

What is Artificial Intelligence?

Artificial Intelligence (AI) is like giving machines a mind of their own! When a machine can think, learn, and make decisions just like a human, it's considered artificially intelligent.

Here's how it works:

- **Mimicking Human Intelligence** - Imagine a computer that can understand language, recognize faces, or even play chess better than any grandmaster.
- **Solving Real-World Problems** - AI is not just about theoretical smarts; it's about solving practical problems. Think about self-driving cars that navigate traffic safely, medical diagnosis systems that identify diseases from X-rays more accurately than doctors, or financial algorithms that detect fraudulent transactions in real time.
- **Learning from Past Experiences** - A fascinating feature of AI is its ability to learn and improve over time. This is called machine learning. For example, email spam filters get better at detecting unwanted messages the more emails they process.
- **Predicting and Decision Making** - AI systems can analyze massive amounts of data to make predictions and decisions on their own. For instance, weather forecasting models use AI to predict future weather patterns with high accuracy.



Examples of AI in action

1. **Voice Assistants:** Siri, Alexa, and Google Assistant can understand and respond to spoken language.
2. **Self-Driving Cars:** Tesla's Autopilot system uses AI to navigate roads safely.
3. **Healthcare:** AI-powered diagnostic tools can identify diseases from medical scans.
4. **Finance:** Fraud detection systems use AI to monitor and identify suspicious activities.

5. **Entertainment:** Netflix's recommendation engine suggests shows and movies based on your viewing history.

Activity Time:

Can you think of a few more examples of AI in action around you? Write them down:

Advantages of AI

1. Efficiency

AI can perform tasks faster and more accurately than humans, increasing productivity. For example, automated systems in factories work continuously without breaks.

2. Improved Healthcare

AI helps doctors diagnose diseases more accurately and quickly. AI algorithms can analyze medical images and detect issues that might be missed by humans.

3. Personalized Experiences

AI personalizes our experiences, like how Netflix recommends movies based on your viewing history.

4. Enhanced Safety

AI improves safety, such as in self-driving cars, which use AI to navigate roads and avoid accidents.

Disadvantages of AI

1. Job Loss

AI can replace human jobs, leading to unemployment in sectors like manufacturing and customer service.

2. Lack of Human Touch

AI lacks emotional understanding, so it can't provide the empathy and personal connection a human can.

3. High Cost

Developing and implementing AI technology can be very expensive, requiring advanced hardware, software, and skilled personnel.

4. Privacy Concerns

AI systems often need large amounts of data, raising privacy concerns about how personal information is collected and used.

Brief History of Artificial Intelligence

1950s: Birth of AI

- 1950: Alan Turing publishes "Computing Machinery and Intelligence," proposing the Turing Test to measure a machine's ability to exhibit intelligent behavior.
- 1956: The Dartmouth Conference, organized by John McCarthy, Marvin Minsky, Nathaniel Rochester, and Claude Shannon, officially coins the term "artificial intelligence" and sets the stage for AI research.

1960s-1970s: Early Development

- Researchers develop basic AI programs, including early natural language processing systems and simple game-playing programs like IBM's chess-playing computer.
- 1966: ELIZA, an early natural language processing computer program, is created by Joseph Weizenbaum.

1980s: AI Winter and Expert Systems

- AI experiences a period of reduced funding and interest, known as the "AI winter," due to unmet expectations.
- Despite setbacks, expert systems, which simulate the decision-making ability of a human expert, gain popularity in industries like medicine and finance.

1990s: Renewed Interest and Advances

- Advances in machine learning and data mining rekindle interest in AI.

- 1997: IBM's Deep Blue defeats world chess champion Garry Kasparov, demonstrating AI's potential in complex tasks.

2000s: Machine Learning and Big Data

- AI research shifts focus to machine learning, enabling systems to learn from data and improve over time.
- 2011: IBM's Watson wins the quiz show "Jeopardy!" against human champions, showcasing advancements in natural language processing and information retrieval.

2010s: Deep Learning and AI Integration

- Deep learning, a subset of machine learning involving neural networks with many layers, leads to breakthroughs in image and speech recognition.
- AI becomes integrated into everyday applications like virtual assistants (Siri, Alexa), recommendation systems (Netflix, Amazon), and autonomous vehicles (Tesla).

2020s: AI in Society

- AI continues to evolve, impacting healthcare, finance, transportation, and more.
- Ethical considerations and regulations around AI become increasingly important, addressing issues like bias, privacy, and job displacement.

Activity Time:

Write down your favourite era from the history of AI and why?

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Types of AI

Broad AI:

Broad AI systems are capable of executing various tasks across various fields. Broad AI would truly replicate human intelligence and help us leverage true power of AI.

Examples of broad AI:

1. Generalize knowledge and apply it as applicable to different circumstances
2. Use knowledge and experience acquired to plan for the future
3. Alter and adapt to circumstances as things shift
4. Ability to reason

Narrow/ weak AI:

Narrow AI is an application of artificial intelligence technologies to enable a high-functioning system that replicates -- and perhaps surpasses -- human intelligence for a dedicated purpose.

Examples of narrow AI:

- Siri by Apple, Alexa by Amazon, Cortana by Microsoft and other virtual assistants
- IBM's Watson
- Image / facial recognition software
- Disease mapping and prediction tools
- Manufacturing and drone robots
- Email spam filters / social media monitoring tools for dangerous content
- Entertainment or marketing content recommendations based on watch/listen/purchase behaviour

What is the Turing Test?

The Turing Test is a method of inquiry in artificial intelligence (AI) for determining whether or not a computer is capable of thinking like a human being. The test is named after **Alan Turing**, the founder of the Turing Test and an English computer scientist, cryptanalyst, mathematician and theoretical biologist.

Experiencing AI in real life - Chatbots

1966, ELIZA was the first natural language programming(NLP)- based conversation program described by Joseph Weizenbaum.

Depending on the how they are programmed, they can be categorized as:

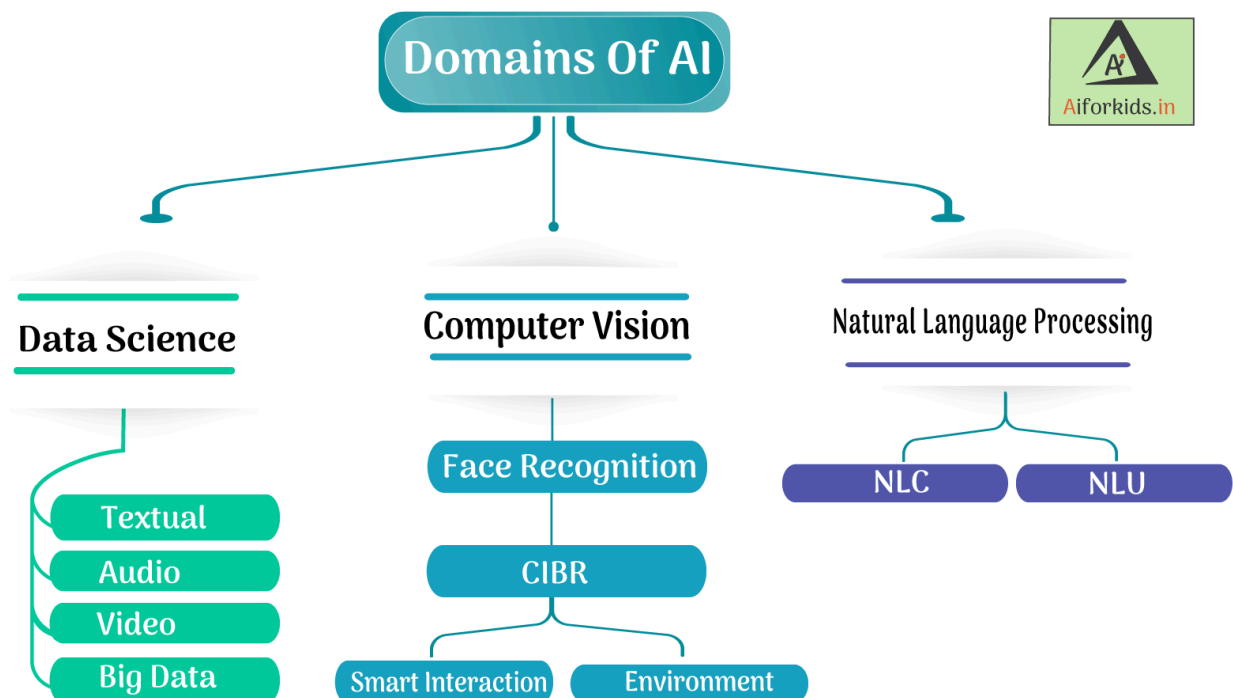
- **Simple Chatbot** : Simple chatbots have limited capabilities, and are usually called rule-based bots. They are task-specific.The chatbot will not make any inferences from its previous interactions. These chatbots are best suited for straightforward dialogues. They are very simple to build and train.

Example: Ordering Pizza - When a customer interacts with a chatbot to order pizza

- **Smart Chatbot:** AI-enabled smart chatbots are designed to simulate near-human interactions with customers. They can have free-flowing conversations and understand intent, language, and sentiment. These chatbots require programming to help it understand the context of interactions. They are much harder to implement and execute and need a lot of data to learn.

Example:Virtual Assistants

Domains of Artificial Intelligence



AI has three underlying domains:



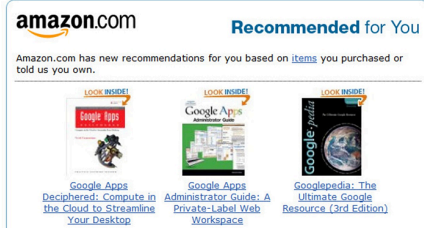
1. Data
2. Computer Vision (CV)
3. Natural Language Processing (NLP)

Data (Data Science and Machine Learning)

Data is a collection of raw facts which can be processed to make Information out of it.

Data Science is all about applying mathematical and statistical principles on data. In simple words Data Science is the study of Data.


Some Applications:

Predictive Analytics:	
 <p>Finance: Stock market prediction, credit scoring, fraud detection.</p>	<p>Healthcare: Predicting disease outbreaks, patient readmission rates.</p> 
Recommendation Systems:	
 <p>amazon.com Recommended for You Amazon.com has new recommendations for you based on items you purchased or told us you own.</p> <p>Look inside! Look inside! Look inside!</p> <p>Google Apps Deciphered: Compute in the Cloud to Streamline Your Desktop Google Apps Administrator Guide: A Private-Label Web Workspace Googlepedia: The Ultimate Google Resource (3rd Edition)</p>	<p>E-commerce: Amazon recommending products based on past purchases.</p> <p>Streaming Services: OTTs suggesting movies and shows based on viewing history.</p>

Computer Vision

Speech recognition or Voice recognition enables Conversational AI and other related applications. Computer Vision is linked to Image and Video Recognition and analysis. In simple terms, this is a technology of AI with which the robots can see.

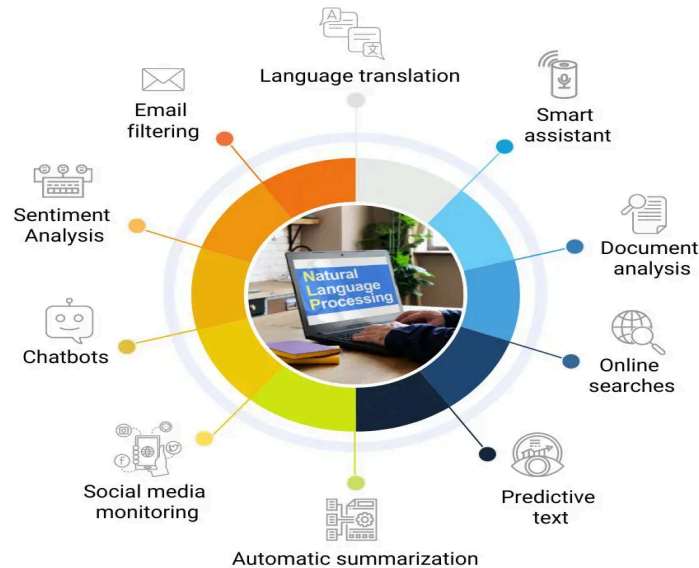
Some Applications:

 <p>7 APPLICATIONS OF COMPUTER VISION</p> <ol style="list-style-type: none">1 Safety/Security2 Face recognition3 Self-driving cars4 Robotics5 Augmented Reality6 Movement and gesture recognition7 Image recovery and processing	<h4>Image and Video Recognition</h4> <ul style="list-style-type: none">● Security: Facial recognition systems for surveillance and access control.● Healthcare: Analyzing medical images to detect diseases like cancer. <h4>Autonomous Vehicles</h4> <ul style="list-style-type: none">● Self-Driving Cars: Detecting and interpreting traffic signs, pedestrians, and other vehicles to navigate safely. <h4>Augmented Reality (AR)</h4> <ul style="list-style-type: none">● Gaming: Enhancing gaming experiences with real-world interactions, like Pokémon GO.● Retail: Virtual try-on features for clothes and accessories.
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Natural Language Processing

NLP stands for **Natural Language Processing**, which is a part of **Computer Science**, **Human language**, and **Artificial Intelligence**. It is the technology that is used by machines to understand, analyse, manipulate, and interpret human's languages.

Applications of Natural Language Processing



Language Translation

- **Communication:** Google Translate provides instant translation between languages.
- **Travel:** Real-time translation apps for tourists.

Chatbots and Virtual Assistants

- **Customer Service:** Automated chatbots handling customer inquiries on websites.
- **Personal Assistants:** Siri, Alexa, and Google Assistant performing tasks based on voice commands.

Sentiment Analysis

- **Social Media Monitoring:** Analysing public sentiment on platforms like Twitter to gauge opinions on brands or products.
- **Market Research:** Assessing customer reviews to understand feedback and improve products or services.

Activity: Game Time

In this activity, you will visit a few online resources to play games and experience the power of AI. **Resources:**

Game 1 (Rock, Paper and Scissors):

Rules for playing Game 1:

- ✓ Type the link below to launch the tool
- ✓ Scroll down and check the box "I Agree". Click on Let' Go
- ✓ You may turn off the camera to select the moves directly from the screen
- ✓ Start the game by selecting "rock", "scissors" or "paper"
- ✓ Choose continuously until you create a pattern and check how AI tries to win.



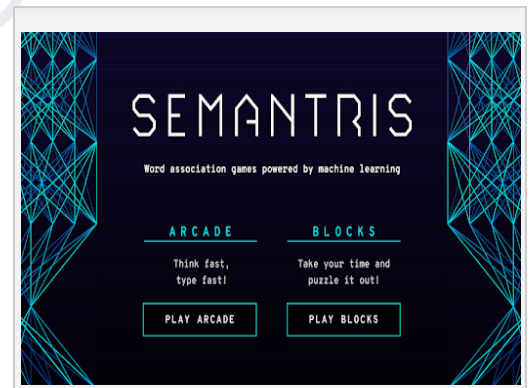
Visit <https://next.rockpaperscissors.ai/> to play the game online.

Game 2 (Semantis):

Rules for playing Game 2:

- ✓ Type the link given and click on launch experiment option to start the game.
- ✓ Click on Play Arcade option to start playing the game.
- ✓ Each time AI gives you the highlighted clue, you are supposed to enter the most closely associated word to get more scores.
- ✓ Check how machine understands your words

Visit <https://research.google.com/semantis/> to experience the magic online.

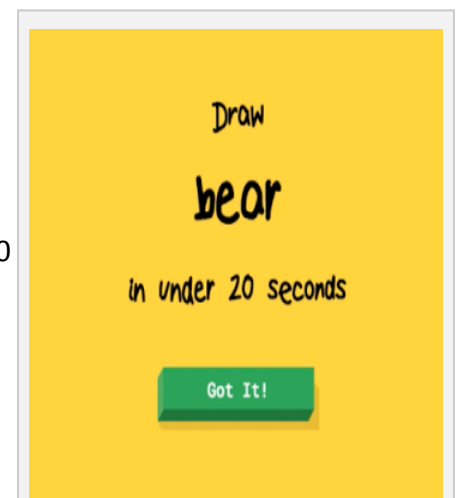


Game 3 (Quick, Draw):

Rules for playing Game 3:

- ✓ Type the link and click on Let's Draw option to start playing the game.
- ✓ An item will be named on the screen for you to draw in 20 seconds after you click on Got it!
- ✓ AI will guess whatever you draw on the white screen.
- ✓ Try drawing 6 objects correctly in a row to win the game!

Launch the game at <https://quickdraw.withgoogle.com/>



Identify the AI domain used in the above games and list them below:

Data	Computer Vision	NLP
Now, think of few more examples and write them below under each domain:		

Revision Time

Part A

Quiz Time: AI Quiz

- Which one of the following is an application of AI?
 - Remote controlled Drone
 - Self-Driving Car
 - Self-Service Kiosk
 - Self-Watering Plant System
- This language is easy to learn and is one of the most popular languages for AI today:
 - C++
 - Python
 - Ruby
 - Java
- This field is enabling computers to identify and process images as humans do:
 - Face Recognition
 - Model-view-controller
 - Computer Vision
 - Eye-in-Hand System
- What does NLP stand for in AI?
 - Neutral Learning Projection
 - Neuro-Linguistic Programming
 - Natural Language Processing
 - Neural Logic Presentation
- Which of the following is not a domain of artificial intelligence?
 - Data Management System
 - Computer Vision
 - Natural Language Processing
 - Data Science

6. How excited are you about this AI curriculum?

- a. Very Excited!
- b. A bit excited
- c. Same as always
- d. Not excited at all

Part B

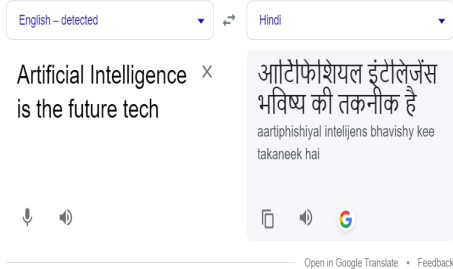
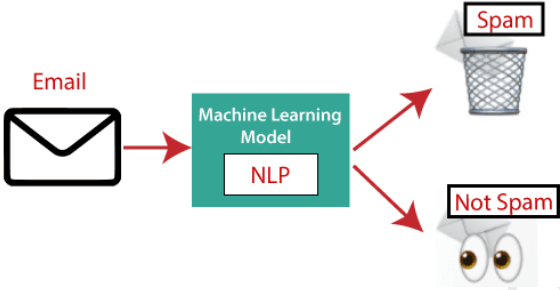

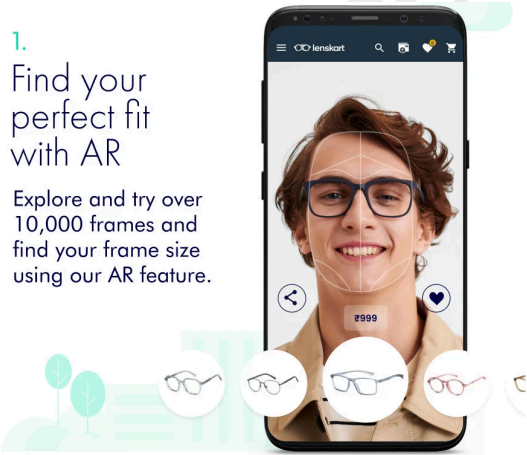
1. How can AI be used as a tool to transform the world into a better place?

2. Can you list down a few applications in your smartphone that widely make use of computer vision?

3. Draw out the difference between the three domains of AI with respect to the types of data they use.

Data	Computer Vision (CV)	NLP

4. Identify the features and the domain of AI used in them:

 <p>a. _____</p>	 <p>b. _____</p>
 <p>c. _____</p>	 <p>d. _____</p>

5. Separate the following areas based on the kinds of domains widely used in them:

a. Crop productivity	
b. Traffic regulation	
c. Maps and navigation	
d. Text editors and autocorrect	
e. Identifying and predicting disease	

6. After the pandemic, it's been essential for everyone to wear a mask. However, you see many people not wearing masks when in public places. Which domain of AI can be used to build a system to detect people not wearing masks?

7. Search for an online game that recognizes the image drawn by you. Write down the observations including the AI domain used by it.



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