

MAKE SKILLED
EARN THE SKILL
WITH MAKING

AI in IoT

Deploy Intelligence on Hardware

Madhu Parvathaneni | 5th June 2023

Agenda

- Session-1: **Introduction to AI & Machine Learning**
 - Introduction to AI
 - Introduction to Machine Learning
 - Types of Machine Learning
- Session-2: **Implementation of AI on Edge Device**
 - Data Collection from Edge Device
 - AI on IoT Data
 - AI on Edge Device

Session - 1

Introduction to AI & Machine Learning

Introduction

- Artificial Intelligence is the branch of **Computer Science which studies machine intelligence**, and which helps machine brain thinks like a human brain.
- Artificial Intelligence is the field which combines **Computer Science with robust datasets to enable problem solving**.
- Artificial Intelligence is the technology which can make '**Better Devices, Smart Devices, Intelligent Devices**'

Monkey Eating Lays

- Let's take a scenario of '**Monkey Eating Lays**'
- How a monkey understand that Lays is an eatable Item?
- How a monkey understand how to eat Lays?
- How a monkey understand that it shouldn't eat lays cover?



Observations from Scene

- Monkey has observed what students are doing with Lays from long. - **Observation**
- Monkey has understood that Lays is an eatable item, and how to eat - **Learning**
- Monkey started running behind girls to eat Lays - **Decision Making**
- Monkey finally **learnt a skill** - How to Eat Lays - stored in the neuron

How to Learn a Skill

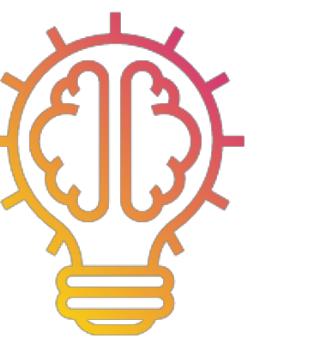
- Learning a Skill in Artificial Intelligence is driven through **Machine Learning**.
- Machine Learning is a **branch of Artificial Intelligence**, which helps the machine to learn from the past experiences without explicitly programmed.
- Machine Learning is the **study of past data**, creating meaningful insights, and converting that insights into proper decision making.
- **Machine Learning** is a methodology of bringing AI onto the IoT devices.

Why is AI Important?

- It is all **around us** in the Modern World.
- From **Facebook Feeds to Google Maps for navigation**, Artificial Intelligence finds its application almost in every aspect of our lives.
- It is quite frightening and interesting to think of how our lives would have been without the use of **Artificial Intelligence**.

SINCE THE DAWN OF TIME
UP UNTIL 2005

HUMANS HAD CREATED
130 EXABYTES OF DATA

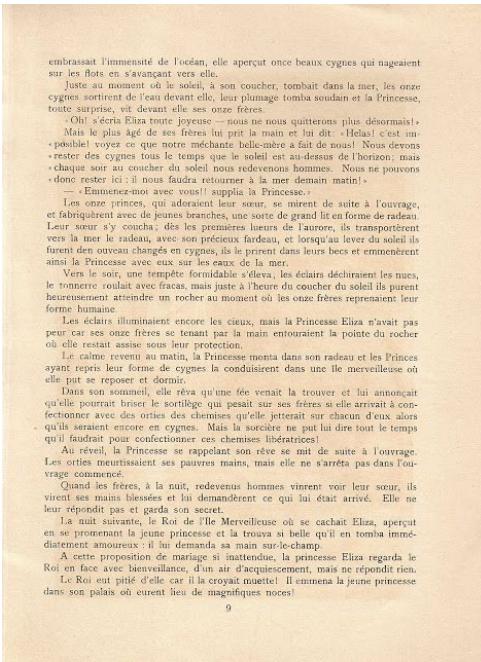


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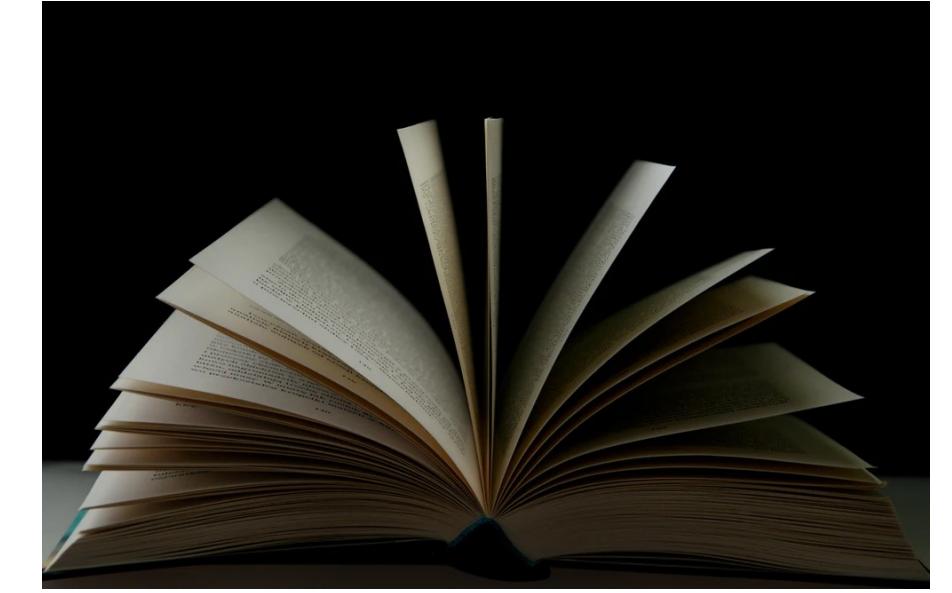
1 byte



1k byte



1M Byte



1G Byte



1T Byte



1 Petabyte



1 Exabyte



AI is the Future

2005 - 130 EXABYTES

2010 - 1,200 EXABYTES

2015 - 7,900 EXABYTES

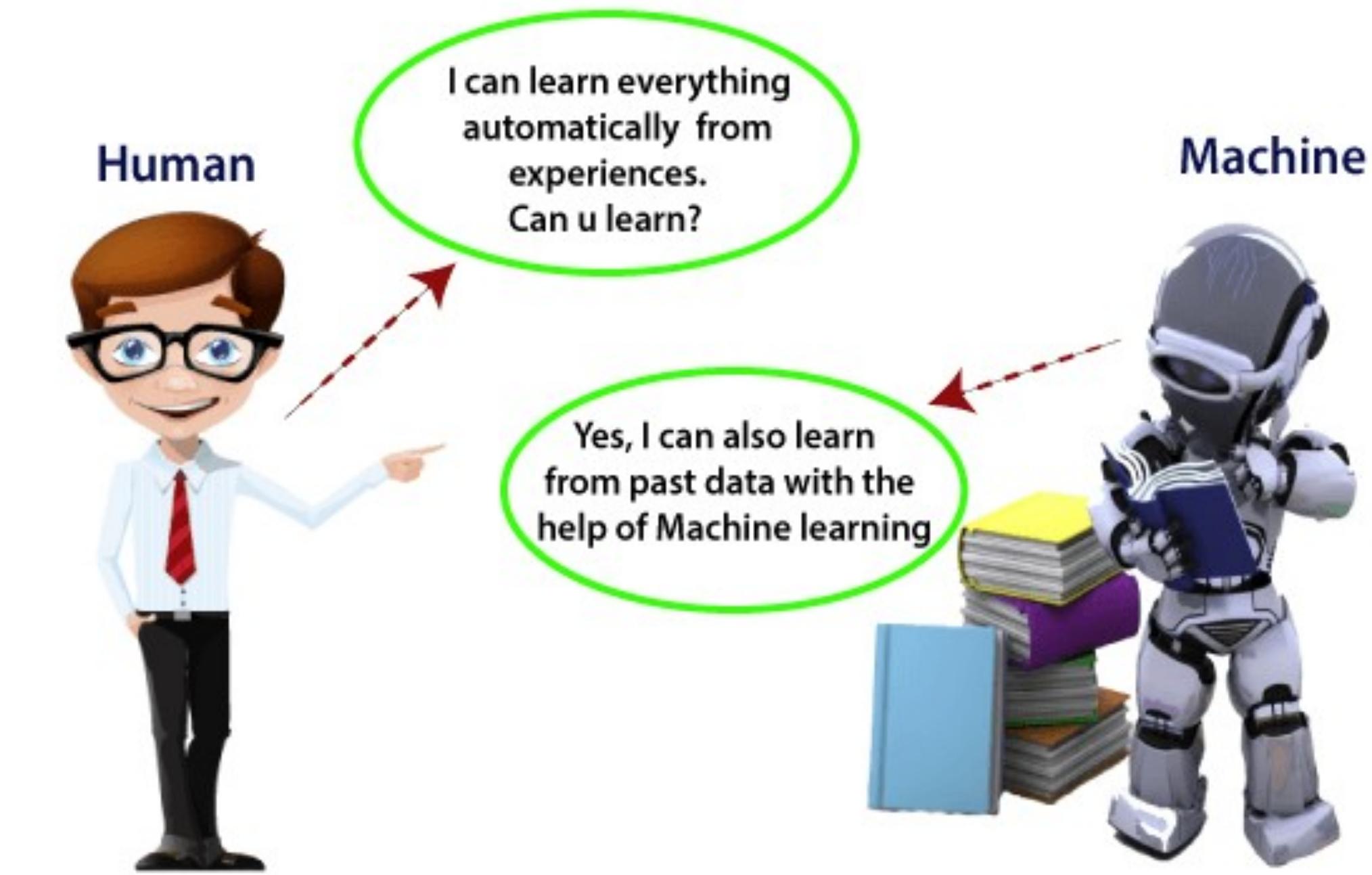
2020 - 40,900 EXABYTES

Applications of AI

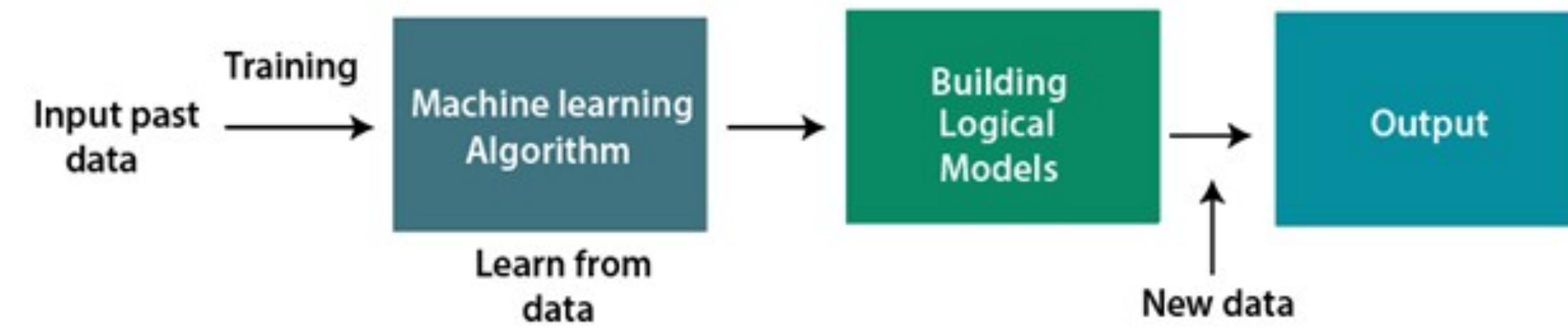


What is Machine Learning?

Machine Learning enables a machine to learn from the past experiences without explicitly programmed.



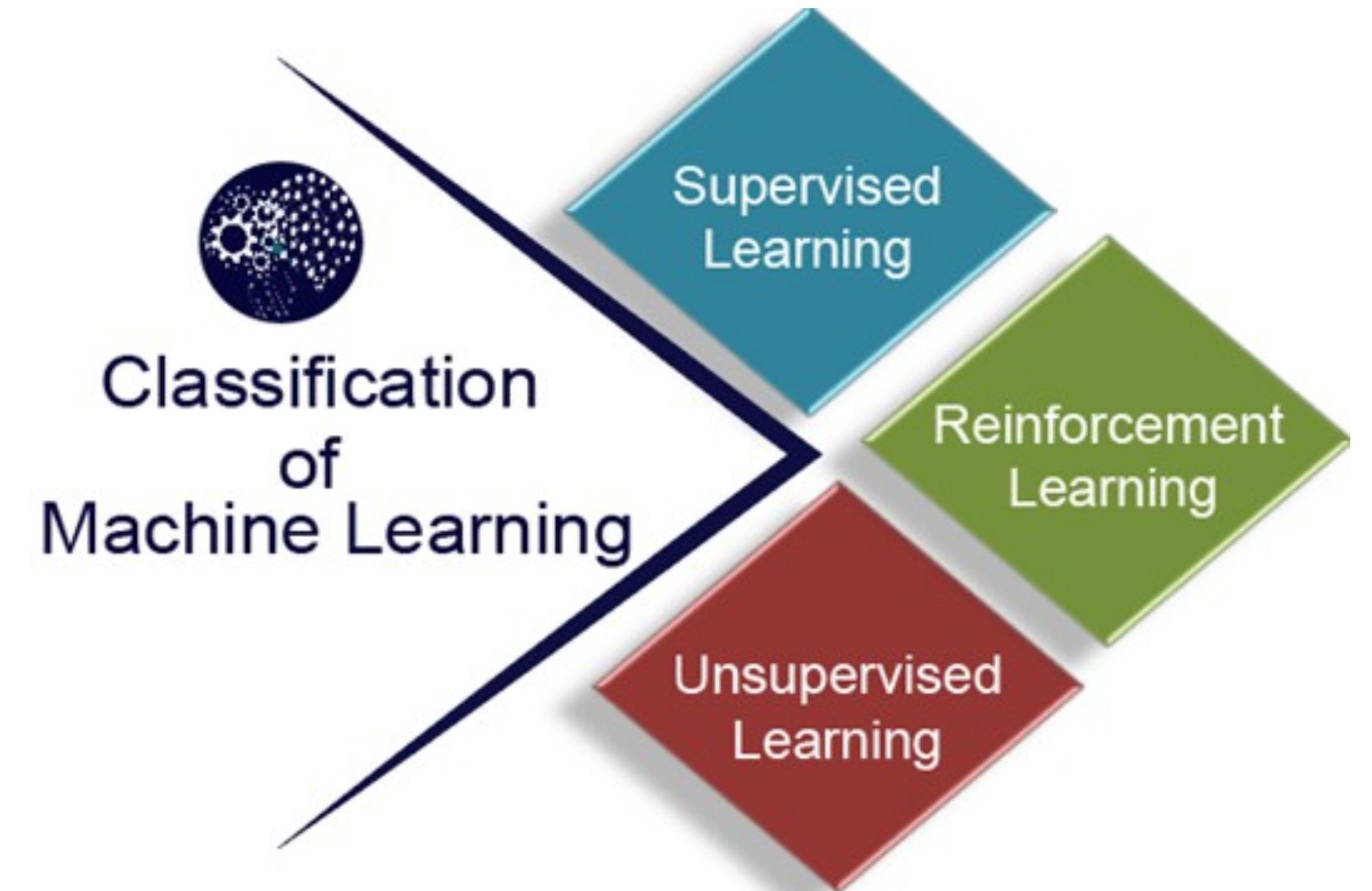
How Does Machine Learning work?



- Machine Learning Algorithm **learns from the past data during training**, and builds logical models to take decision when a new data is passed to it.
- **Accuracy of decision** it takes based on the past experiences, if the past data is meaningful bulk data then the predictions would be correct.

Types of Machine Learning

- Supervised Learning
- Unsupervised Learning
- Reinforcement Learning



Supervised Learning

- It is a type of Machine Learning which applies when you provide labelled data and if the **model knows what to predict.**
- There are two types of Supervised Learning:
 1. Regression
 2. Classification

Unsupervised Learning

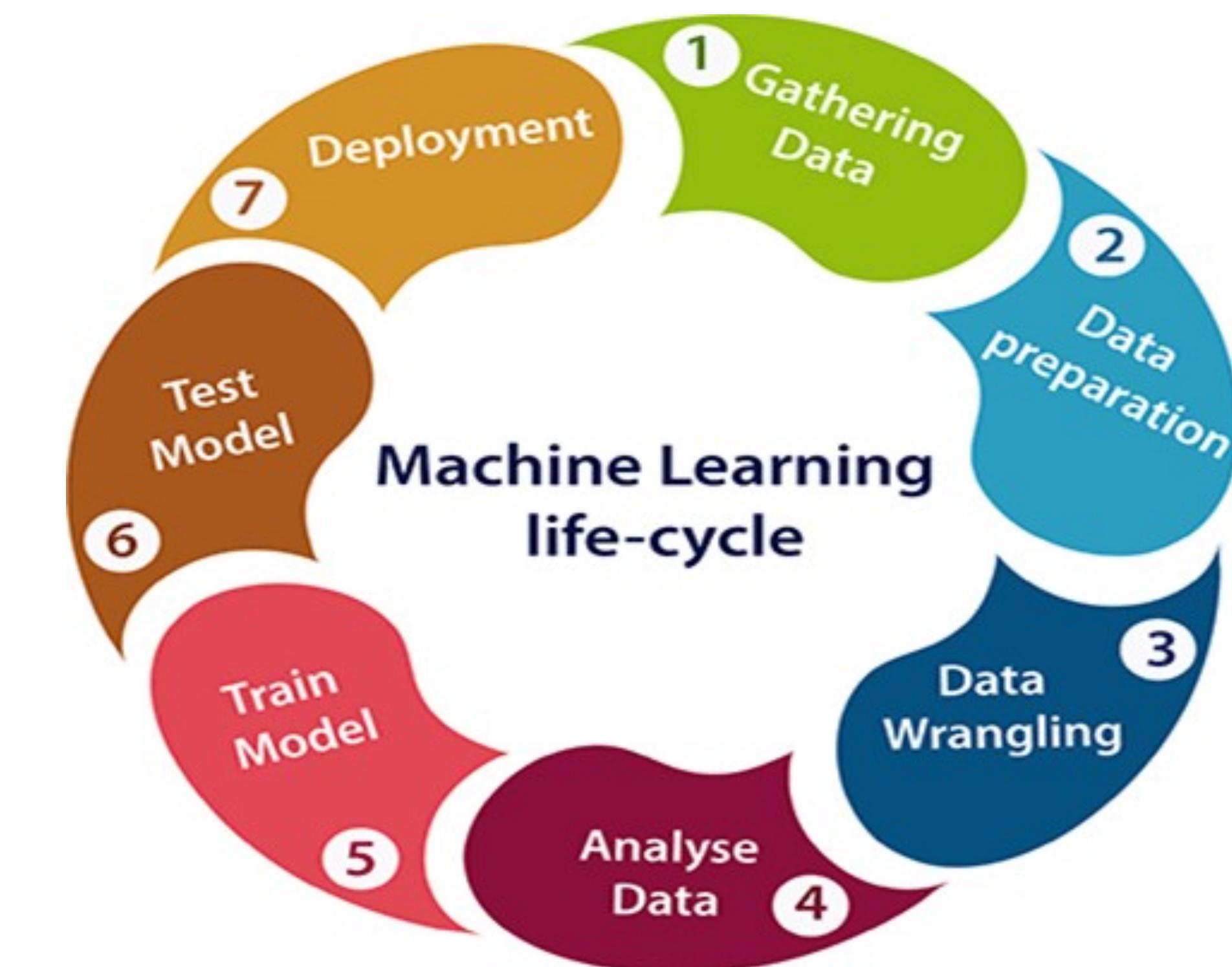
- It is a type of Machine Learning which applies when you provide labelled data and if the **model doesn't know what to predict.**
- There are two types of Unsupervised Learning:
 1. Clustering
 2. Association

Reinforcement Learning

- It is a feedback-based learning method, in which a learning agent gets a **reward for each correct action and gets a penalty for each wrong action.**
- The agent learns automatically with these **feedbacks** and improves its performance.

AI Project Development Life Cycle

1. Data Gathering
2. Data Preparation
3. Data Wrangling
4. Data Analysis
5. Model Training
6. Model Testing
7. Model Deployment



Summary

- **Data is the new oil**, and AI fuels it for creating smarter world.
- India is one of the country which has **cheapest internet**, due to this many industries, many companies fuelling this for creating smarter gadgets to a public use.
- Bringing AI onto every Smart Device involves **Internet of Things (IoT)** and IoT is a phenomena of making devices go smarter.

**Thank You (For questions, do reach us at
maddy@makeskilled.com)**



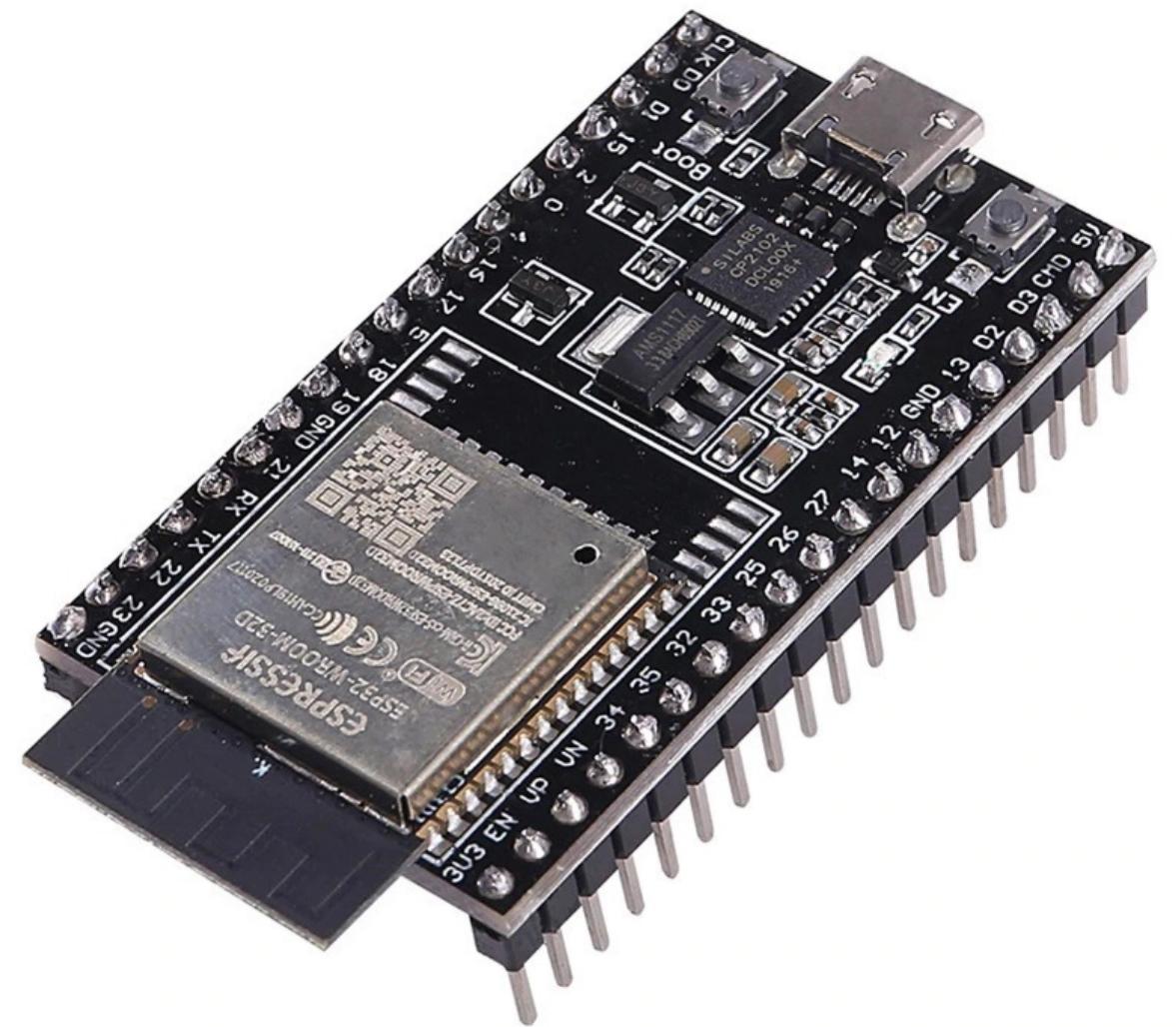
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Session - 2

Implementation of AI on Edge Device

ESP32

- **ESP32** is a series of low-cost, low-power **system on a chip microcontrollers** with integrated **Wi-Fi** and dual-mode **Bluetooth**.
- Operates at 3.3V DC
- Clock Frequency: 240MHz
- I/O and UART
- Wi-Fi
- Bluetooth
- Flash Size: 4MB
- RAM: 520KB



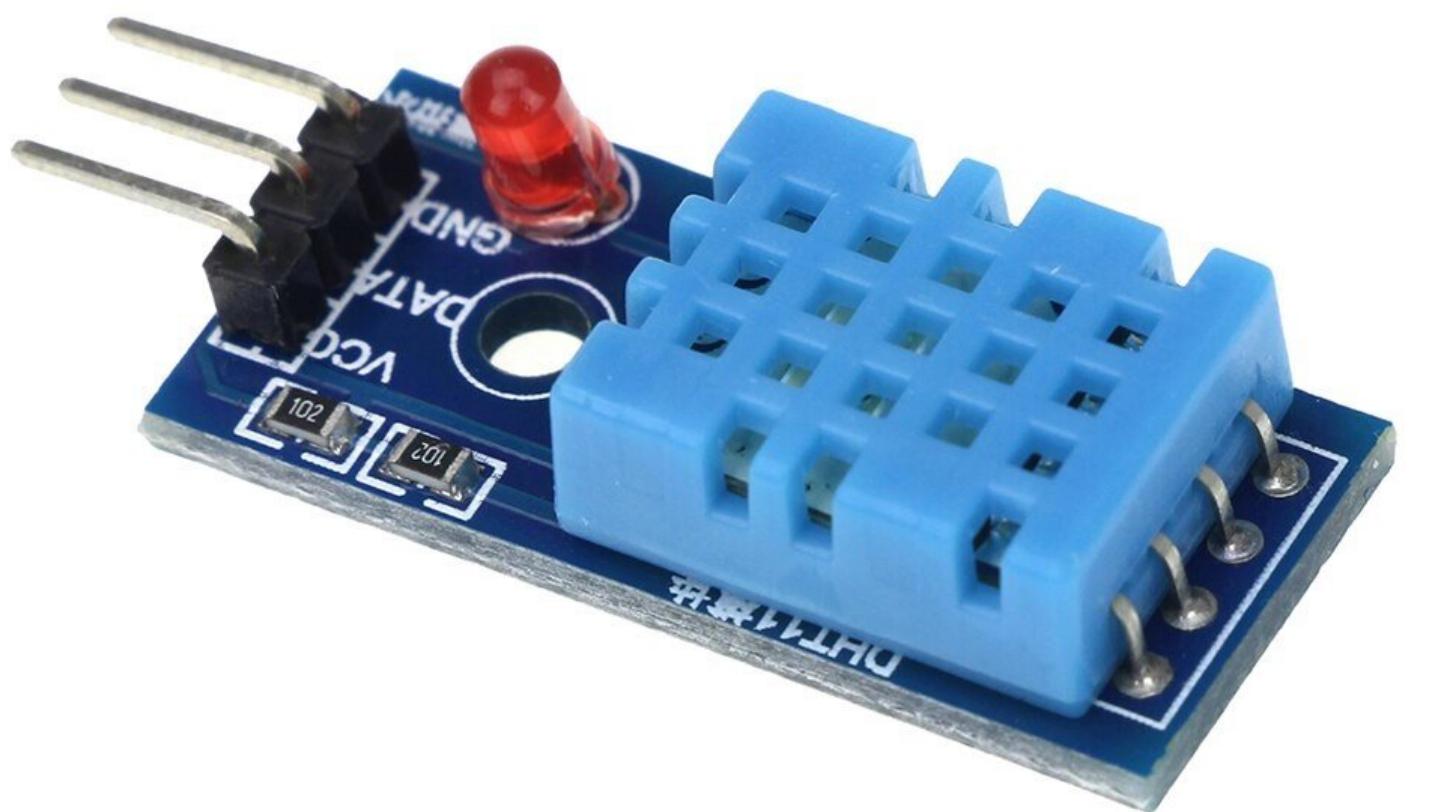
Arduino IDE

- Arduino IDE is an open-source software distributed by Arduino community and it is programmed in C++.
- Arduino IDE is a cross-compiler which generates HEX file.
- Arduino IDE supports code, debug, test, upload features for microcontrollers.
- Arduino IDE supports third-party boards like ESP32



DHT11

- DHT11 is a Digital Humidity and Temperature Sensor, it is an environmental sensor which measures humidity and temperature.
- Humidity is Relative Humidity (20 to 90%)
- Temperature is Degrees Celsius (0 to 50)
- Operates at 5V DC



Programming Edge Device

Look at my GitHub Repo -

<https://github.com/maddydevgits/ai-iot-nec-fdp>

Summary

- **AI in IoT** transforms IoT devices more smarter.
- You can easily implement **Machine Learning Algorithms** on ESP32.
- Create Smart Devices which makes **life experiences go better**.
- AI + IoT is the **deadly combination** to go digital in this modern era of Industry 5.0

**Thank You (For questions, do reach us at
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