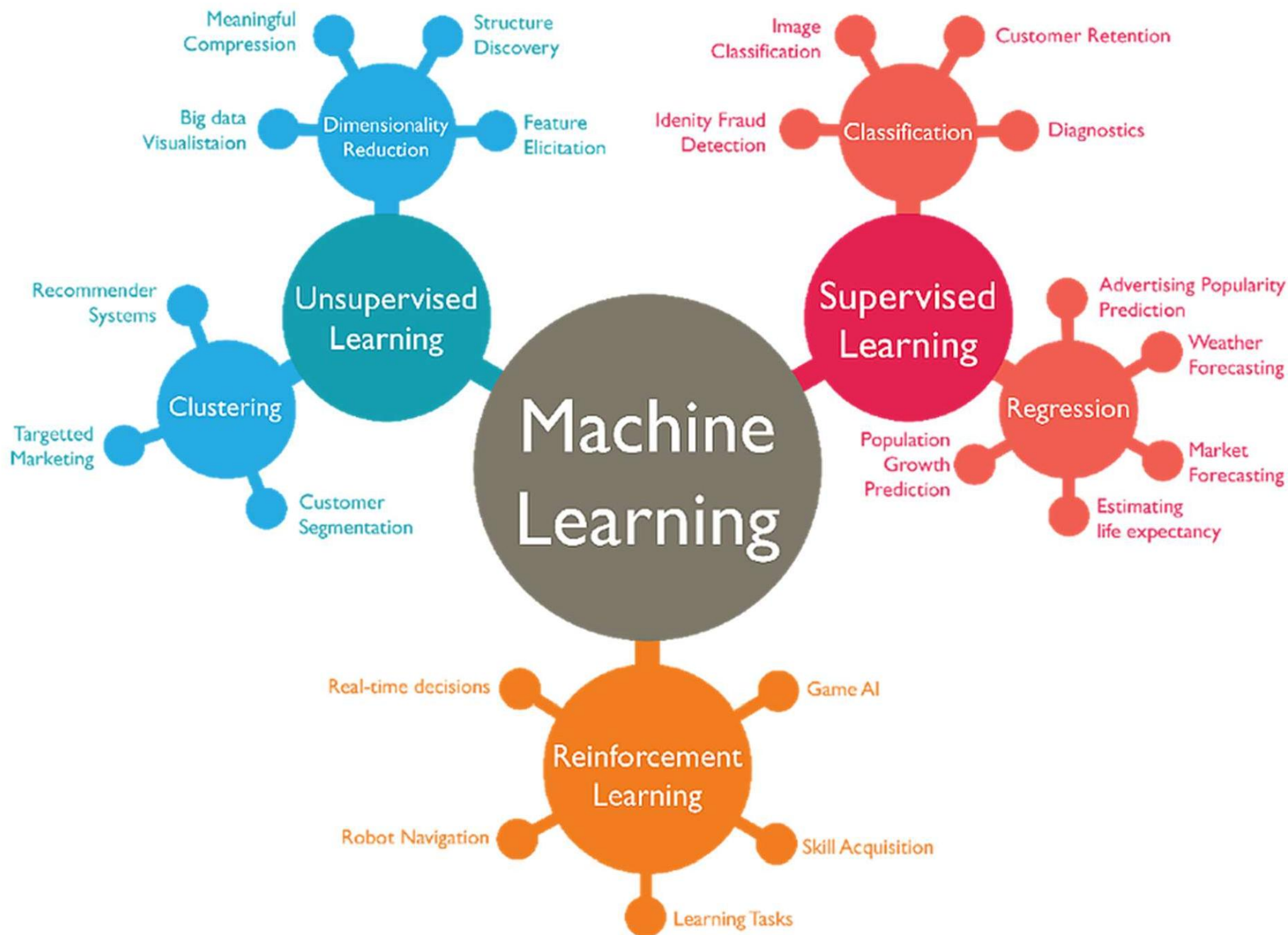
**Riconoscimento di
oggetti**

**Veicoli a guida
autonoma**

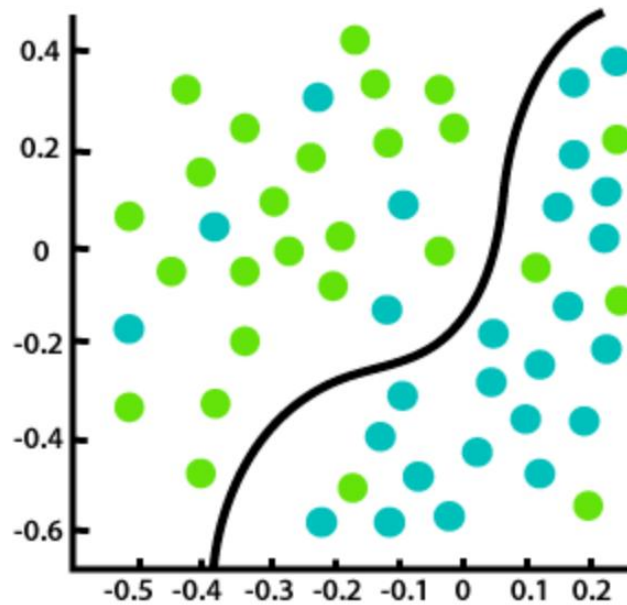
Fraud detection

**Customer
segmentation**

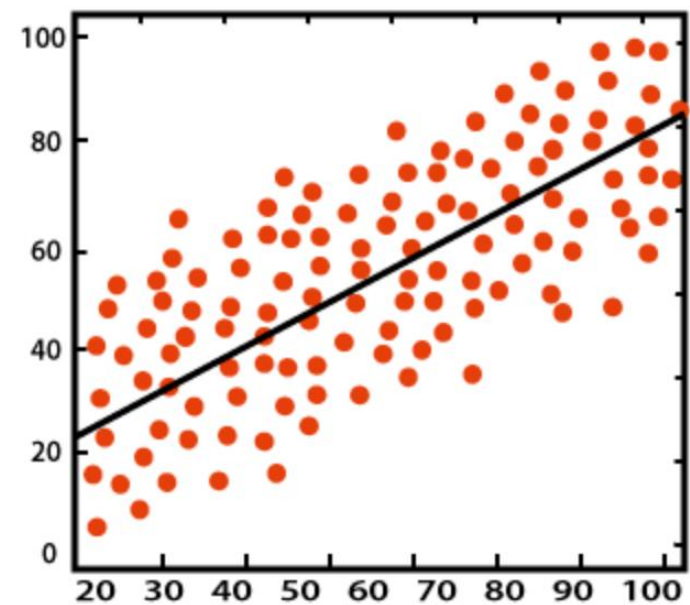
Diagnosi mediche



SUPERVISIONATO

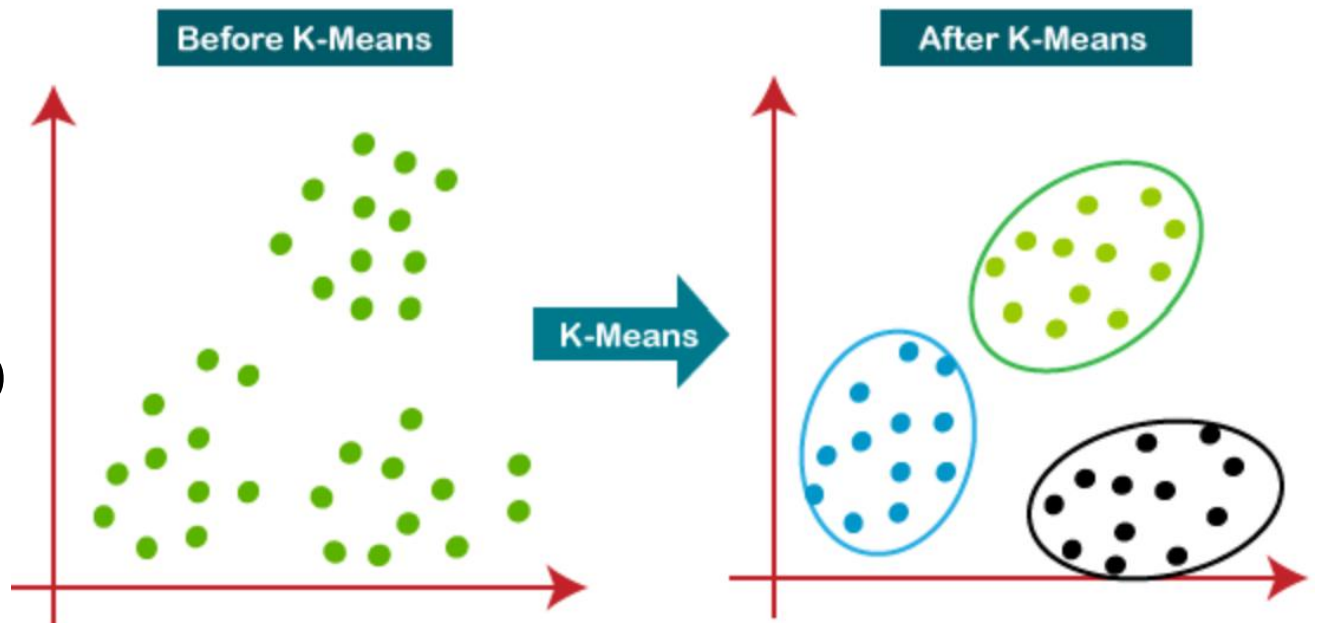


Classification



Regression

NON SUPERVISIONATO



Supervised

They gave me so much to read, and test!

Unsupervised

Me too. But at least they told you the answers

Reinforcement

At least you all don't get punished for every wrong action



Il machine learning si basa su statistica e probabilità



92% gatto

8% tigre





1997 - Deep Blue batte
il campione di scacchi
Garry Kasparov



2008 - Watson vince a
Jeopardy! contro i
campioni Ken Jennings
e Brad Rutter



2016 - AlphaGo batte
Go il 18 volte campio
del mondo Lee Sedor

PERCHE' OGGI ?



MAGGIORE POTENZA DI CALCOLO DISPONIBILE



DISPONIBILITA' DI ENORMI QUANTITA' DI DATI

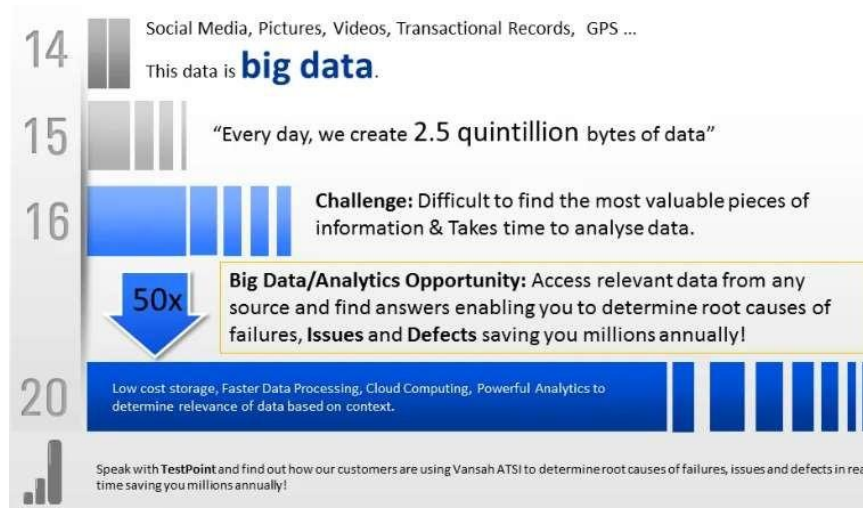
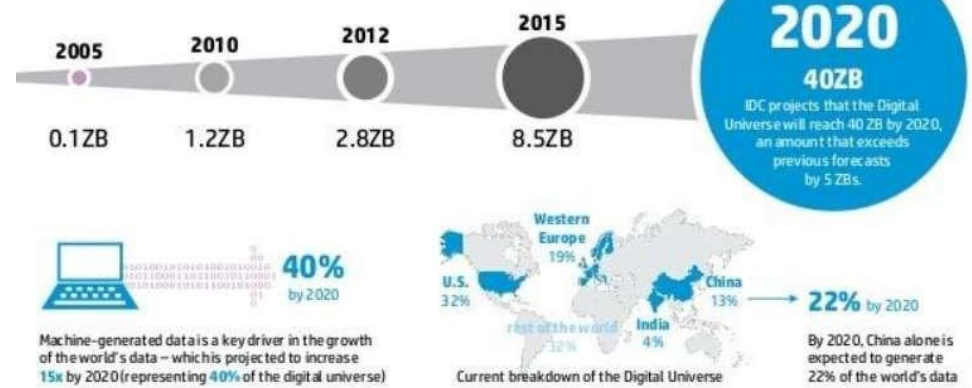
Perché lo si utilizza?

Il machine learning aiuta le aziende a dare un senso ai loro dati, indipendentemente dalla loro dimensione e dal settore di mercato in cui operano.

- Comprendere velocemente le informazioni
- Mostrare i fenomeni che determinano certi andamenti
- Evidenziare i trend emergenti
- Identificare relazioni e pattern nascosti
- Condividere le proprie scoperte con gli altri



Machine Generated Data - 40% of the Digital Universe

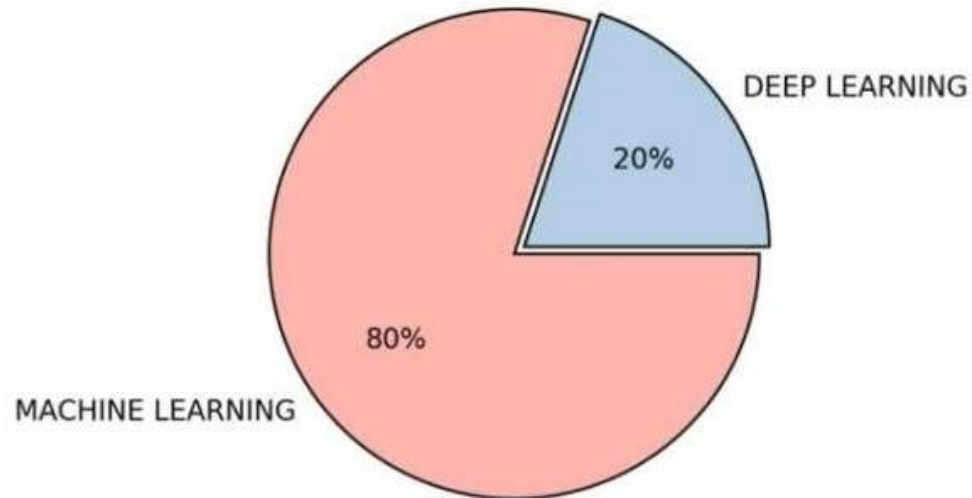




?

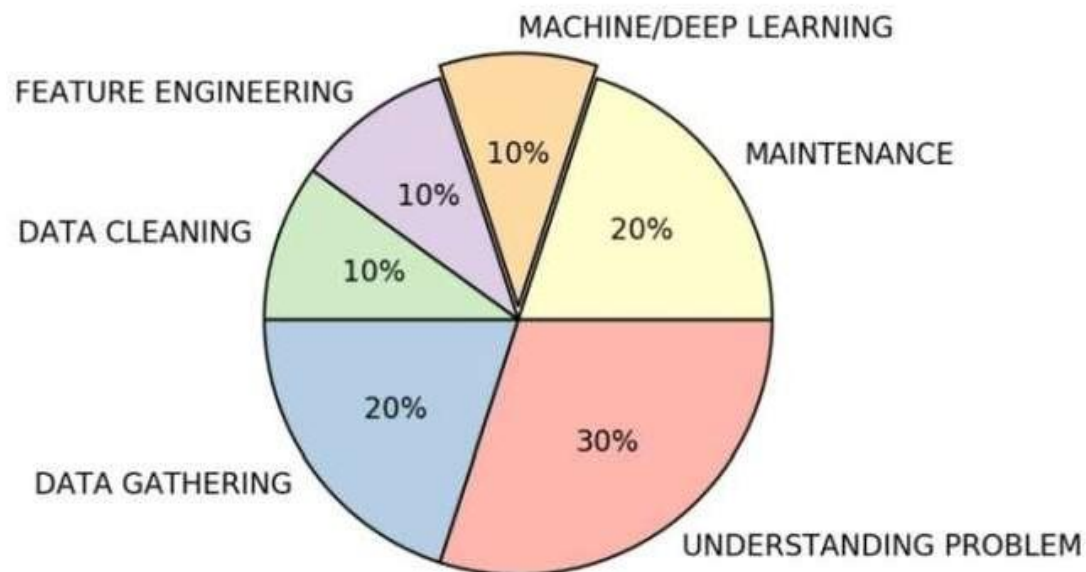
DATA SCIENTIST JOB - EXPECTATION

@drangshu



Follow: Dr. Angshuman Ghosh

DATA SCIENTIST JOB - REALITY





Understanding the business problem

- You should ask relevant questions which makes you understand the problem which you are going to solve
- You should ask multiple WHY? questions and get answers from the client or the stakeholder or the person who told you to do the project.

#2

Data acquisition

- After deciding what features or metrics to use to solve the business problem.
- Next step is to gather the data.
- You may use sources like Databases, API's, Web scraper, online repositories etc...



Data preparation

- This step involves 2 important things Data cleaning, Data transformation.
- Data cleaning is like check missing values, inconsistency datatypes, duplicate values etc..
(Check our post on data pre-processing to see what are the most used techniques)
- Data transformation is a process of modifying the data based on predefined rules.

#4

Exploratory data analysis

- EDA helps you to understand what exactly you can do with the data.
- This is the most important step.
- Through EDA you can find what features are the most important in the model building.
- You can also find useful insights through EDA.



Data modeling

- This is the most important part where you will be finding the model the best fits the business requirement.
- You will be doing multiple iterations on the test and train data to find the best performing model.

#6

Visualization and communication

- This is where you will show all the things which you did and found during the previous steps to your client, stakeholders or the person who gave you the project.
- You will be creating reports or dashboards to show your business finding in a powerful way (visualizations) to make them understand easily.

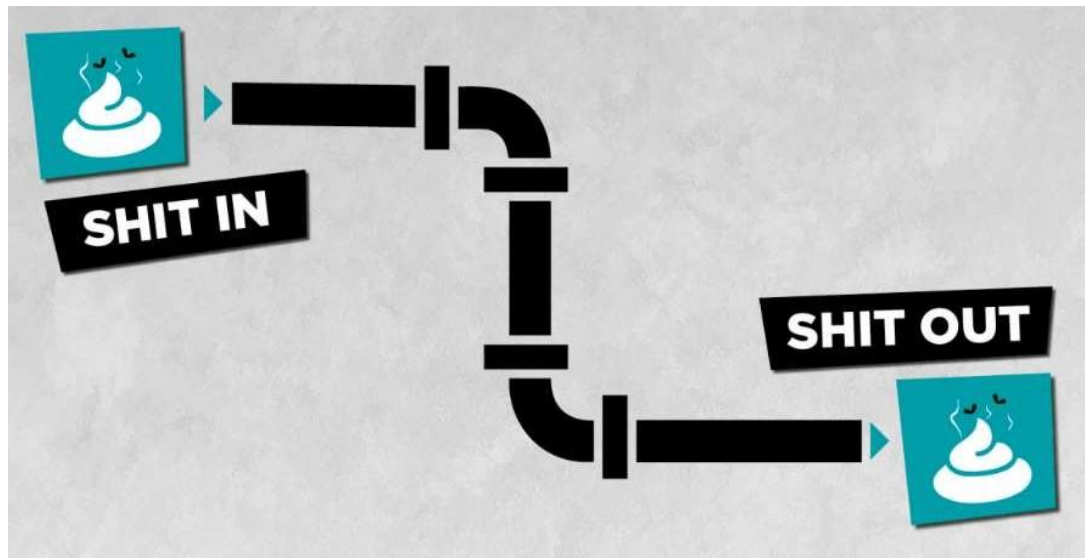


Deploy & maintenance

- Test your best performing model multiple times before deploying it into production.
- You will be using reports and dashboards for real-time analytics.
- It is also important to monitor the model performance in the real world and retraining it if the performance degrades.

Requirements:

- Comprendere i dati che desideri elaborare, incluse le loro dimensioni e cardinalità (l'unicità dei valori dei dati in una colonna).
- Determinare cosa stai processando e quale tipo di informazioni vuoi estrapolare.
- Conoscere la tua audience e comprendere come elabora l'informazione, o cosa si aspetta.
- Utilizzare una visualizzazione che trasmetta le informazioni nella maniera più appropriata e semplice per la tua audience.



CAUTION: BAD DATA



**BAD DATA QUALITY
MAY RESULT IN
FRUSTRATION AND
LEAD TO DROP
KICKING YOUR
COMPUTER**

Evitare Errori Grossolani!





WHAT IS PYTHON?



- ▶ A back end programming language
- ▶ High-level & approachable for beginners
- ▶ Has a welcoming & established community

Used for tasks like:



Used by companies like:

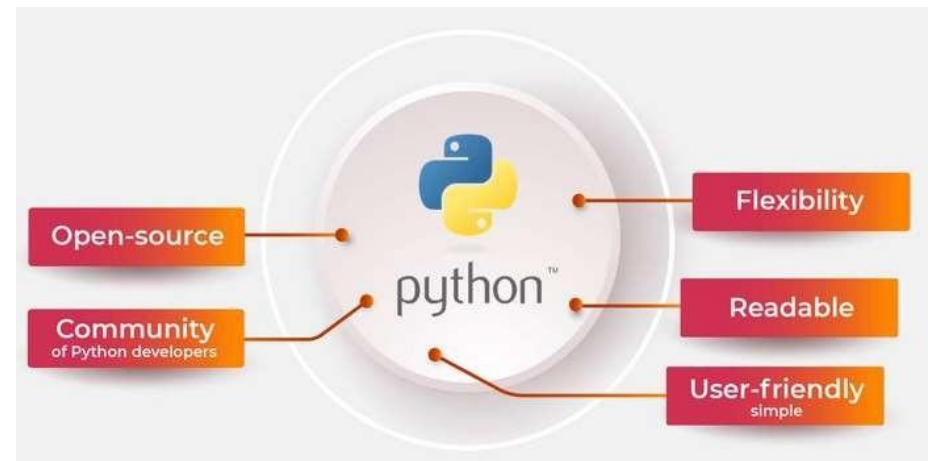


Used with frameworks like:

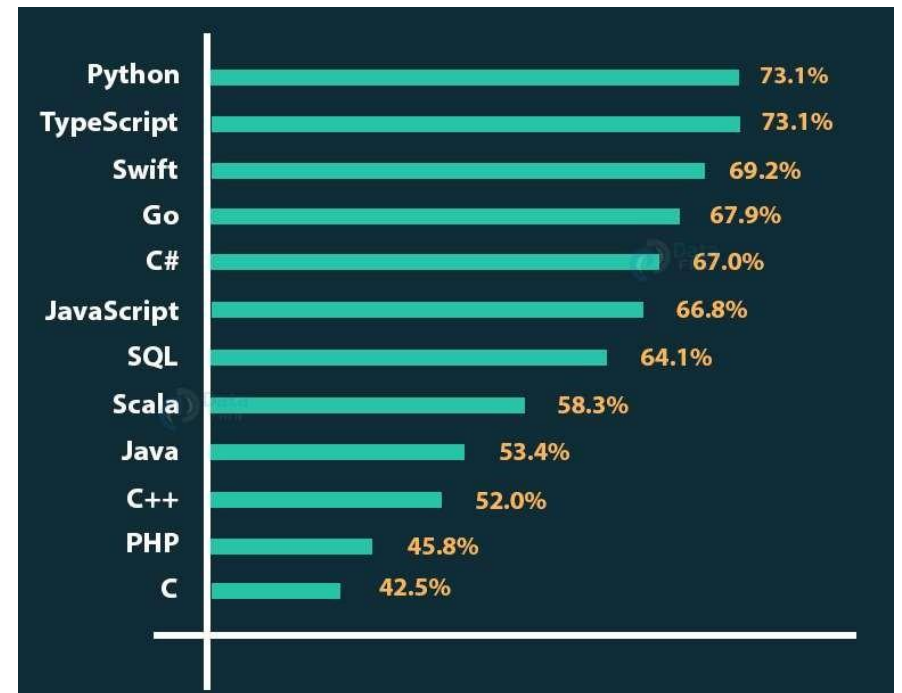
django



Flask

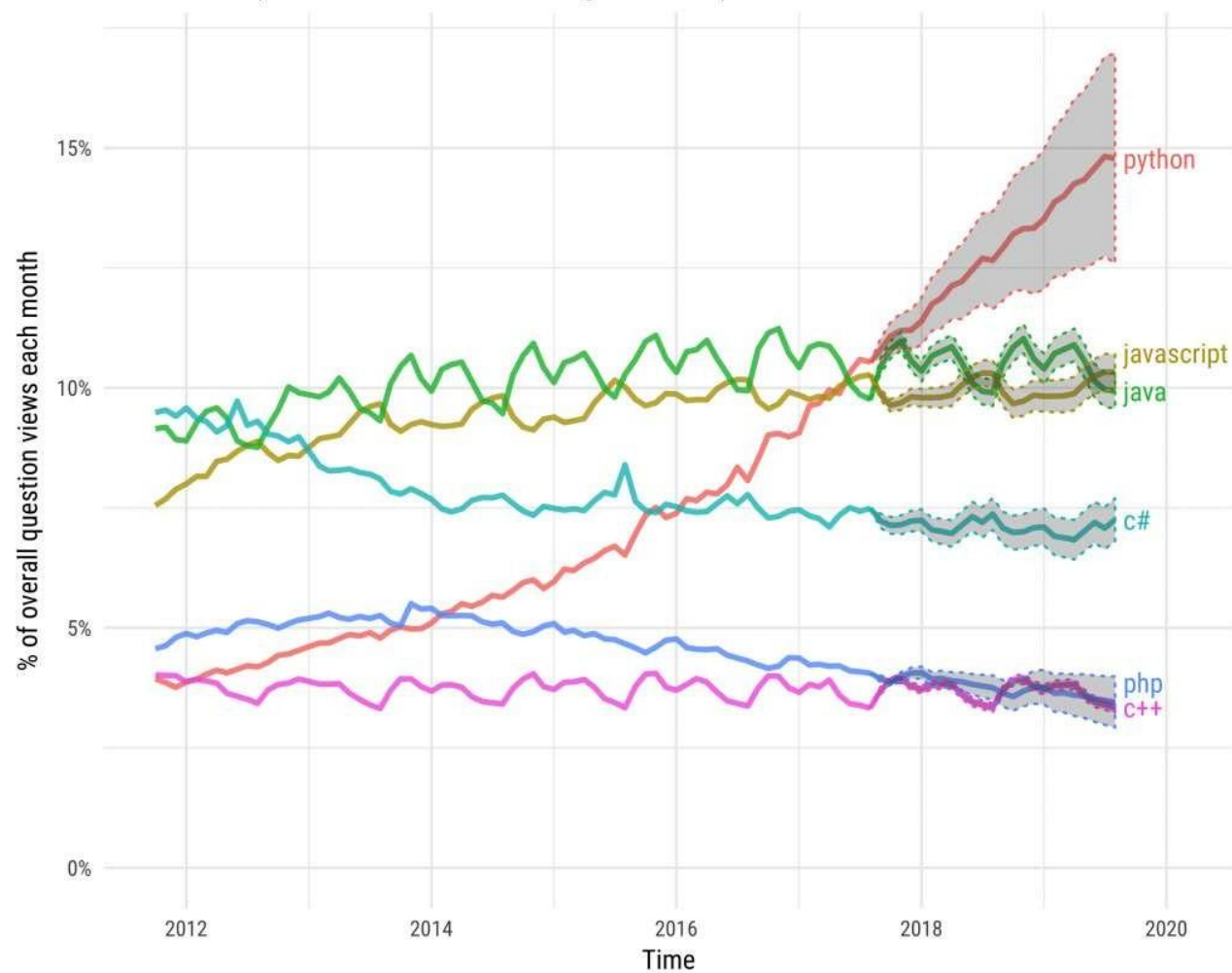


PYTHON



Projections of future traffic for major programming languages

Future traffic is predicted with an STL model, along with an 80% prediction interval.





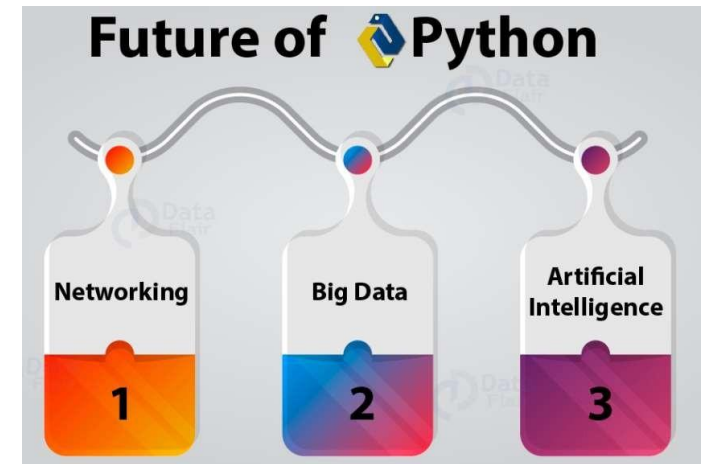
Top Companies using Python





WHY Python

01	Simplicity
02	Large Community
03	High Demand-Supply Ratio
04	Large Number of Frameworks
05	Chosen Language for AI and ML
06	Make your own DIYs



X	python
Lines of Code: 105	Lines of Code: 10
Wall Time: 7.89s	Wall Time: 0.83s
More complex	More simple

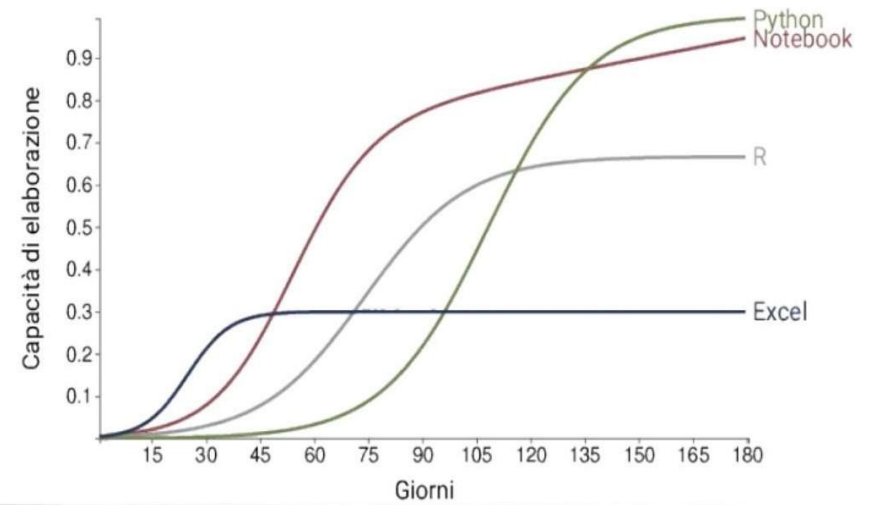


- Python is Easy
- More Functions – Less Code
- Perfect Language for Building Prototypes
- Great Flexibility
- Perfect Language in case you're on a Budget
- The Internet of Things (IoT) + Python Combination
- A Lot of useful Frameworks (Django, Flask)

"Python Vs Java!"	"Python Vs C++!"
Python	
Print ("Python Vs Java!")	Print ("Python Vs C++!")
Java	C++
<pre>public class PythonVsJava { public static void main(String[] args) { System.out.println("Python Vs Java!"); } }</pre>	<pre>#include <iostream> void main() { cout << "Python Vs C++!"; }</pre>

**Gratificazione
e
soddisfazione**

**Noia e
frustrazione**





Learn
programming
for **future work**



Learn
programming
to understand
programming jokes



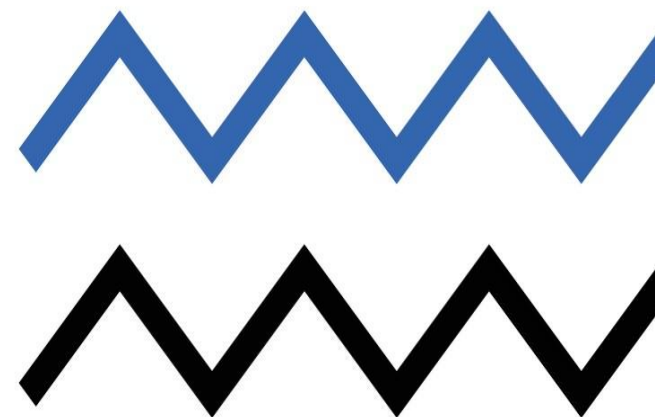
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www.bigdata-lab.it



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