

INTRODUCTION TO MACHINE LEARNING



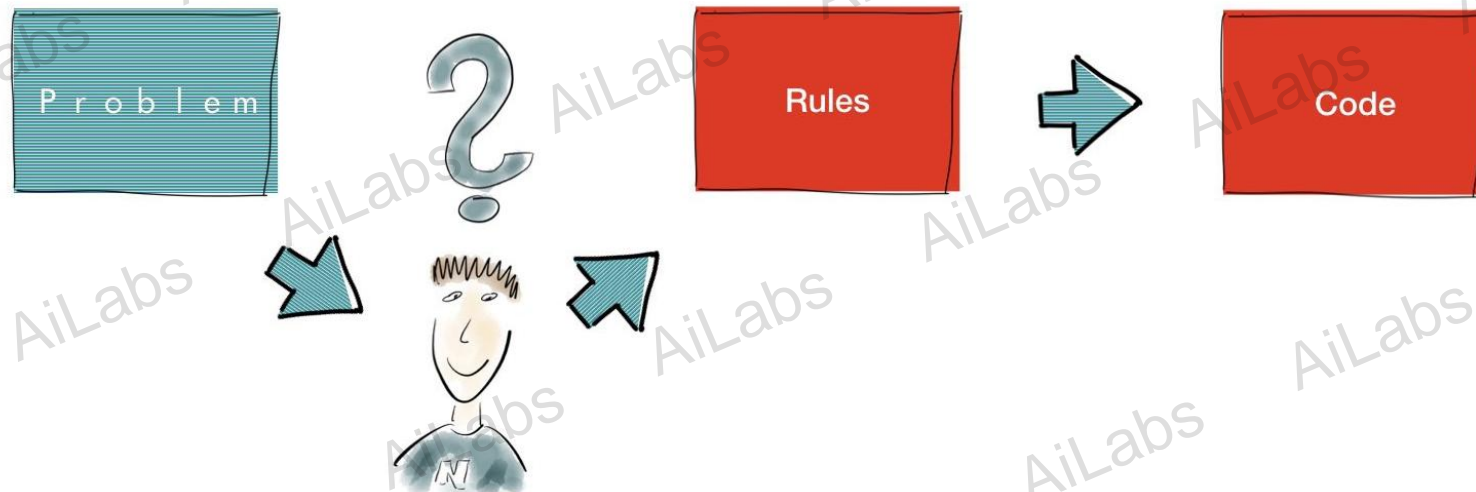
What is Machine Learning?

*Machine learning is about **predicting the future based on the past.***

-- Hal Daume

For some kinds of problems we are just not able to write down the rules

👉 e.g. image & speech recognition, language translation, sales forecasting

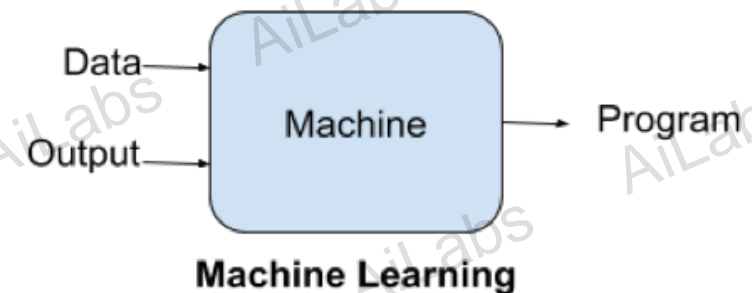
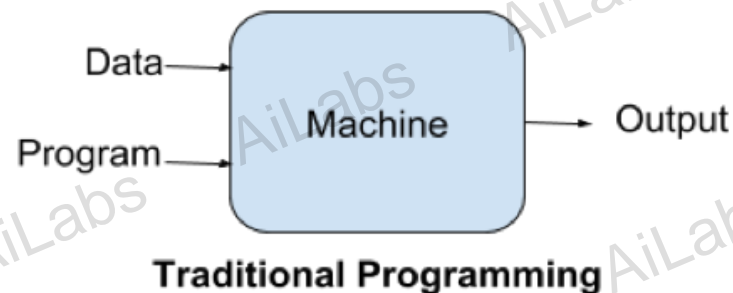


What is Machine Learning?

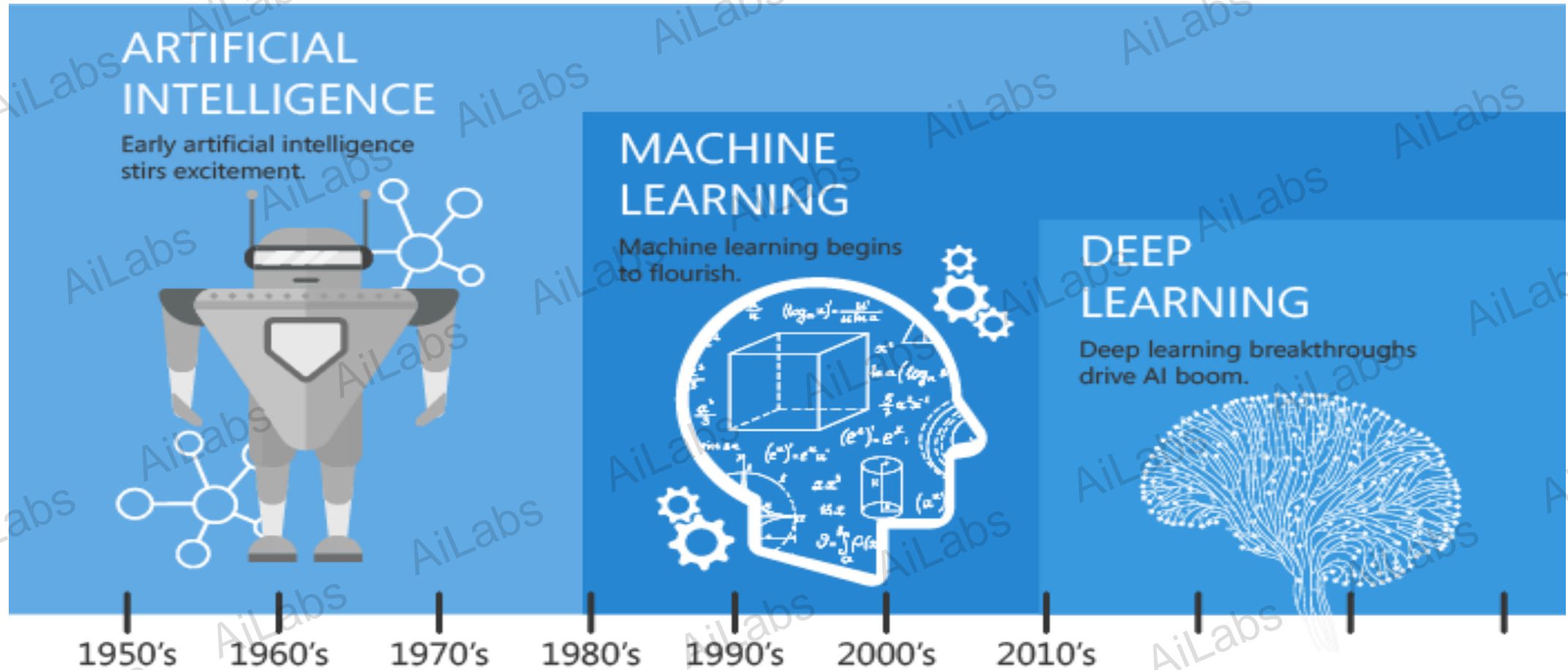
*Machine learning is about **predicting the future based on the past.***

-- Hal Daume

- Machine learning is a **branch of Artificial Intelligence (AI)** focused on building applications that **learn from data** and **improve their accuracy** over time **without being programmed** to do so.
- The primary aim is **to allow the computers learn automatically without human intervention** or assistance and adjust actions accordingly.

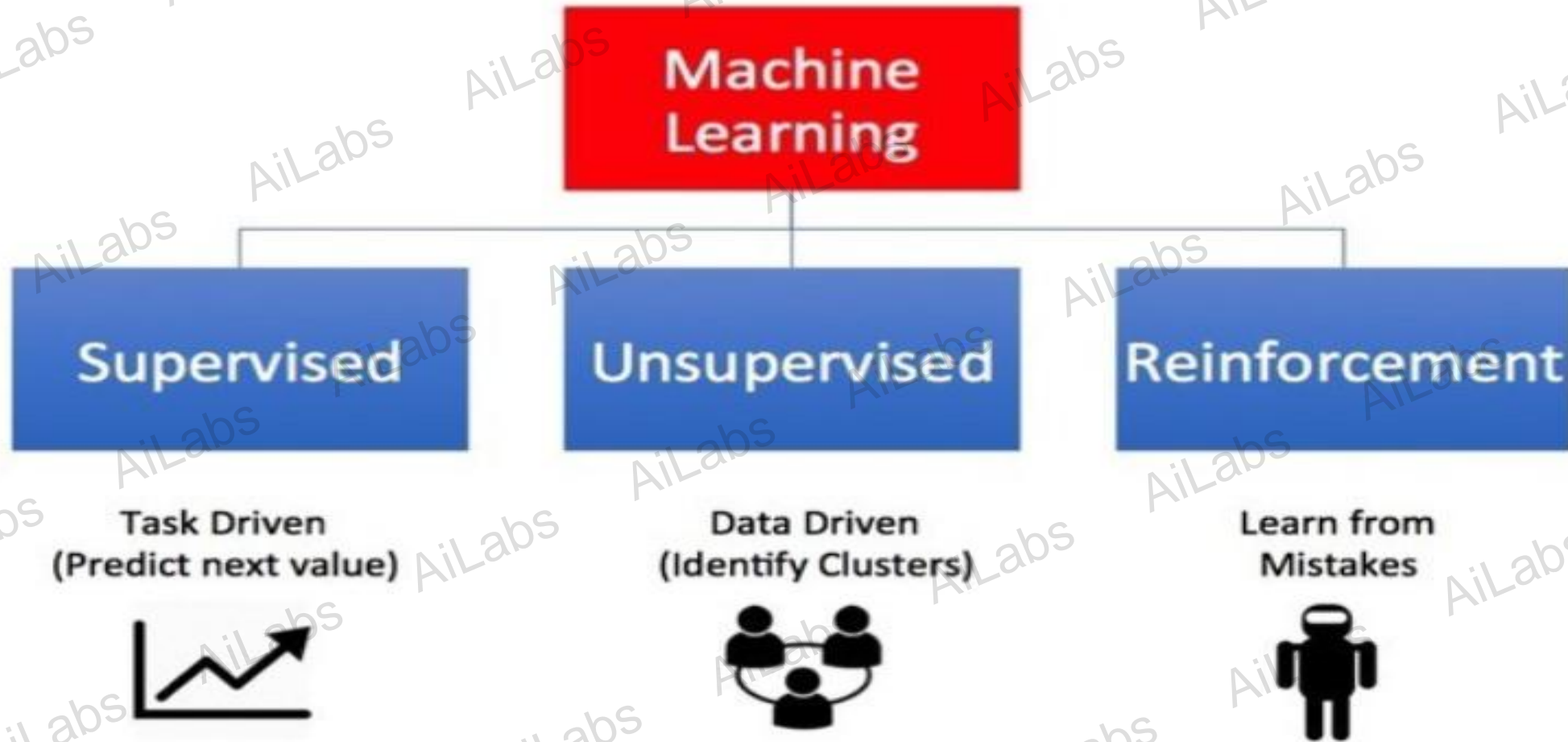


A Quick History of Machine Learning



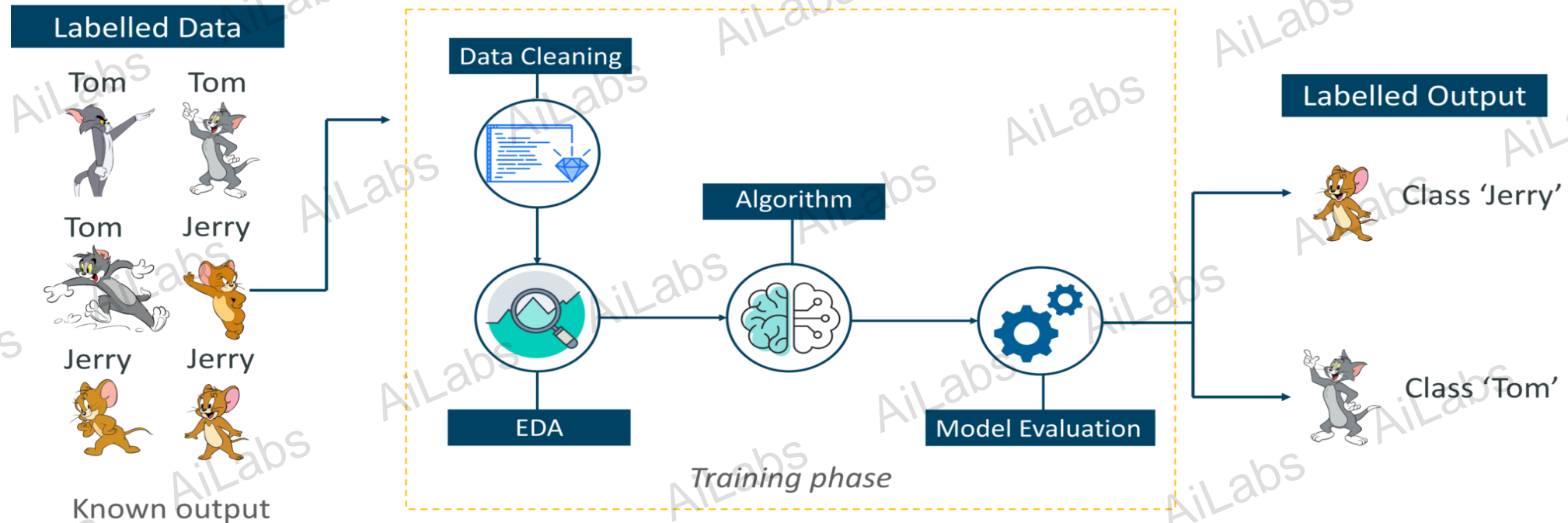
Since an early flush of optimism in the 1950's, smaller subsets of artificial intelligence - first machine learning, then deep learning, a subset of machine learning - have created ever larger disruptions.

Types of Machine Learning



Supervised Learning

Supervised learning is a learning process in which we **train a machine/model** using **data which is well labelled** i.e. data is already **tagged** with the **correct answer**.



Supervised Learning: Types

Classification:

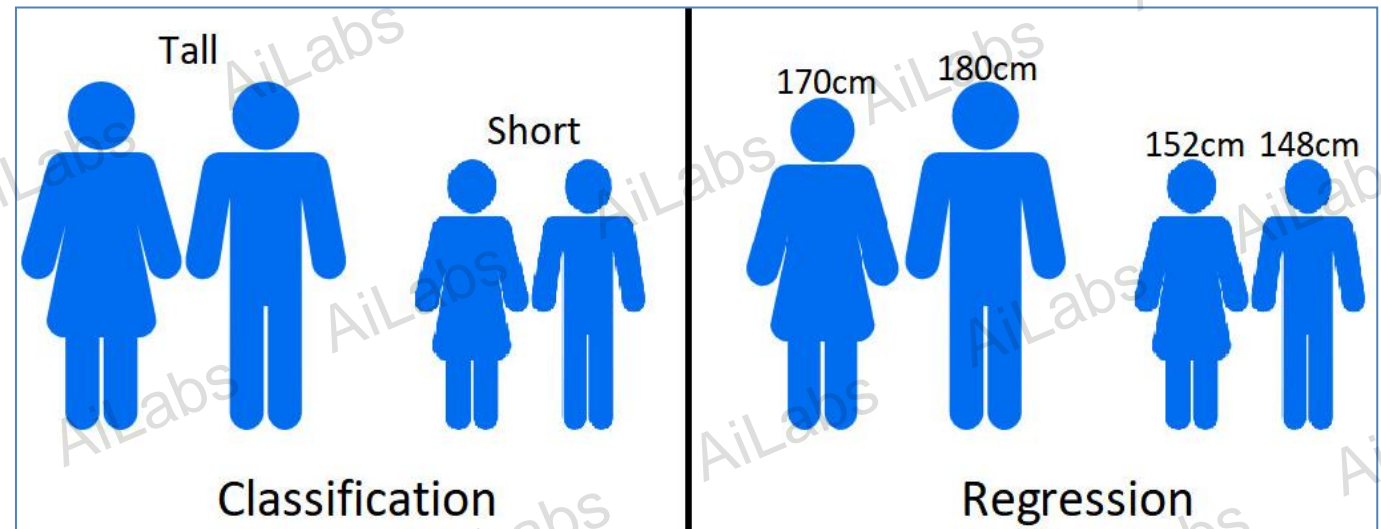
Classification means **to group the output** inside a class. If the algorithm tries to label input into two distinct classes, it is called **binary** classification. Selecting between **more than two classes** is referred to as **multiclass classification**.

Example: Predicting loan defaulter , COVID-19: Positive or Negative, Tall or Short, Cat or Dog or Tiger, etc.

Regression:

Regression technique predicts a single output value.

Example: Predicting house price, height, temperature, etc



The Key Difference

Classification predicts a **discrete label**, while **regression** predicts a **continuous quantity or value**.

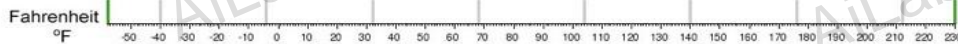


Regression

What is the temperature going to be tomorrow?

PREDICTION

84°



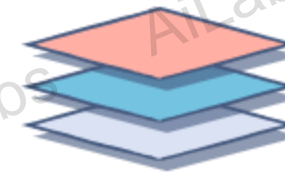
Classification

Will it be Cold or Hot tomorrow?

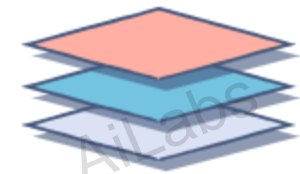
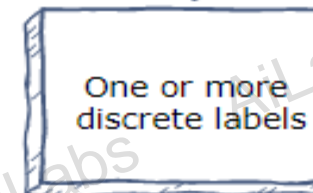
PREDICTION

COLD

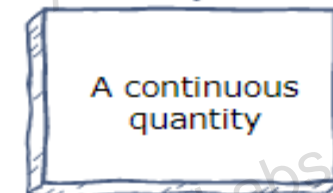
HOT



Input Data

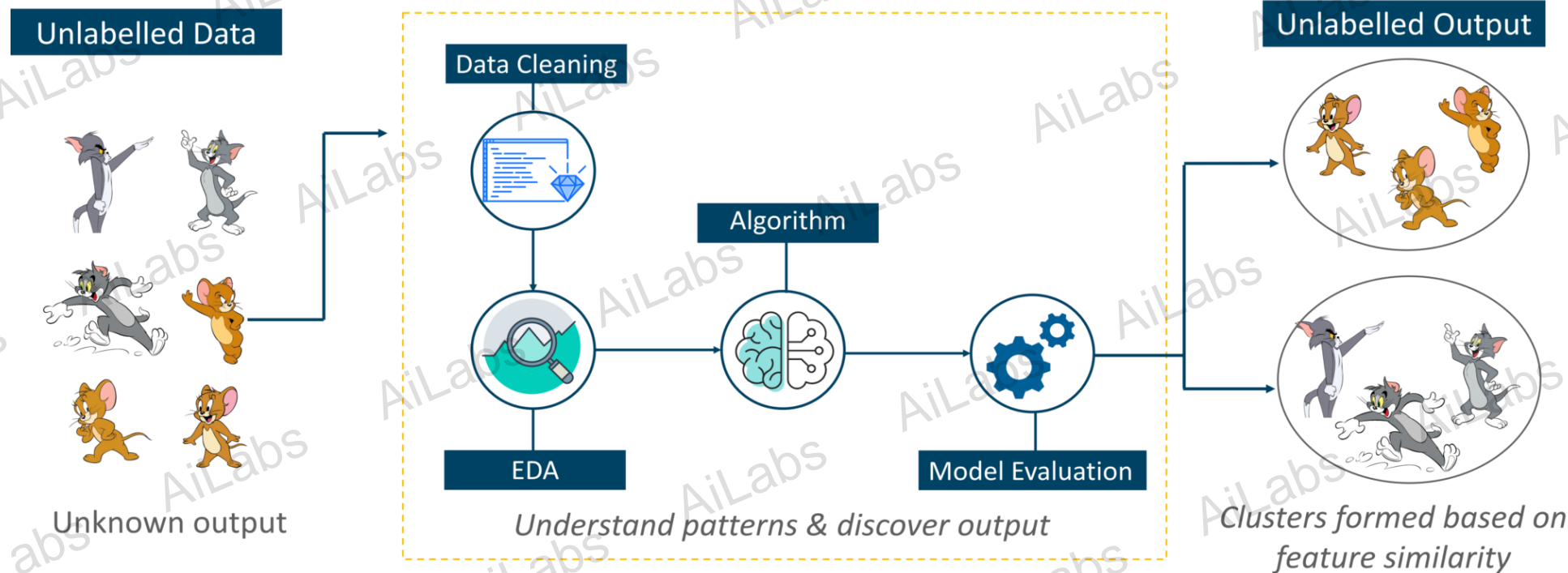


Input Data



Unsupervised Learning

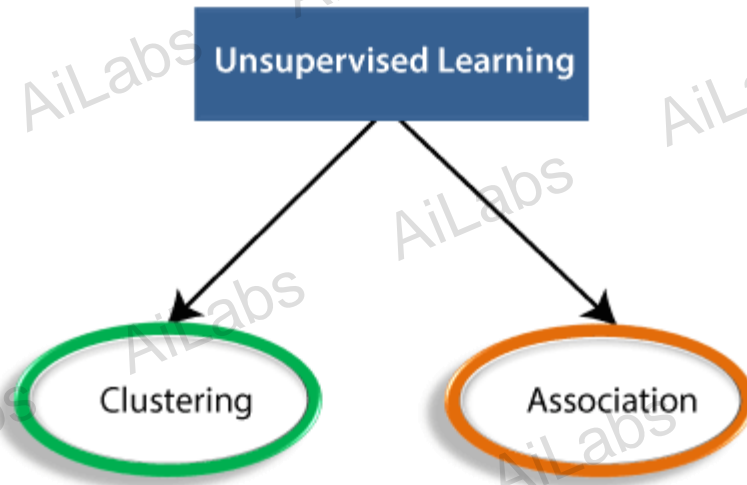
Unsupervised learning is the training process, in which a **machine/model** is **trained using the data that is not labelled** and allowing the algorithm to **act on the data without guidance**.



Unsupervised Learning: Importance

- Unsupervised learning is helpful for **finding useful insights from the data**.
- Unsupervised learning is **much similar as a human learns to think by their own experiences**, which makes it closer to the real AI.
- Unsupervised learning **works on unlabeled and uncategorized data** which make unsupervised learning more important.
- In **real-world**, we **do not always have input data with the corresponding output** so to solve such cases, we need unsupervised learning.

Unsupervised Learning: Types



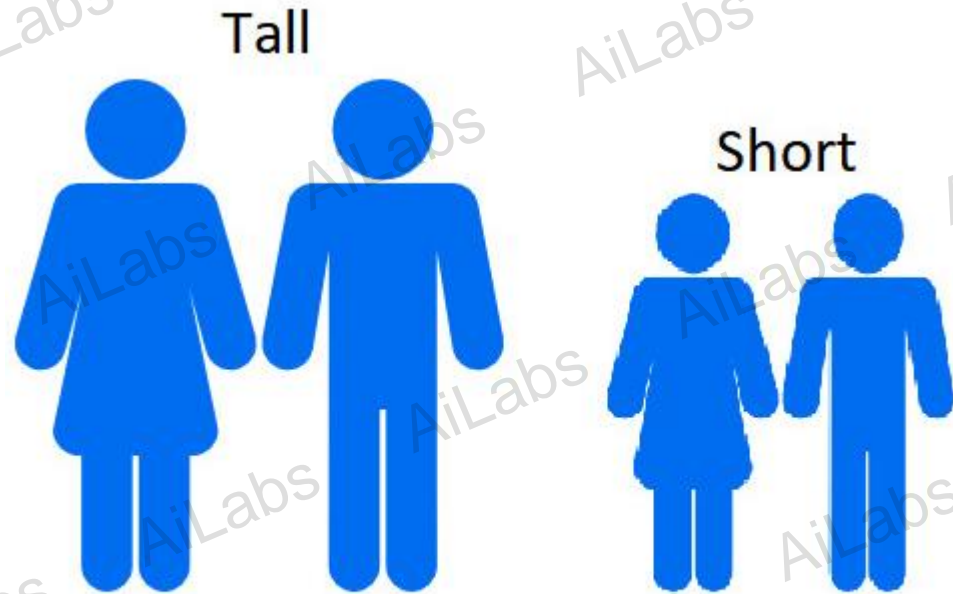
Clustering:

Clustering is a **method of grouping** the objects into clusters such that **objects with most similarities remains into a group** and **has less or no similarities** with the **objects of another group**. Cluster analysis finds the **commonalities** between the data objects and **categorizes** them as per the **presence and absence** of those **commonalities**.

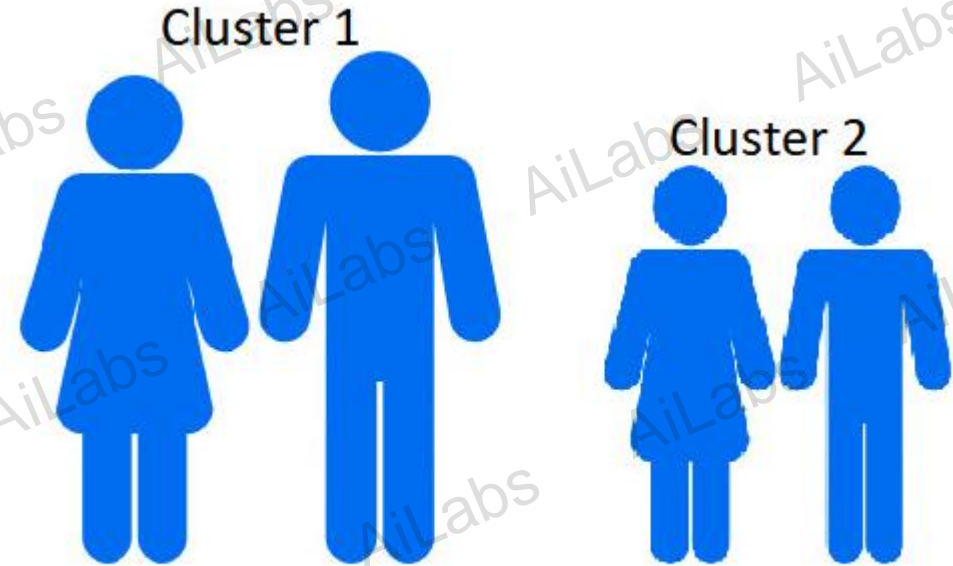
Association:

An association rule is an **unsupervised learning method** which is used for **finding the relationships** between **variables** in a database. It **determines the set of items** that **occurs together** in the dataset. Association rule makes marketing strategy more effective. Such as people who buy X item (suppose a bread) are also tend to purchase Y (Butter/Jam) item. A typical example of Association rule is Market Basket Analysis.

Classification Vs Clustering







Classification



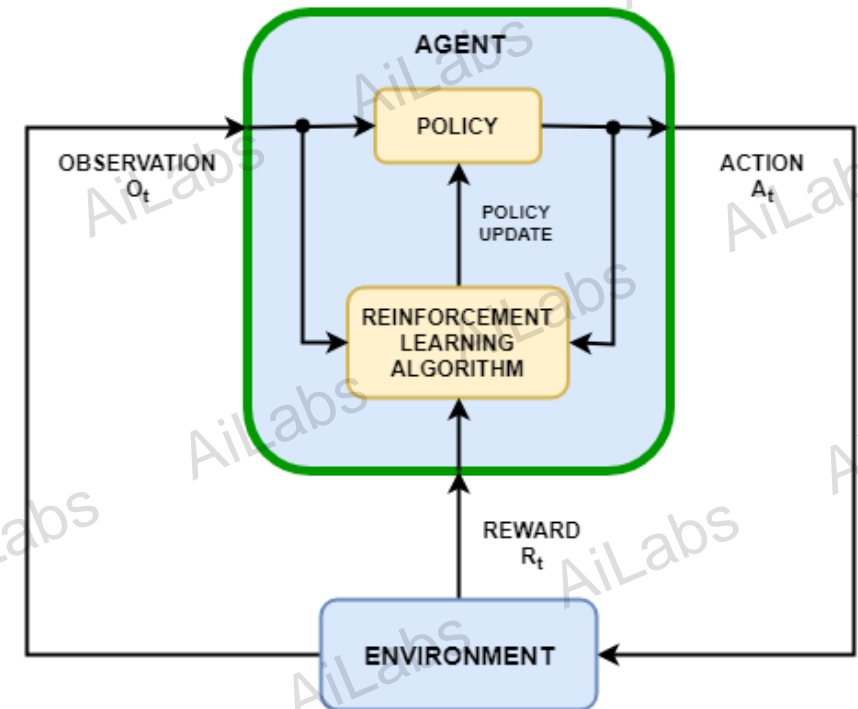
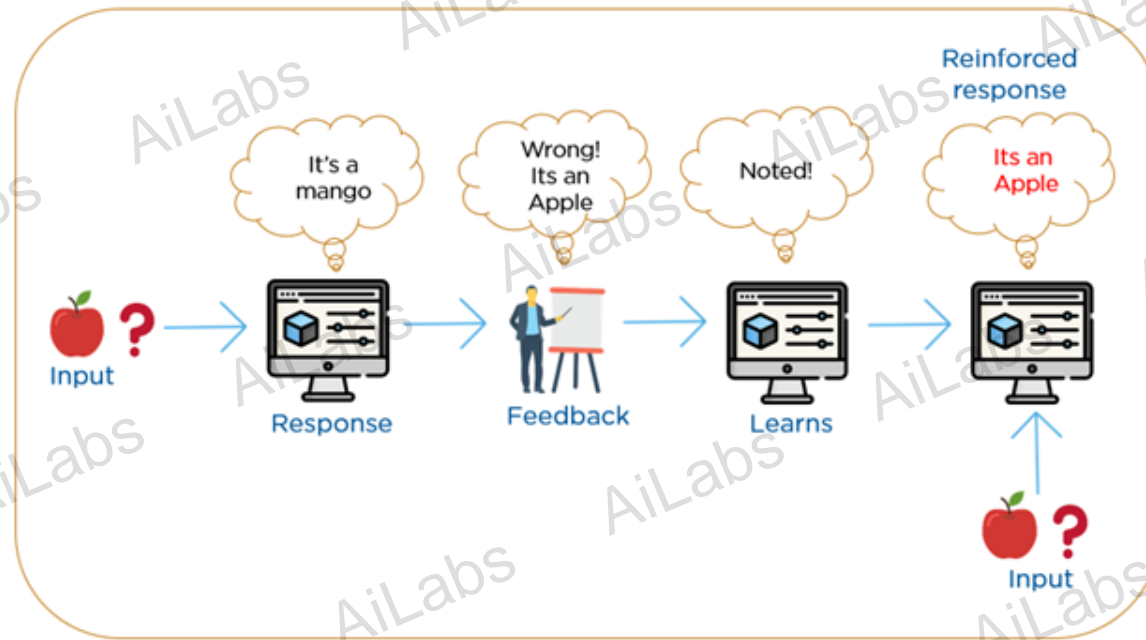
Clustering

Let's Summarize

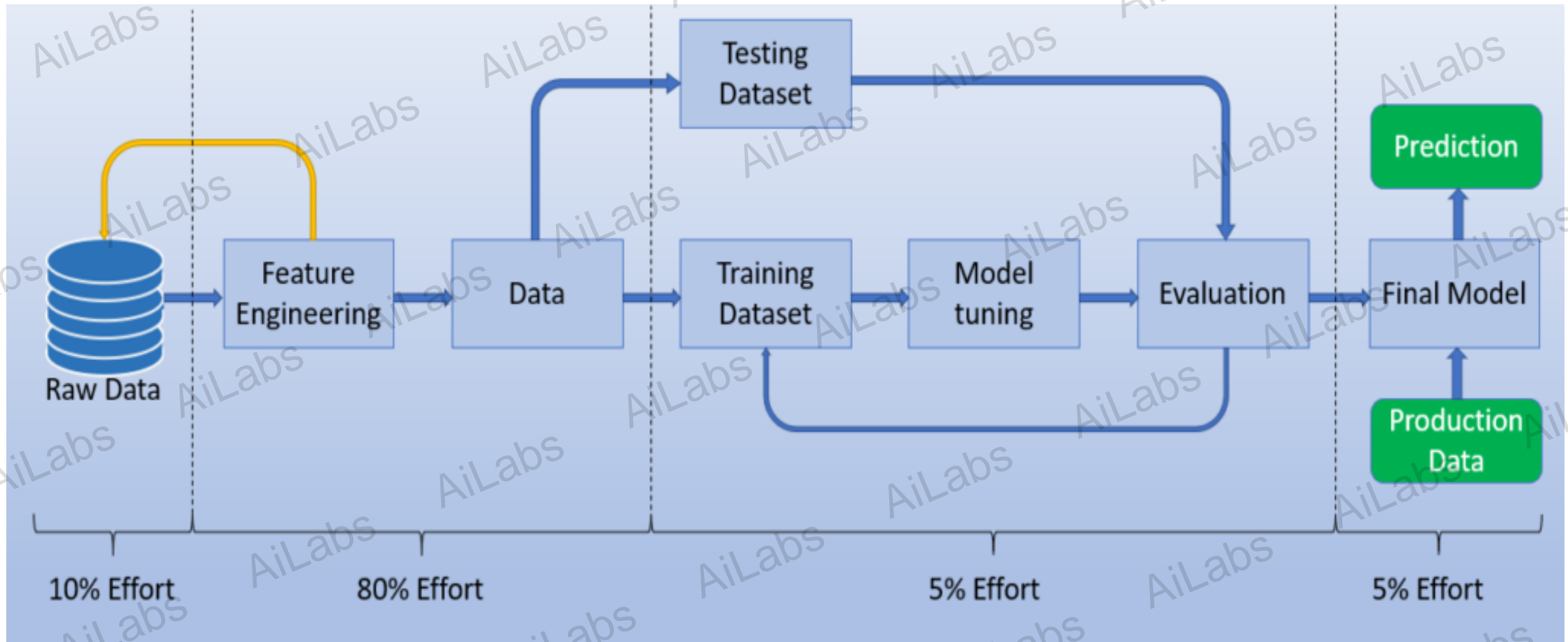
Predictive methods	Descriptive methods
<div>Classification</div> <div></div> <div>Learns a method for predicting the instance class from pre-labeled (classified) instances</div>	<div>Clustering</div> <div></div> <div>Finds "natural" grouping of instances given un-labeled data</div>
<div>Regression</div> <div></div> <div>An attempt to predict a continuous attribute</div>	<div>Association Rules</div> <div></div> <div>Method for discovering interesting relations between variables in large DBs</div>

Reinforcement Learning

Reinforcement Learning (RL) is a type of machine learning technique that **enables an agent to learn in an interactive environment by trial and error using feedback** from its own actions and experiences.

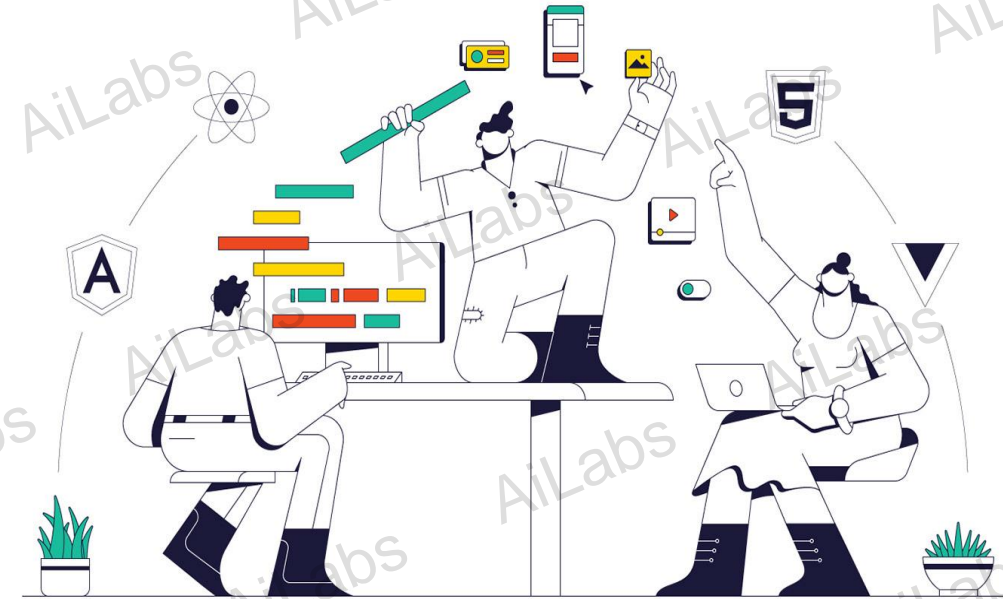


A Complete Life-Cycle of ML Projects



Who Can Contribute in ML Projects?

- An **enthusiast** having **graduated** with any **mathematical/engineering** background.
- A **working professional** having experienced in some **programming language** and (or) **s/w development**.



But, all need, in-depth theoretical knowledge and hands-on experiences of various kinds of machine learning algorithms.



MACHINE LEARNING

Implement Your Ideas using Python



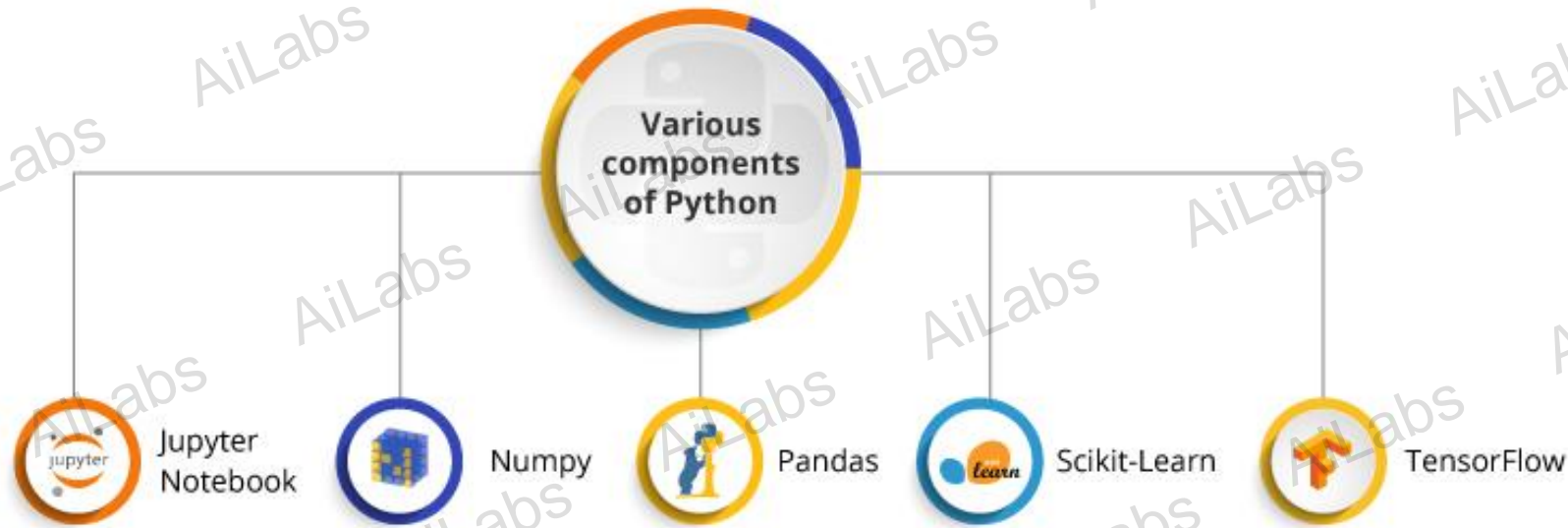
Why is Python ideal for ML?

- Python is **beginner friendly** and **easy to learn**.
- It boasts of **rich libraries** and **APIs** that solve various needs of machine learning pretty easily.
- Python is **open-source** as well as there are **huge support communities** which can help developers at every stage of coding practices.
- Python **offers great flexibility** in terms of checking the data through data structures right on the IDE.



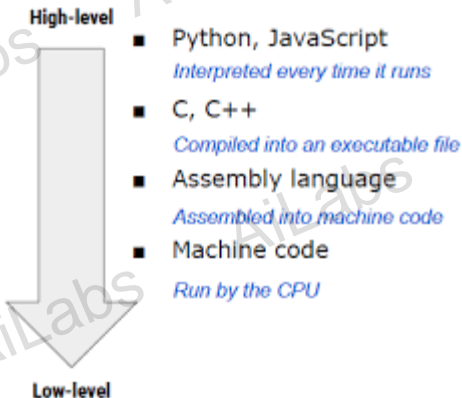
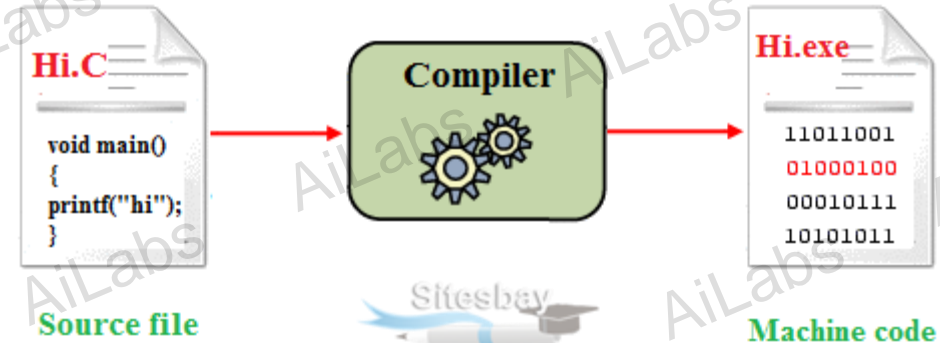
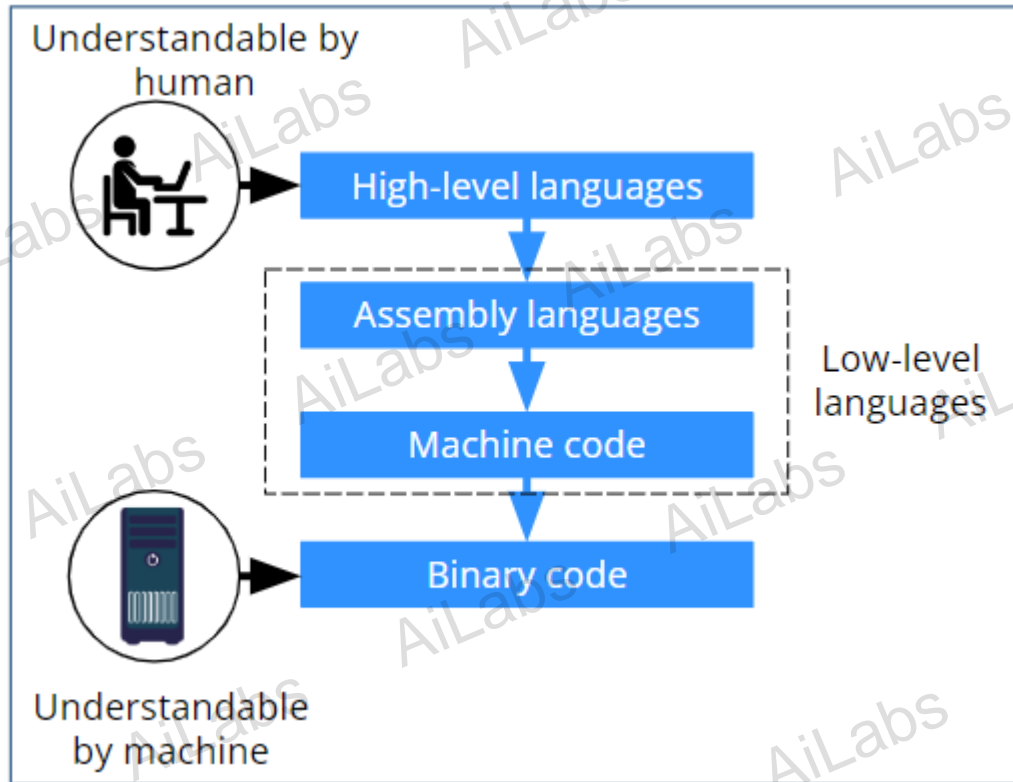
Python EcoSystem for Machine Learning?

- There are **various components** of Python that make it preferred language for machine learning.
- The EcoSystem offers **ease of integration** and gets the **workflow smoothly** from the designing stage to the production stage.



Programming Language

- A programming language is a way by which programmers **communicate** with computers **through the set of instructions** known as code/program.
- These are also known as High level language.



- Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable.
- Python is an object-oriented programming language created by Guido Rossum in 1989.

•Interpreted

- An interpreted language is a type of programming language for which most of its implementations execute instructions directly and freely, without previously compiling a program into machine-language instructions.

•Object Oriented

- Object-oriented programming (OOP) is a programming language model in which programs are organized around data, or objects, rather than functions and logic.

•High Level

- In computer science, a high-level programming language is a programming language with strong abstraction from the details of the computer

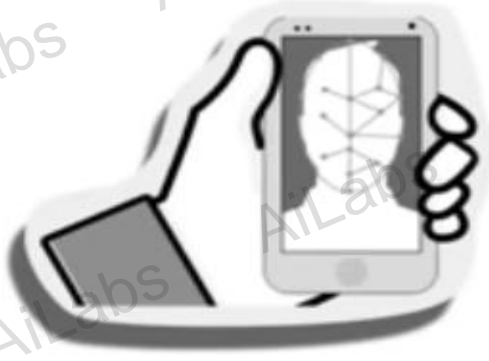
Quiz Time



SUPERVISED
OR
UNSUPERVISED?

SCENARIO - 1

Facebook
Face Recognition



SCENARIO - 2

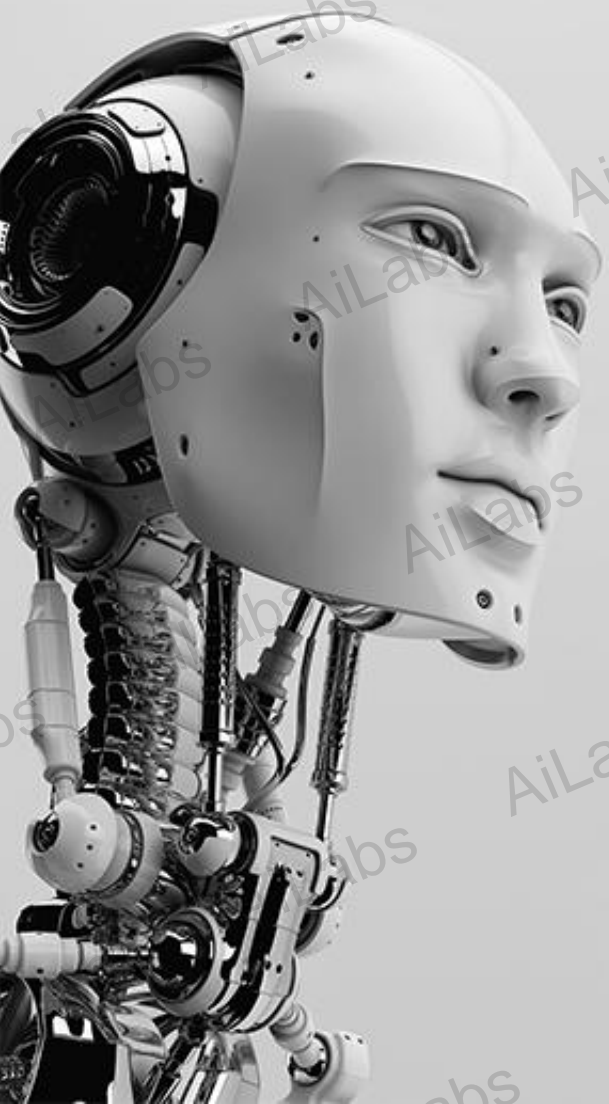
Netflix Movie
Recommendation



SCENARIO - 3

Fraud
Detection





Thank You



Website : www.ailabs.academy

Email: info@ailabs.academy

Call: 9339850883 | 9051324266