

***Dr. Wafa Zubair Al-Dyani***

***Subject: AI***

***Lecture: 1***

***Level : 3***

***Department: CS***

# ***Artificial Intelligence***



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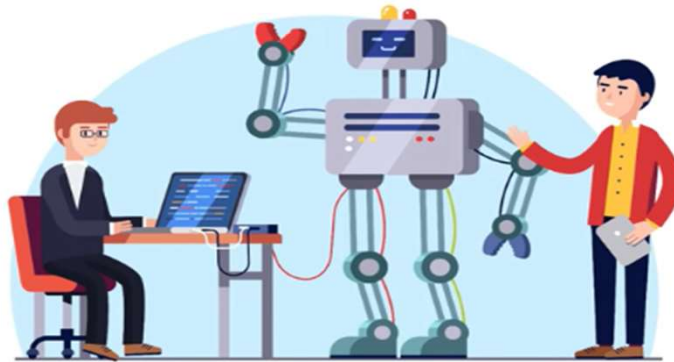
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## What is Artificial Intelligence?

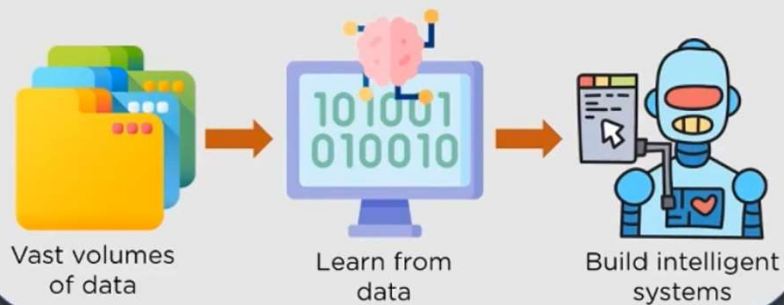
ARTIFICIAL INTELLIGENCE IS A BRANCH OF COMPUTER SCIENCE DEDICATED TO CREATING INTELLIGENT MACHINES THAT WORK AND REACT LIKE HUMANS.



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## Artificial Intelligence

AI is the science of building **intelligent machines** from **large volumes of data** and learning from **experience** to perform **human-like tasks**

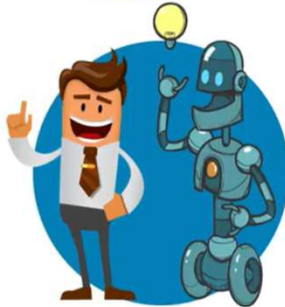


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## What is Artificial Intelligence?



AI IS A FORM OF COMPUTER SCIENCE USED TO CREATE INTELLIGENT MACHINES THAT CAN RECOGNIZE HUMAN SPEECH, OBJECTS, CAN LEARN, PLAN AND SOLVE PROBLEMS LIKE HUMANS



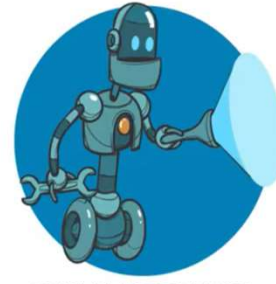
SPEECH RECOGNITION



OBJECT DETECTION



SOLVE PROBLEM AND LEARN FROM THE GIVEN DATA



PLAN AN APPROACH FOR FUTURE TASKS TO BE DONE

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## Artificial Intelligence

SMART HOMES ARE RUN BY ARTIFICIAL INTELLIGENCE!



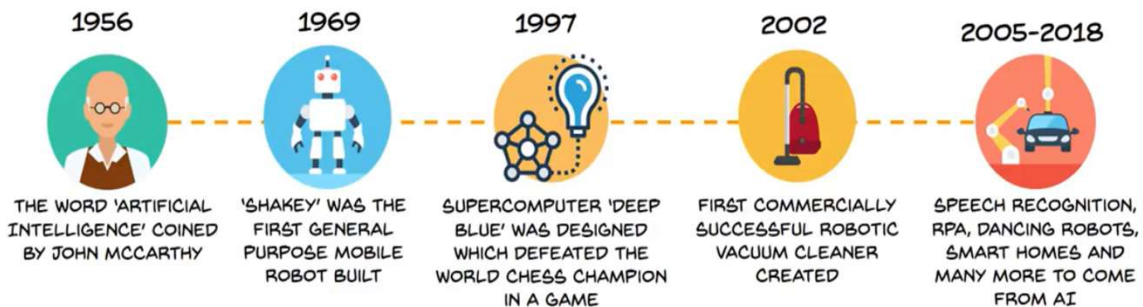
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## Artificial Intelligence



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## Brief History of Artificial Intelligence



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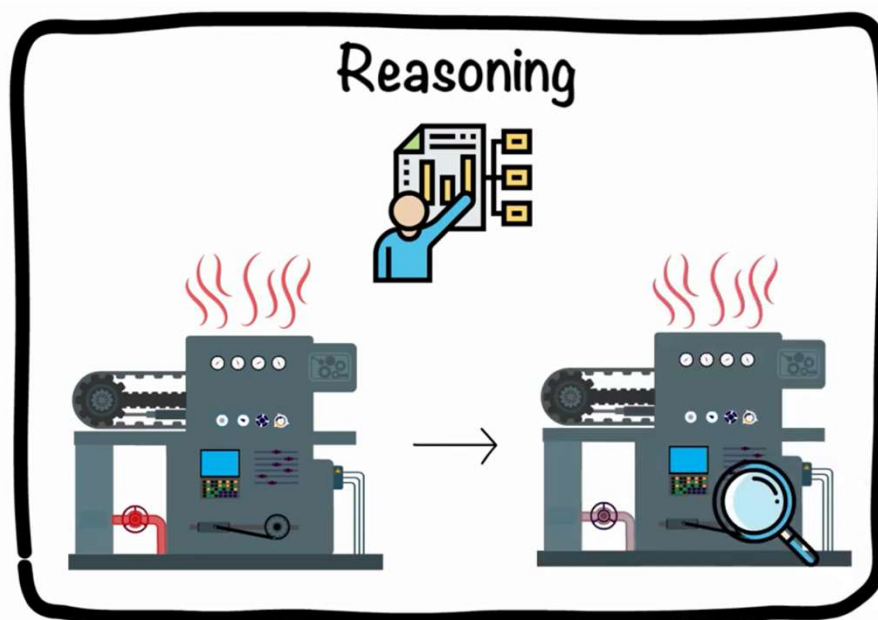
WHAT DOES AN AI DO AT ITS CORE?

### Core Goal of Artificial Intelligence (AI)

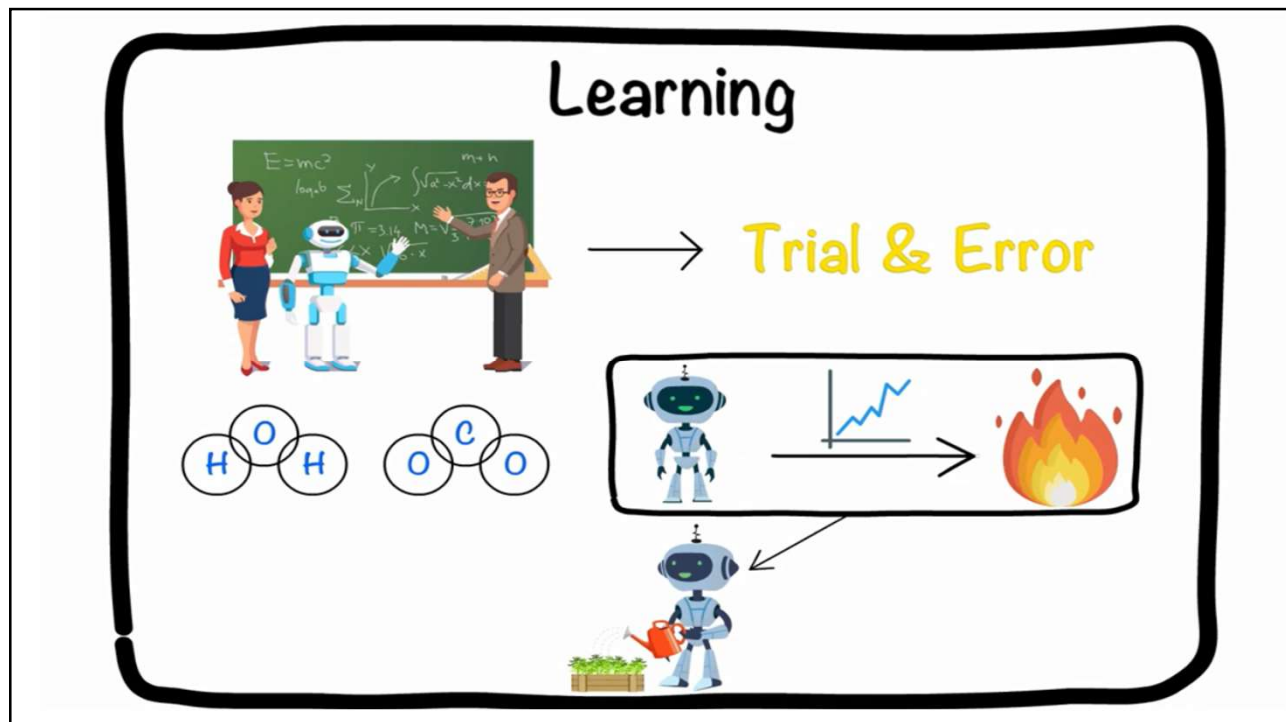
Emulate human intelligence in machines. This can involve tasks like:

- **Reasoning:** Analyze information and draw logical conclusions.
- **Learning:** Acquire new knowledge and skills from data.
- **Problem-solving:** Identify and solve problems in a goal-oriented way.
- **Decision-making:** Evaluate options and make choices based on available information.

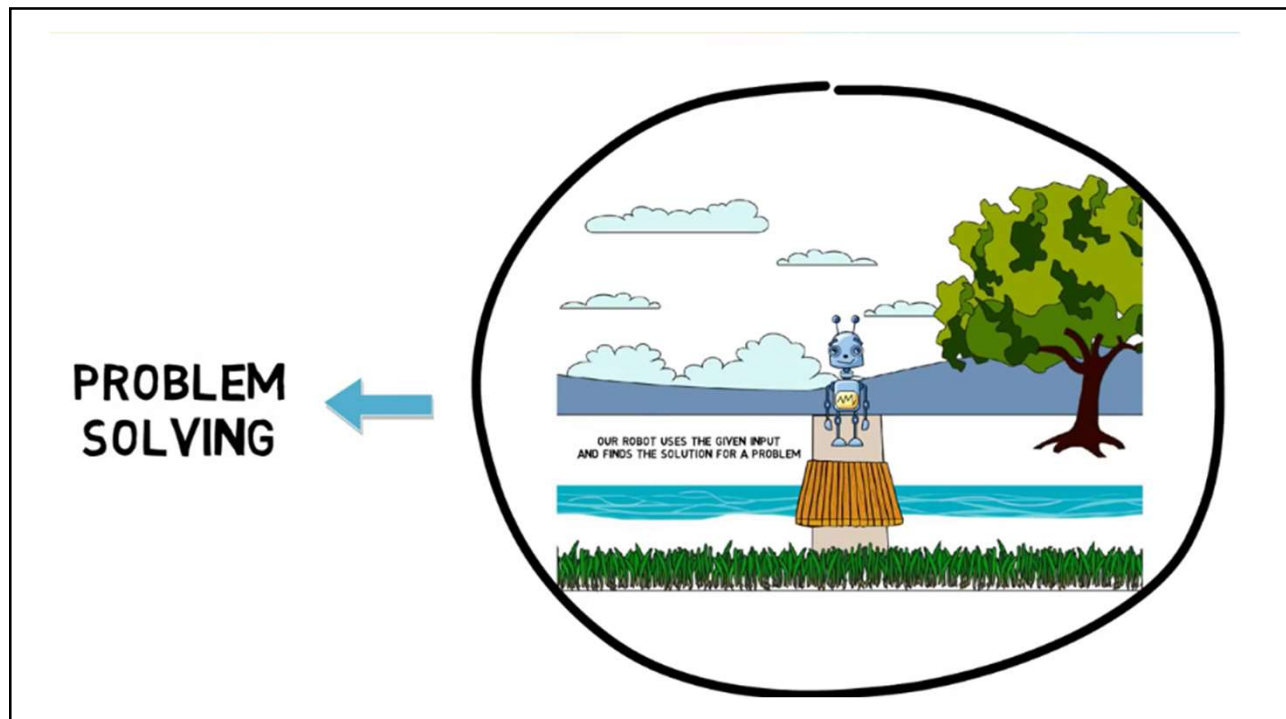
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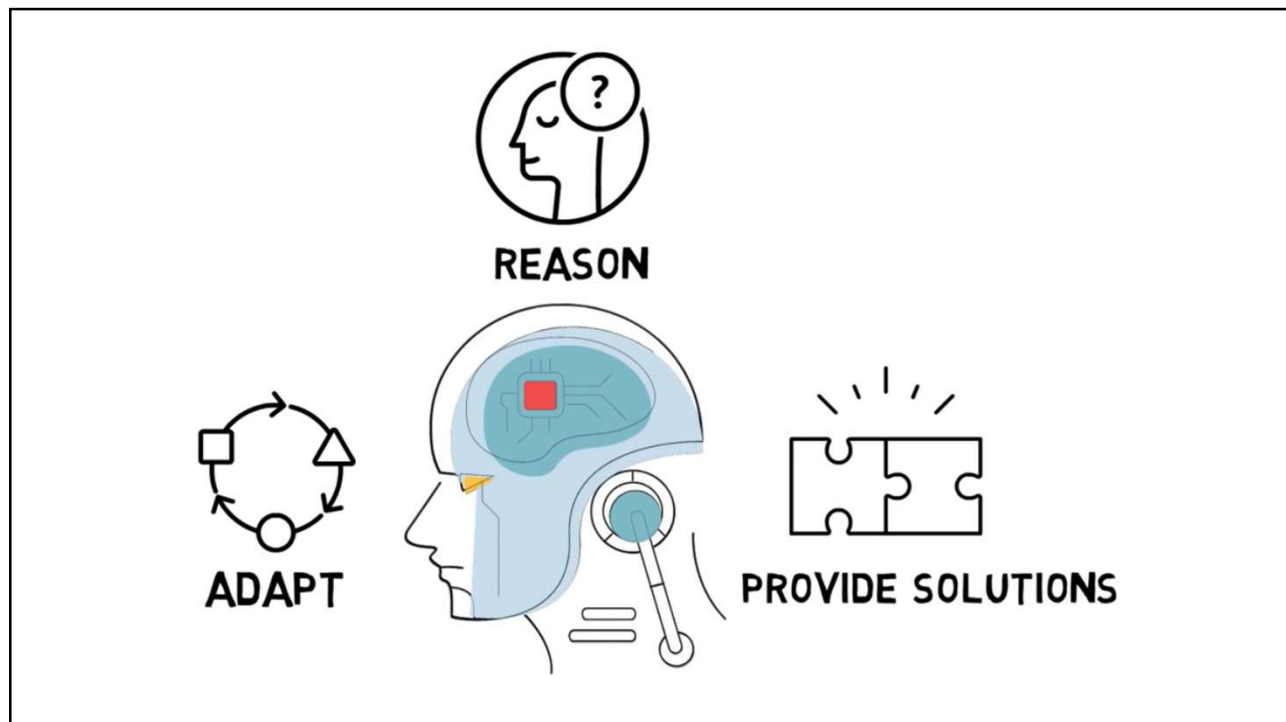
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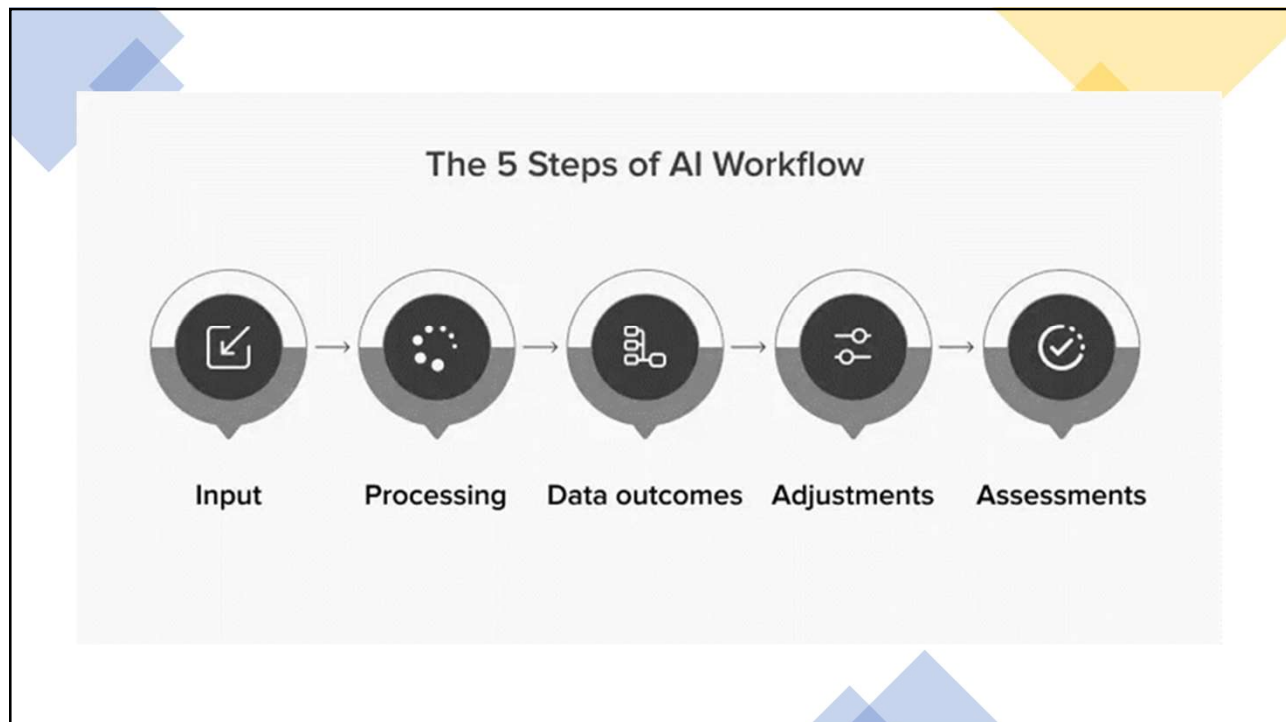
### How Does AI Work?

Artificial intelligence (AI) enables machines to learn from data and recognize patterns in it, to perform tasks more efficiently and effectively. AI works in five steps:

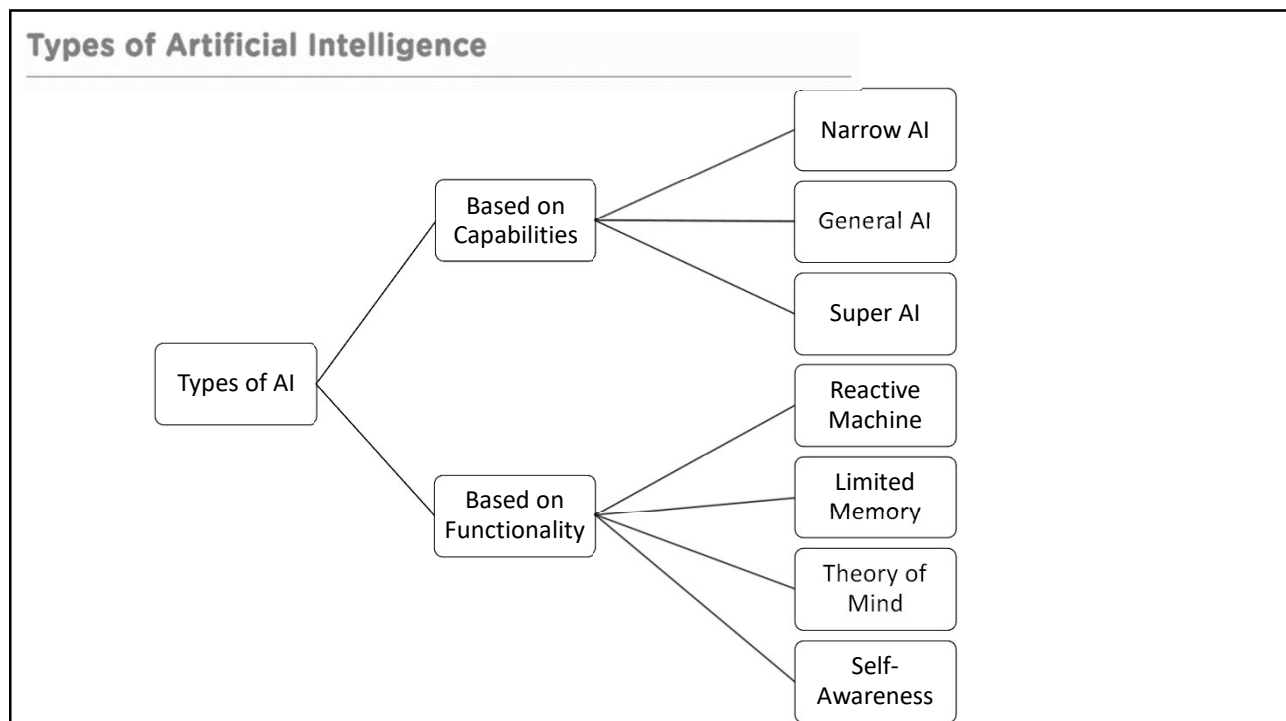
- **Input:** Data is collected from various sources. This data is then sorted into categories.
- **Processing:** The AI sorts and deciphers the data using patterns it has been programmed to learn until it recognizes similar patterns in the data.
- **Outcomes:** The AI can then use those patterns to predict outcomes.
- **Adjustments:** If the data sets are considered a “fail,” AI learns from that mistake, and the process is repeated again under different conditions.
- **Assessments:** In this way, AI is constantly learning and improving.

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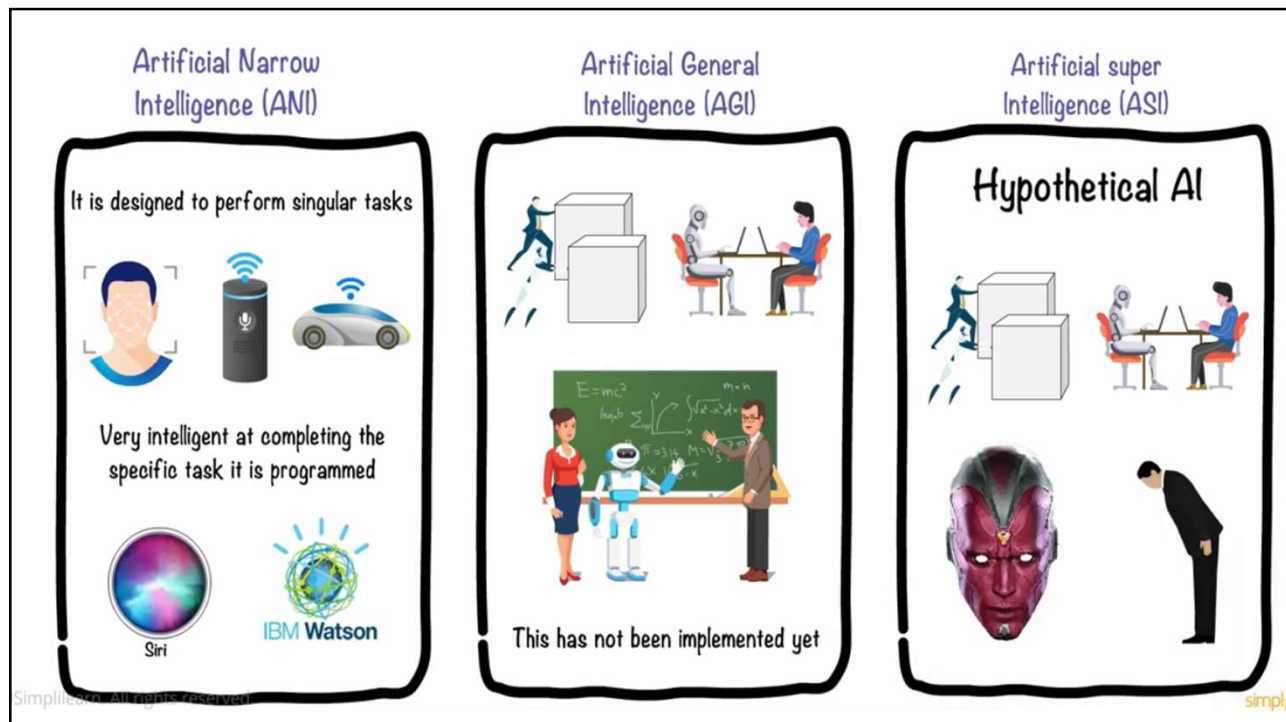


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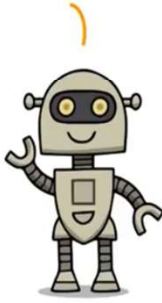
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## Types of Artificial Intelligence

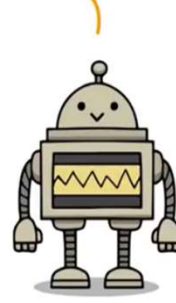
PURELY REACTIVE



LIMITED MEMORY



THEORY OF MIND



SELF AWARE

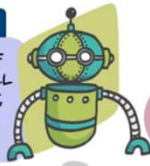


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## Types of Artificial Intelligence

SELF AWARENESS

THIS IS THE FUTURE OF AI. THESE MACHINES WILL BE SUPER INTELLIGENT, SENTIENT AND CONSCIOUS



REACTIVE MACHINES

THIS KIND OF AI ARE PURELY REACTIVE AND DO NOT HOLD THE ABILITY TO FORM MEMORIES OR USE PAST EXPERIENCES TO MAKE DECISIONS. THESE MACHINES ARE DESIGNED TO DO SPECIFIC JOBS



THEORY OF MIND

THESE AI MACHINES CAN SOCIALIZE AND UNDERSTAND HUMAN EMOTIONS. MACHINES WITH SUCH ABILITIES ARE YET TO BE BUILT



LIMITED MEMORY

THIS KIND OF AI USES PAST EXPERIENCE AND THE PRESENT DATA TO MAKE A DECISION. SELF DRIVING CARS ARE A KIND OF LIMITED MEMORY AI



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## Types of Artificial Intelligence

### PURELY REACTIVE

HE DOES NOT HAVE  
ANY PAST MEMORY OR  
DATA TO WORK WITH



OKAY! ITS NOT  
THAT TOUGH



OBSERVES EVERY  
MOVE

I WIN!



TAKES THE BEST POSSIBLE  
DECISION

PURELY  
REACTIVE  
MACHINES  
SPECIALIZE IN  
ONE FIELD OF  
WORK ONLY



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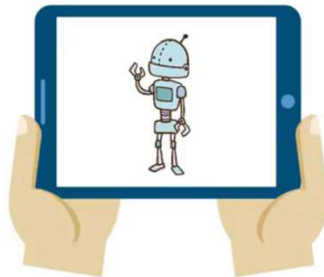
## Types of Artificial Intelligence

### LIMITED MEMORY

LET'S TRY TO  
UNDERSTAND  
LIMITED MEMORY



THESE MACHINES  
USE PREVIOUS  
DATA AND KEEP  
ADDING IT TO  
THEIR MEMORY

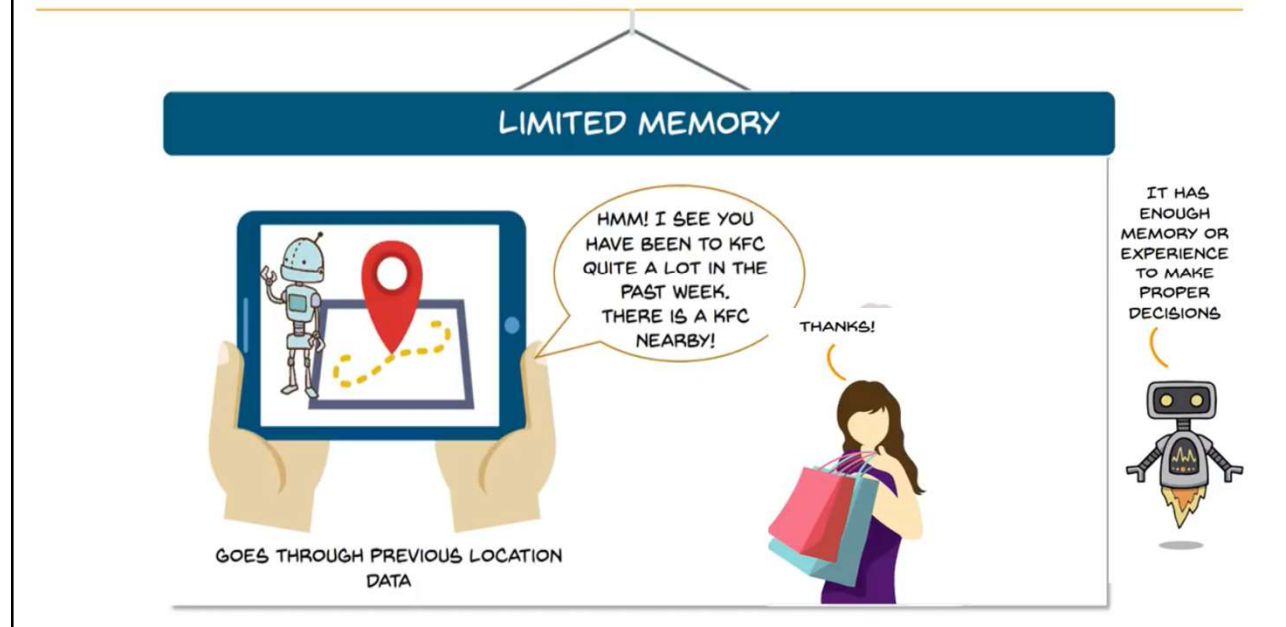


SUGGEST ME A GOOD  
RESTAURANT!



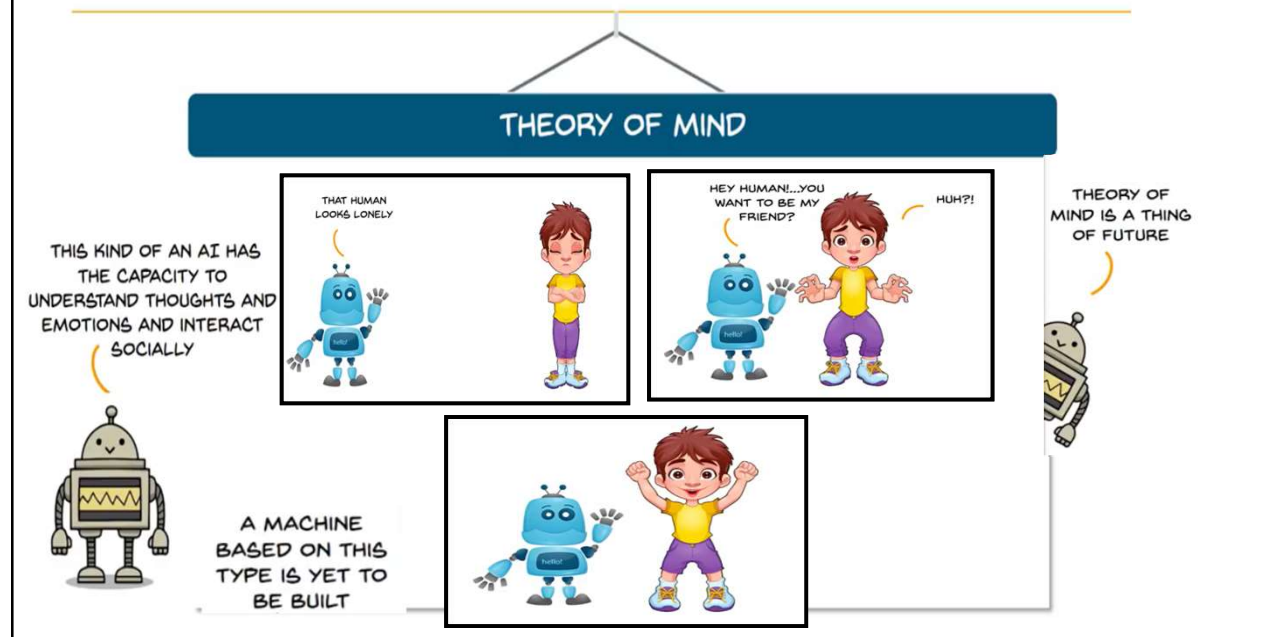
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## Types of Artificial Intelligence



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## Types of Artificial Intelligence



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## Types of Artificial Intelligence

### SELF - AWARE

SELF AWARE  
MACHINES ARE THE  
FUTURE GENERATION  
OF MACHINES



LIKE THE  
TERMINATOR



OR ULTRON!!



OR VISION FROM  
AVENGERS!



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## Applications of AI

 **Healthcare**

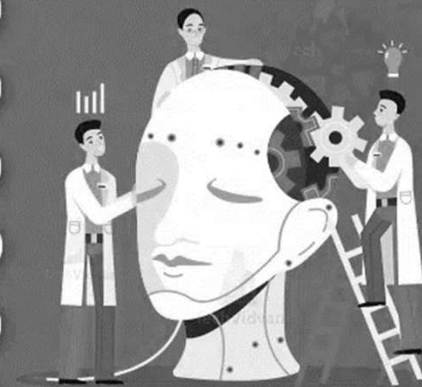
 **Automobile**


 **Finance**

 **Surveillance**

 **Social Media**


 **Entertainment**





 **Education**

 **Space Exploration**

 **Gaming**

 **Robotics**

 **Agriculture**

 **E-commerce**

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**1. Healthcare**

AI is used for medical diagnosis by analyzing medical images like X-rays and MRIs to identify diseases. For instance, AI systems are being developed to detect skin cancer from images with high accuracy.

**2. Finance**

AI helps in credit scoring by analyzing a borrower's financial history and other data to predict their creditworthiness. This helps banks decide whether to approve a loan and at what interest rate.

**3. Retail**

AI is used for product recommendations by analyzing your past purchases and browsing behavior to suggest products you might be interested in. For example, Amazon uses AI to recommend products to customers on their website.

**4. Manufacturing**

AI helps in quality control by inspecting products for defects. AI systems can be trained to identify even very small defects that human inspectors might miss.

**5. Transportation**

AI is used for autonomous vehicles by developing self-driving cars that can navigate roads without human input. Companies like Waymo and Tesla are developing self-driving car technology.

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**6. Customer service**

AI-powered chatbots are used to answer customer questions and provide support. For instance, many banks use chatbots to answer customer questions about their accounts and transactions.

**7. Security**

AI is used for facial recognition by identifying people from images or videos. This technology is used for security purposes, such as identifying criminals or unauthorized individuals.

**8. Marketing**

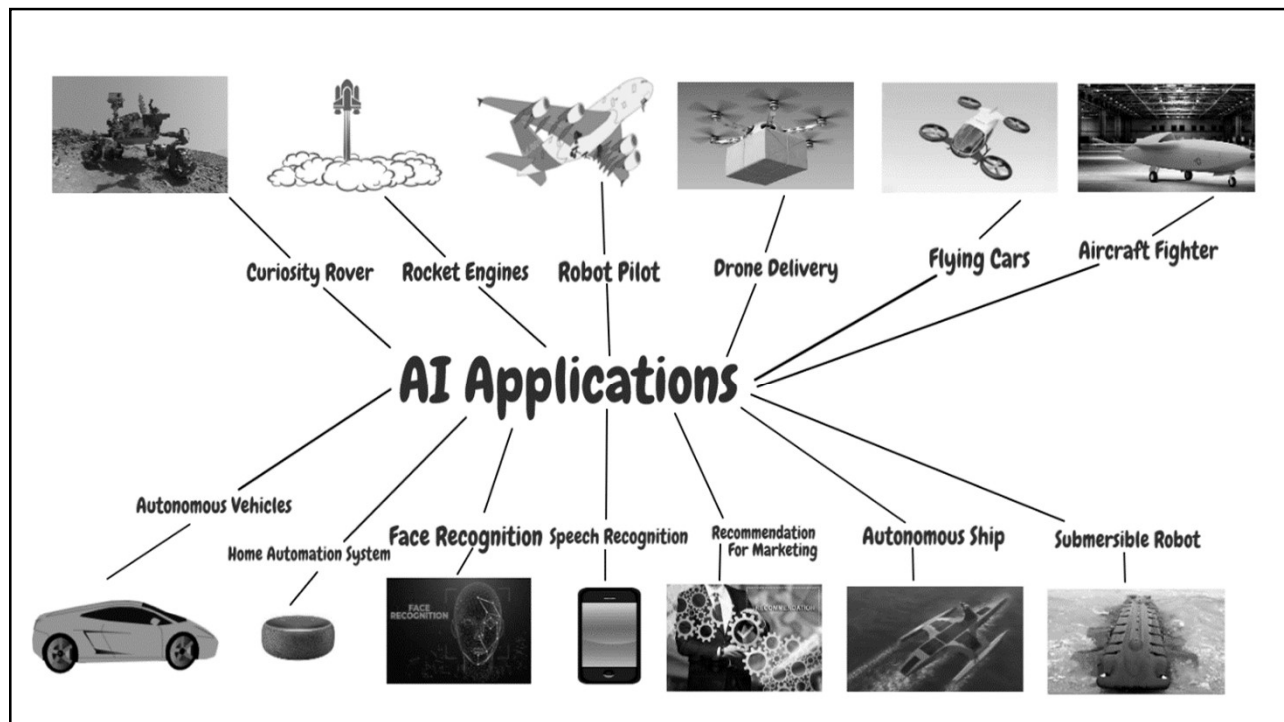
AI is used for targeted advertising by showing ads to people who are most likely to be interested in the product or service being advertised. For example, social media companies use AI to target ads to users based on their interests and demographics.

**9. Education**

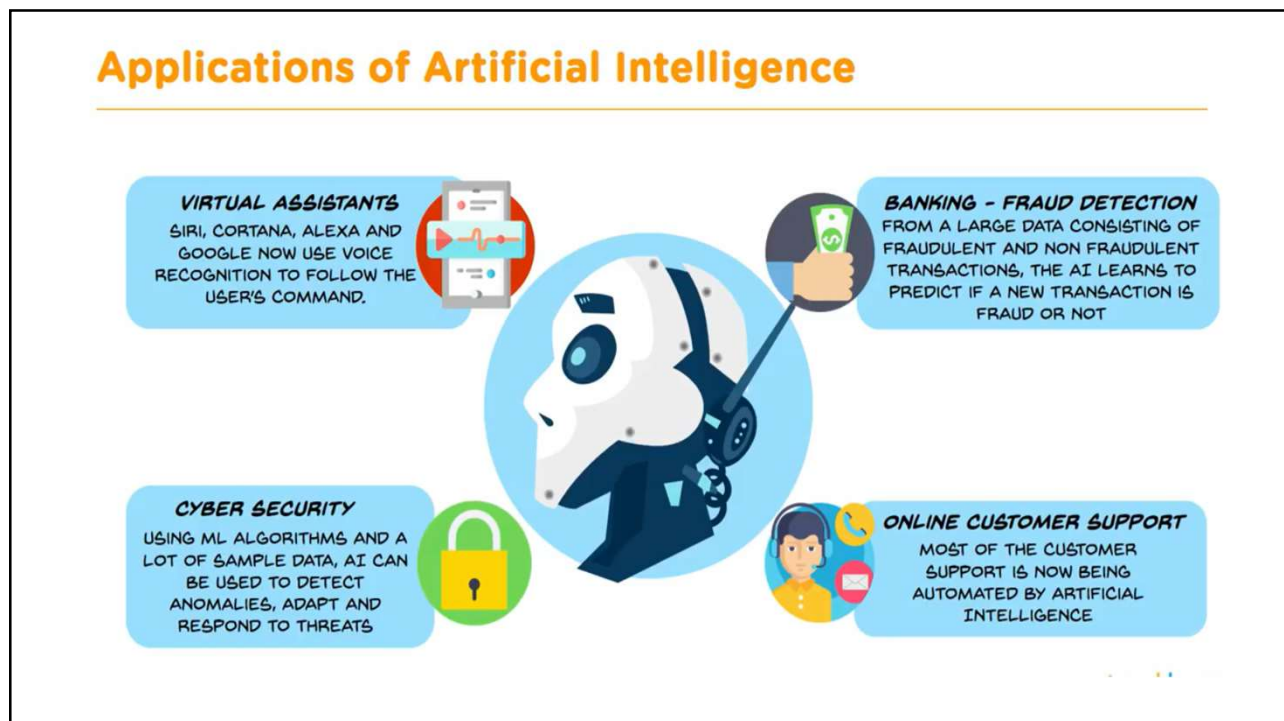
AI is used for personalized learning by tailoring educational content to the individual needs of each student. For example, AI-powered tutoring systems can provide students with personalized instruction and feedback.

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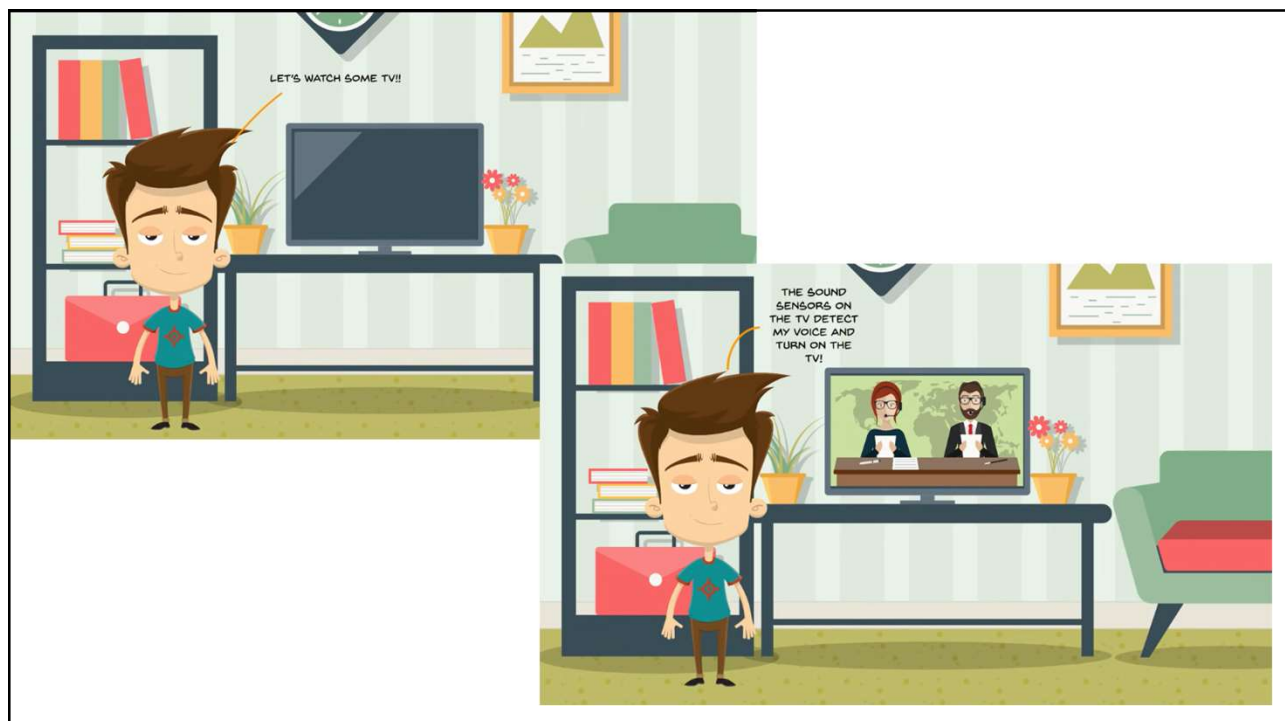


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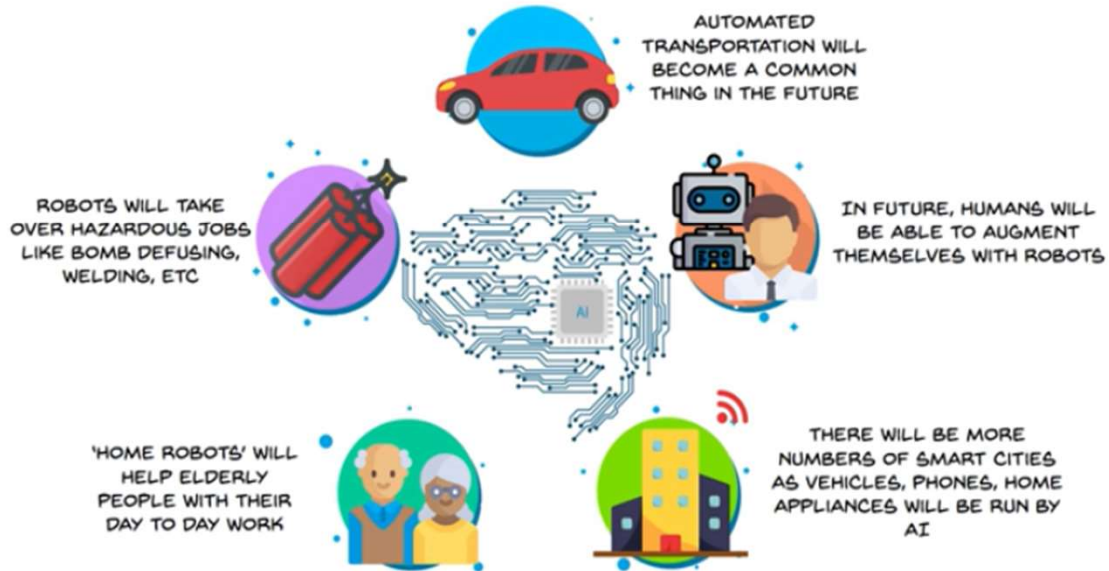


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## Future of Artificial Intelligence



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### Need for Artificial Intelligence – Why is AI Important?

The need for Artificial Intelligence (AI) stems from our desire to improve efficiency, solve complex problems, and make better decisions. Here's a breakdown of the importance of AI across various aspects:

#### 1. Increased Efficiency and Productivity

- AI automates repetitive tasks, freeing up human time and resources for more strategic endeavors.
- Imagine AI-powered robots handling assembly lines in factories or chatbots managing customer service inquiries, allowing human employees to focus on innovation or complex problem-solving.

#### 2. Enhanced Decision-Making

- AI can analyze vast amounts of data to identify patterns and trends that humans might miss.
- This allows for data-driven decision making in various fields like finance, healthcare, and marketing. For instance, AI can analyze financial data to predict market trends or patient medical data to suggest personalized treatment plans.

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### 3. Innovation and Progress

- AI can accelerate scientific discovery and technological advancements.
- AI-powered research tools can analyze complex scientific data, simulate experiments, and identify promising areas for further exploration.

### 4. Improved Quality of Life

- AI has the potential to revolutionize various sectors, leading to a better quality of life.
- Examples include self-driving cars improving transportation safety and AI-powered prosthetics enhancing mobility for those with disabilities.

### 5. Addressing Global Challenges

- AI can be a powerful tool for tackling global challenges like climate change and resource management.
- AI can optimize energy use, predict weather patterns, and analyze environmental data to support sustainable practices.

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### Technologies Based on Artificial Intelligence

Some of the common and popular technologies that are used in Artificial Intelligence are as follow:

- **Machine Learning:** A subfield of AI that uses algorithms to enable systems to learn from data and make predictions or decisions without being explicitly programmed.
- **Natural Language Processing (NLP):** A branch of AI that focuses on enabling computers to understand, interpret, and generate human language.
- **Computer Vision:** A field of AI that deals with the processing and analysis of visual information using computer algorithms.
- **Robotics:** AI-powered robots and automation systems that can perform tasks in manufacturing, healthcare, retail, and other industries.
- **Neural Networks:** A type of machine learning algorithm modeled after the structure and function of the human brain.
- **Expert Systems:** AI systems that mimic the decision-making ability of a human expert in a specific field.
- **Chatbots:** AI-powered virtual assistants that can interact with users through text-based or voice-based interfaces.

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