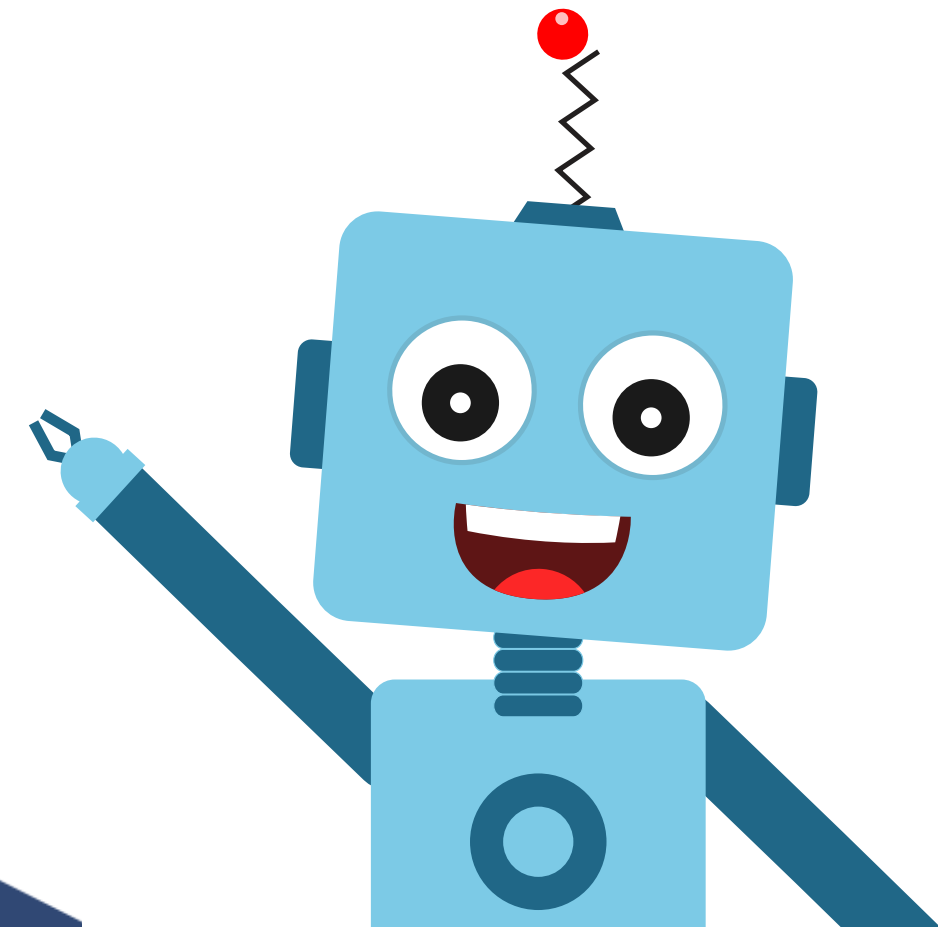# Introduction to Artificial Intelligence

Session 12

Artificial Intelligence

- What is intelligence?

- What makes humans, intelligent beings?

- How to classify a machine as intelligent?

All these questions would pop up in your mind when you hear the word **Artificial Intelligence or AI**. In this lesson, we will look at the answer to all these questions and the various AI applications.

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Topics Covered in This Lesson

1) Human Intelligence

2) Artificial Intelligence

3) Applications of AI

4) Advantages of AI

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Key Learning Outcomes

At the end of the lesson, you will be able to:

1) Understand the **difference between human intelligence and artificial intelligence**.

2) Appreciate the **advantages of using AI**.

3) Correlate with the **real-world applications of AI** to generate an AI mindset.

4) Describe the application of AI in their daily lives.

5) Identify the **3 domains of AI**.

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What is Intelligence?

There are some situations in life, where you feel proud of your **intelligence**:

- When you get **all questions correct** in a tough exam.

- When you **solve a challenging puzzle** in record time.

- When you **beat your sibling** in a difficult stage of Contra (game!).

- When you **can recognize and remember** the names of all the players of your favorite football team.

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What is Intelligence?

- **Definition:** Intelligence is one's capacity for logic, understanding, self-awareness, learning, emotional knowledge, planning, creativity, and problem-solving.

- **Human intelligence** can be described as:
    1) The ability to **perceive, understand and analyze information.**
    2) The ability to **learn and increase knowledge.**
    3) The ability to **make decisions based on knowledge.**

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- **Animals are intelligent, but they are not as good as humans.** In most animals, their skills and abilities are **restricted to survival**. Here are some examples of intelligent animals:

1) **Dolphins:** Dolphins are **extremely sociable creatures** with a highly developed ability to adapt to their habitat. They help one another when injured or ill and, thanks to their individually distinct calls, **they're able to pass on their knowledge to others**.

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2) **Parrots**: These birds can recognize different human faces and **have a high aptitude for communication.**

Besides these, parrots have **an excellent memory** which helps them solve complex problems.

3) **Elephants**: Elephants boast the **largest brain of all land animals**. These animals are renowned for their ability to socialize and **can express a wide range of emotions**, including happiness and compassion, as well as pain and grief.

With a **greater memory than even us humans**, an elephant truly never forgets!

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Are Computers Intelligent?

- Computers are used to:

1) **Store information in their memory ex:** documents, images, and videos.

2) **Run programs that interact with the user** to help solve his problems like solving calculations, etc.

3) Play games.

4) Watch movies and videos.

5) Surf on the Internet.

- In all of these tasks, **the task is defined** and the computer runs programs to get the result. This is **not termed as intelligence,** because there is **no learning process involved** in this. Computers are just **following some set of predefined instructions.**
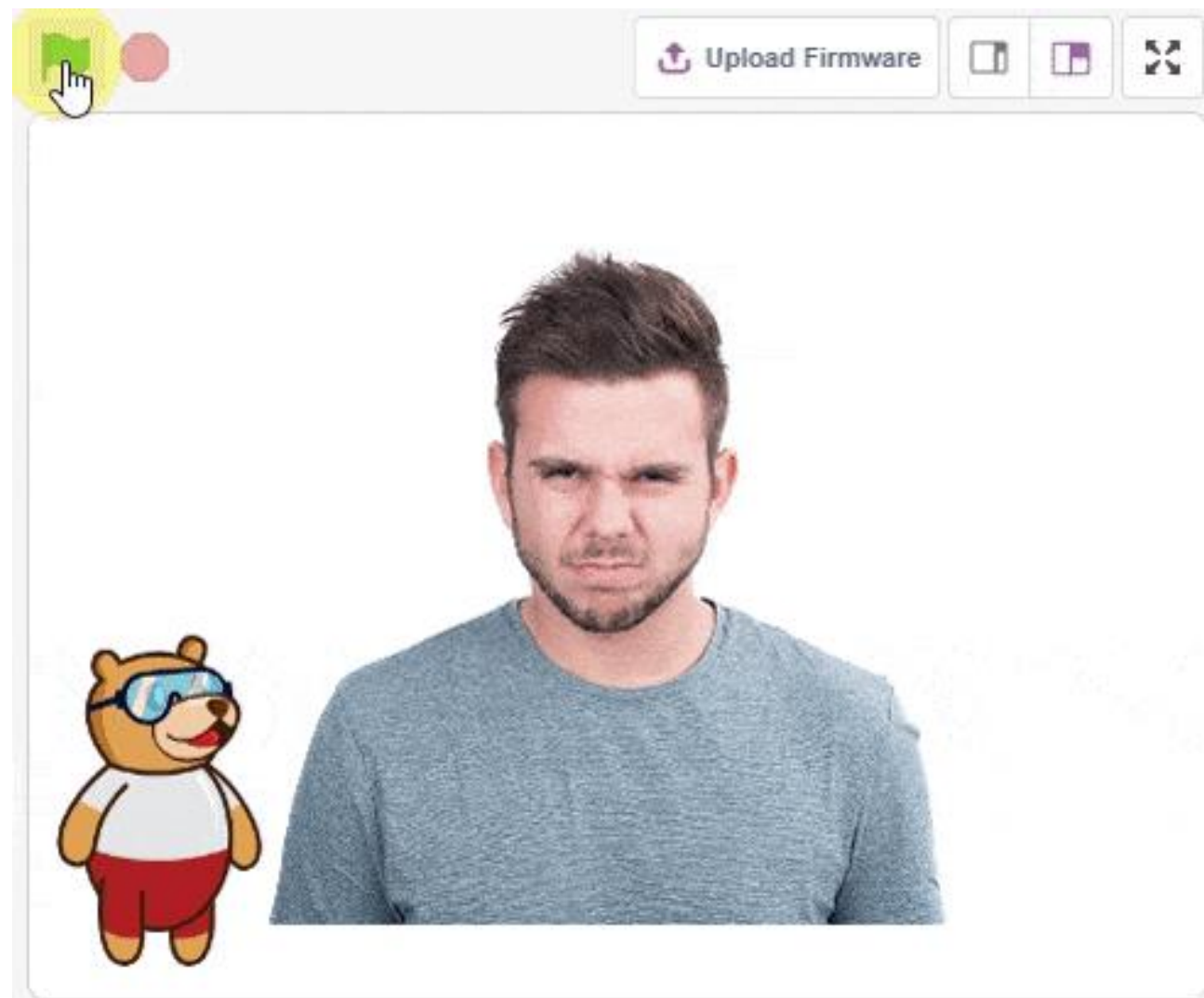
- When computers are equipped with a program that **learns and acts based on their environment**, they can be termed as **intelligent**.
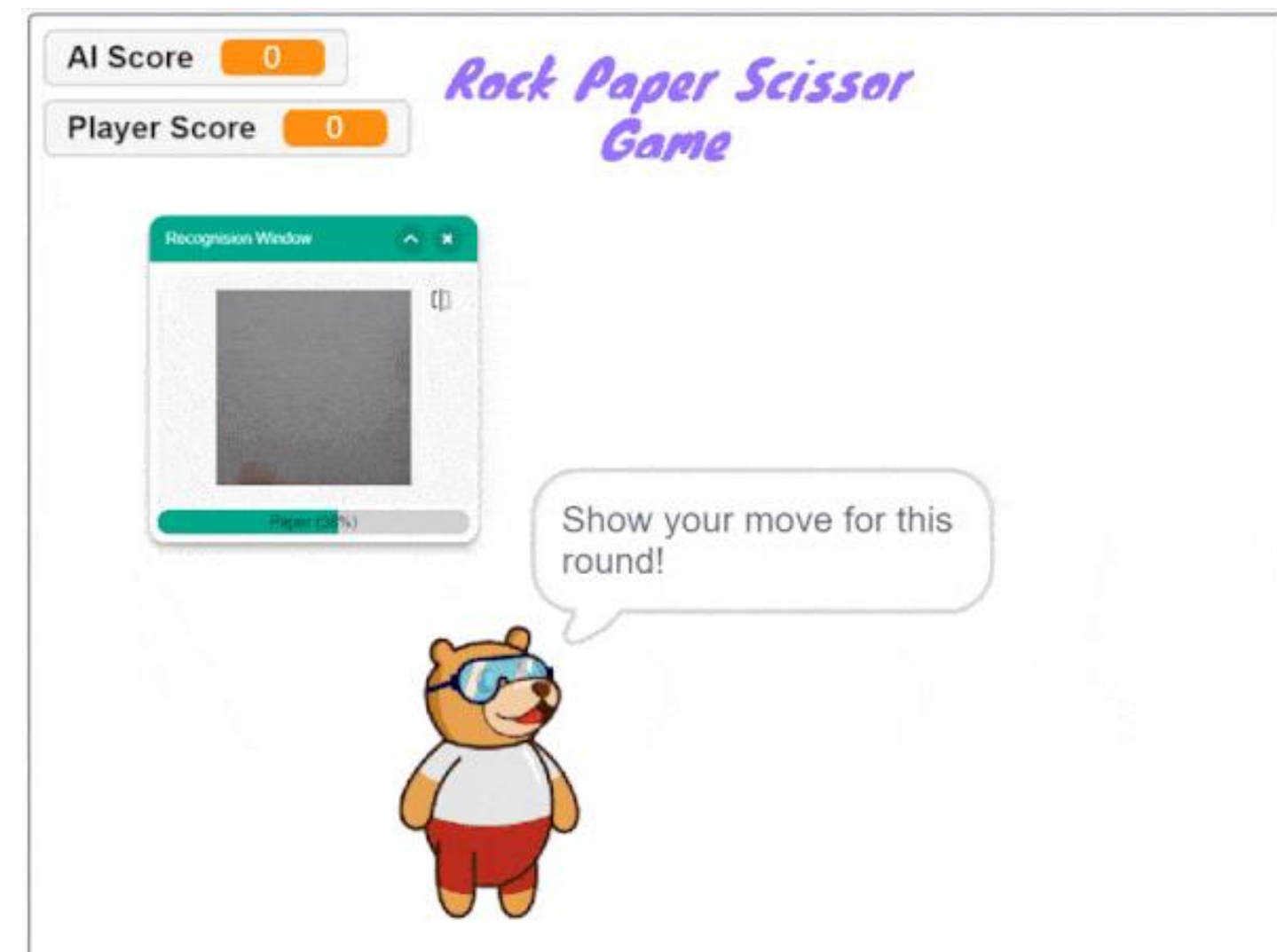
- Let's see some examples:

1) **Self Driving Cars:** They can recognize their environment and act accordingly.

2) **Emotion Identifiers:** They can identify the emotion of human using their knowledge.

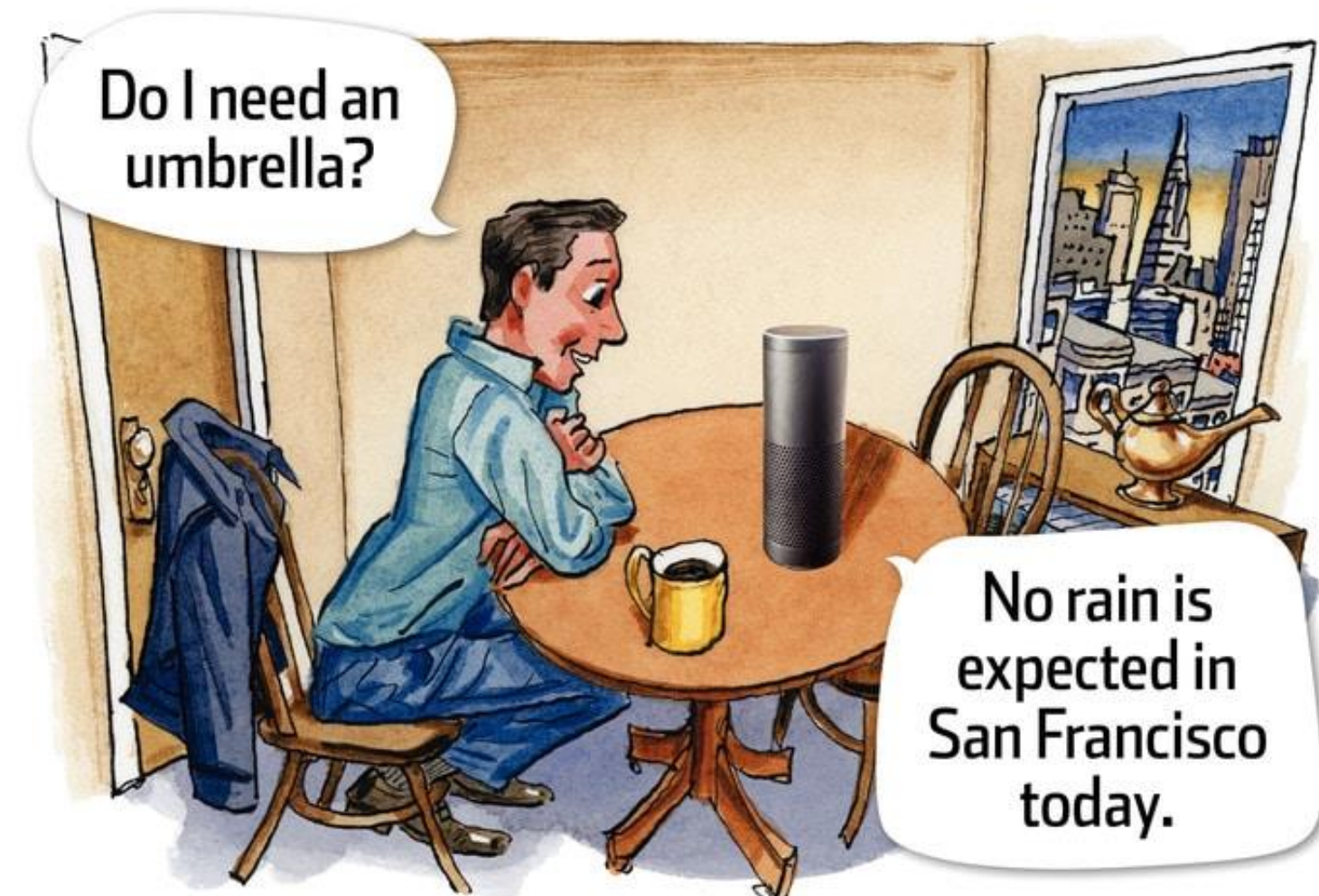3) **AI Bots In-Game:** They can play the game, as if a human is playing.

3)

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Artificial Intelligence

4) **Alexa or Home pod (Siri):** Recognizes what you say and reacts accordingly.

- In all of the above cases, the computer uses its knowledge to get information and act accordingly.

- **Definition of Artificial Intelligence:**
  Artificial Intelligence is the study and design of intelligent agents (computers) which have the ability to analyze the environments and produce actions which maximize task success.
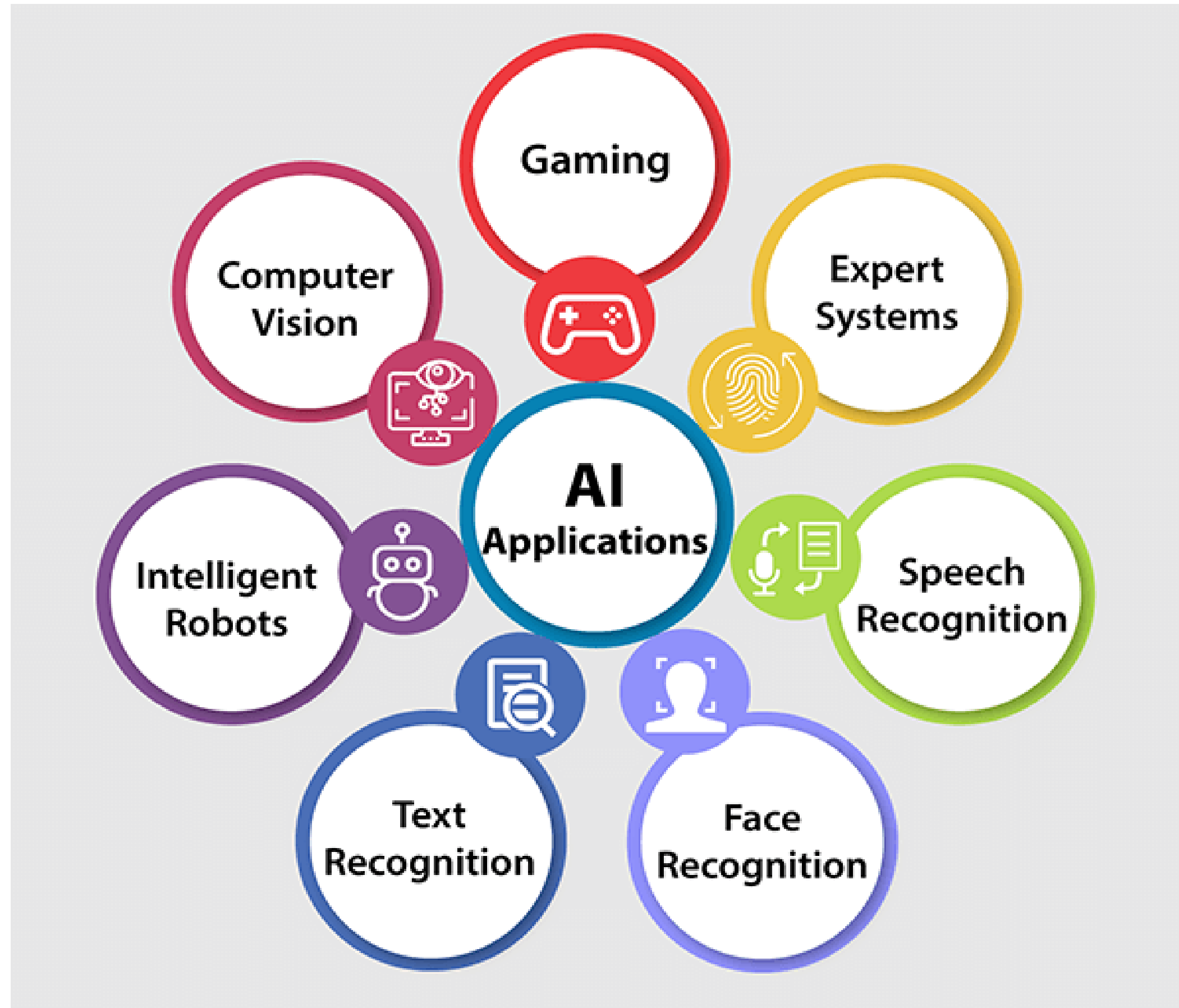

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Advantages of AI

- There are many advantages that an AI machine has over humans. Some of these are:

No.	Advantage	Description
1.	**Large Memory**	They can be fed a large amount of information and can retrieve it almost instantaneously.
2.	**Speed of Execution**	While a doctor makes a diagnosis in ~10 minutes, an AI system can make a million in the same duration.
3.	**Not Lazy**	They can calculate, analyze, and **perform tasks tirelessly and round the clock** without wearing out, unlike humans.
4.	**Accuracy**	Computers **have a very high accuracy** in some tasks (ex: Arithmetic Calculations).
5.	**Less Biased**	They are **not affected or influenced by emotions, feelings, wants, etc.** that often cloud our judgement and intelligence.

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- Below the robot identifies the position of the pancakes and segregates them using a robotic arm controlled by Artificial Intelligence.

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Face Recognition

- AI is widely used to **detect and recognize faces from images**.

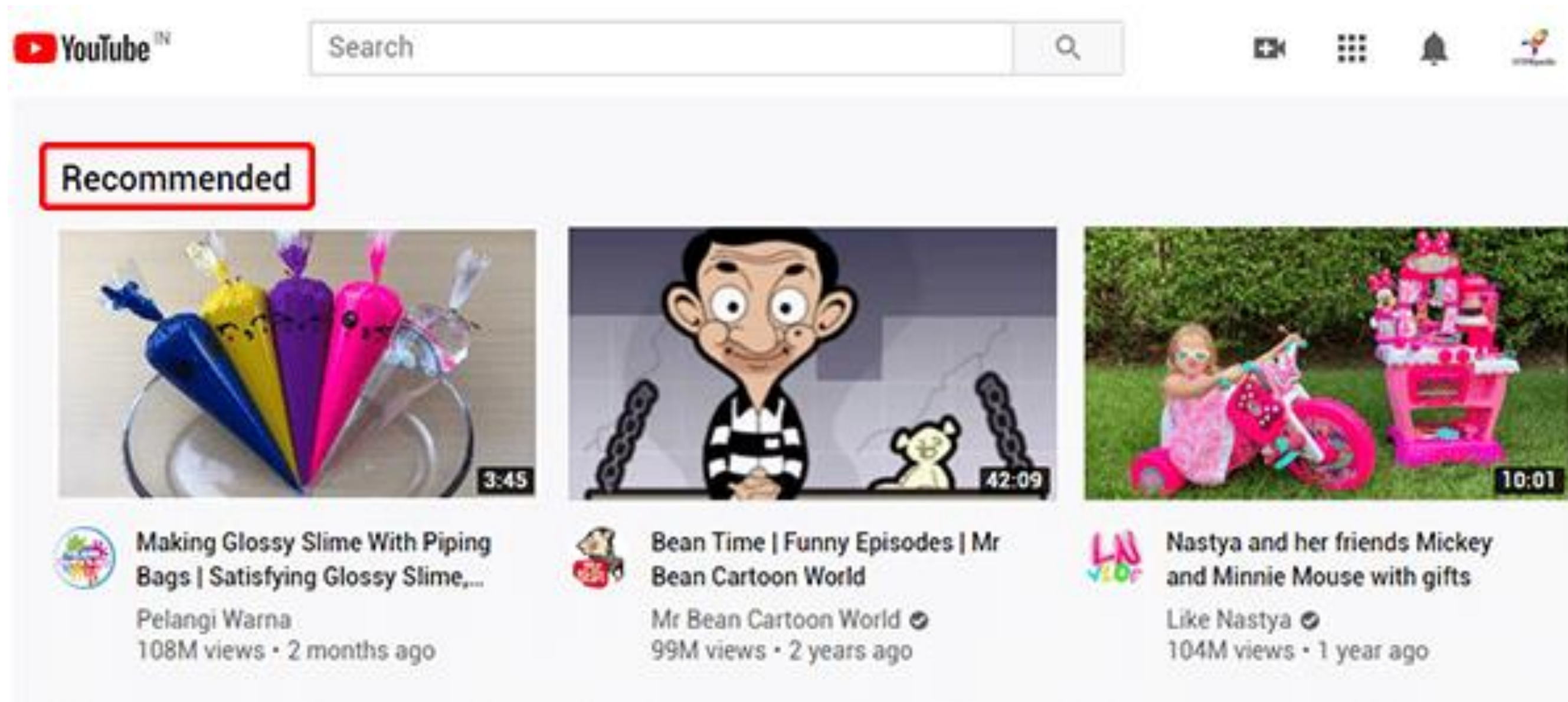- Facebook uses it to **identify people in photos and tag them**.

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- An AI system called **AlphaZero** taught itself from scratch how to master the games of Chess, Shogi and Go.

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- Machines or softwares that imitates the decision-making ability of humans and uses that to provide explanations and advice to the users, e.g. Youtube recommending you new videos.

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Speech Recognition

- Some AI-based speech recognition systems can:
  - Hear and Understand Speech
  - Express themselves in words
  - Ex. Siri, Alexa, and Google Assistant.
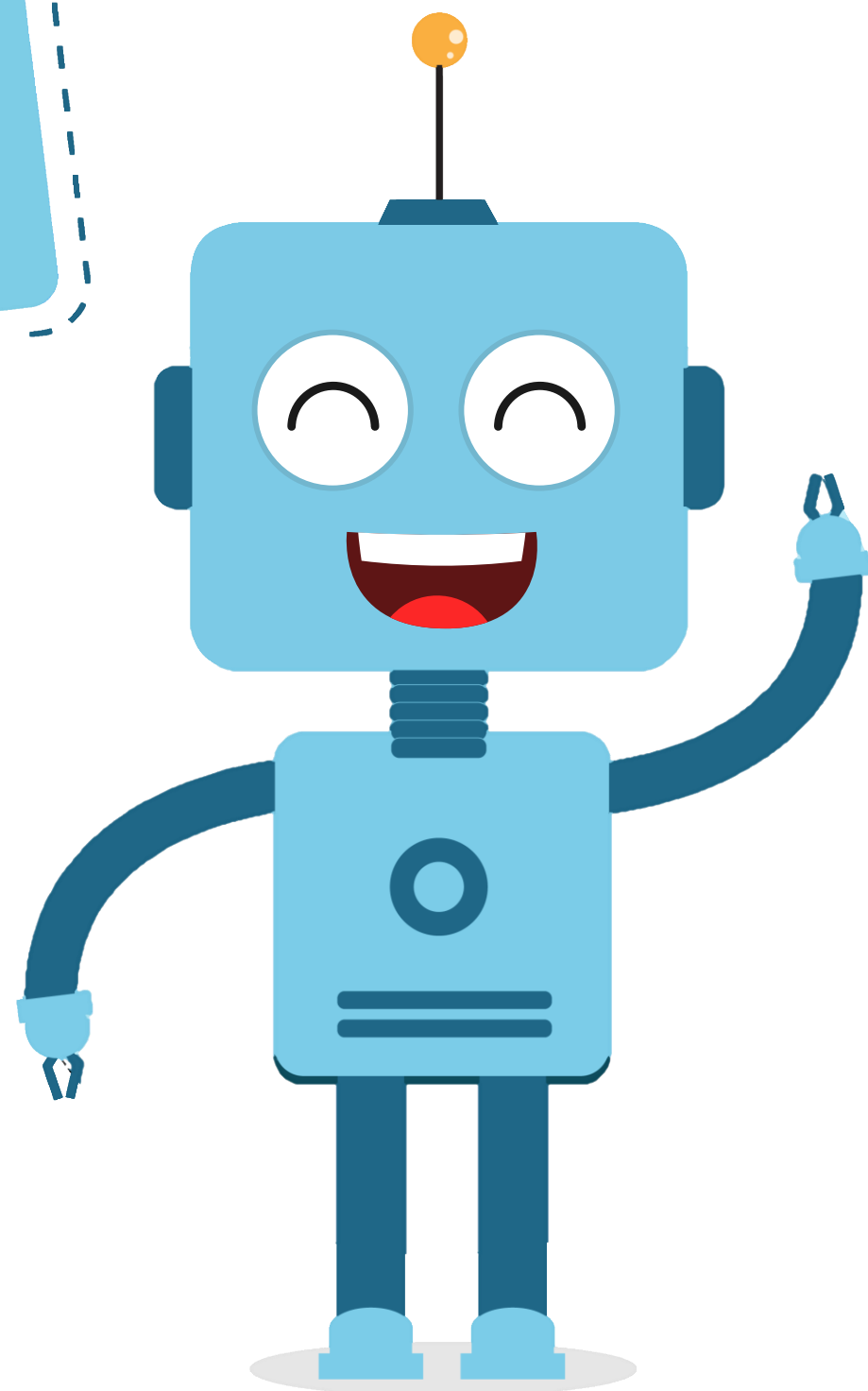

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Text Recognition From Image

The handwriting recognition software:

- Reads the text written on paper

- Recognizes the shape of the letters and

- Converts them into editable text

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