# Introduction to AI Concepts and Applications

ICLED BUSINESS SCHOOL, LEKKI LAGOS

Learning Objectives

- Understand fundamental concepts of Artificial Intelligence

- Identify types of AI and how they function

- Explore applications and benefits of AI

- Develop critical thinking on ethical and social impacts

- Gain insights into trends and future developments of AI
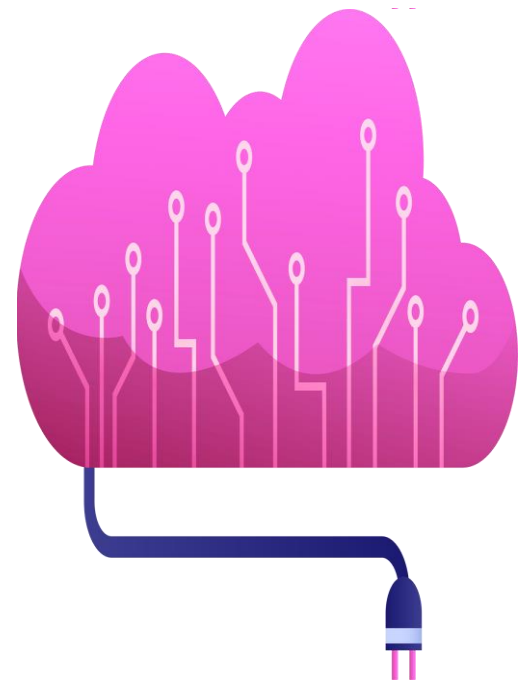
Overview

- ☐ Introduction to Artificial Intelligence
- ☐ History and Evolution of AI
- ☐ Understanding AI
- ☐ Types of AI
- ☐ Application/Benefits
- ☐ Conclusion
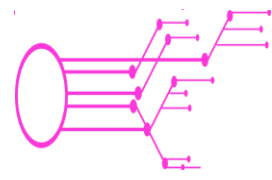
Introduction

What is Artificial Intelligence (AI)?

Artificial intelligence also called AI refers to systems or machines that mimic human intelligence to perform tasks and can improve themselves based on data. It enables machines to learn, reason, and solve problems.

- **Examples:** Siri or Google Assistant answering your questions, Netflix recommending movies you might enjoy, Self-driving cars that understand traffic signs etc

- AI systems can perform tasks that typically require human intelligence
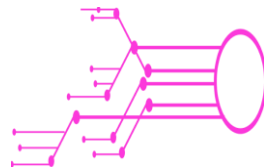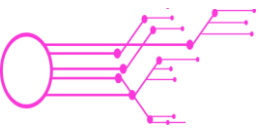
History & Evolution of AI

• 1950 – Alan Turing proposed the Turing Test, suggesting a benchmark for machine intelligence: if a computer could convincingly imitate a human in conversation, it might be considered intelligent.

• 1956 – Birth of AI as a field: At the Dartmouth Conference, computer scientist John McCarthy coined the term "Artificial Intelligence", launching formal research into machine-based intelligence.

• 1970s–1980s – Expert Systems became the first commercial success of AI, using rule-based logic for decision-making in fields like medicine and finance.

• 1997 – IBM's Deep Blue defeated world chess champion Garry Kasparov, showcasing that machines could outperform humans in strategic tasks.
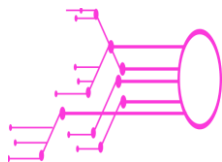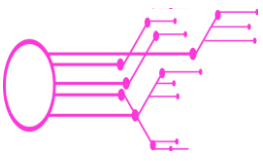
History & Evolution of AI

- 2012 – Deep Learning Emerges: Researchers using deep neural networks won the ImageNet competition with breakthrough accuracy, igniting the modern AI boom.

- 2016 – AlphaGo vs. Lee Sedol: Google DeepMind's AlphaGo beat a world champion in the complex game of Go, demonstrating the potential of AI in intuition-based tasks.

- 2020s – Generative AI like ChatGPT ushered in an era of creative and conversational AI, capable of producing text, images, and code with human-like fluency.
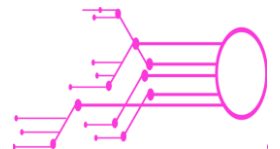
Understanding AI

Artificial Intelligence (AI) is the ability of machines or computer systems to perform tasks that usually require human intelligence. These tasks include learning from experience, understanding language, recognizing images, making decisions, and even problem-solving.

- In simple terms, **AI is about teaching machines to "think" or act smart** just like humans do.

Examples: Face unlock or voice assistants in smart phones, Product recommendations when shopping online, Disease detection or virtual assistants in healthcare, Self-driving cars, GPS traffic updates in transportation, Content suggestions, spam filters for social media etc
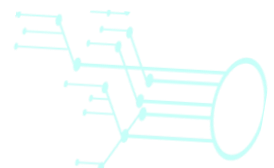
What is an Algorithm?

An algorithm is a step-by-step set of instructions that a computer follows to solve a problem or complete a task.

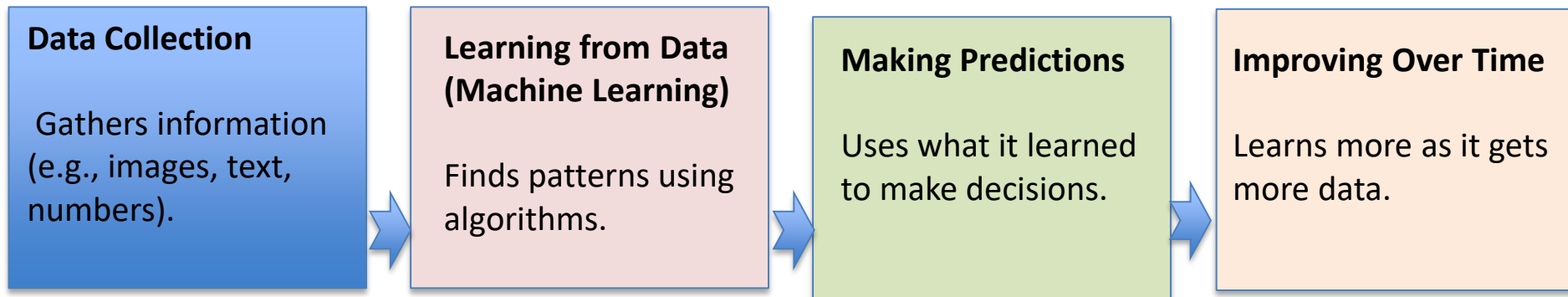**Example,** Just like you might follow these steps when making noodles:

Boil water → Add noodles → Wait 5 minutes → Serve.

That's an algorithm! It's clear, step-by-step, and has a goal.

Think of AI as the body, and algorithms as its brain cells, each doing a specific job.

How AI Works

Data Collection	Learning from Data (Machine Learning)	Making Predictions	Improving Over Time
Gathers information (e.g., images, text, numbers).	Finds patterns using algorithms.	Uses what it learned to make decisions.	Learns more as it gets more data.

AI doesn't think like humans. It learns by running thousands of algorithms that:

- Compare numbers and images
- Find trends
- Make predictions
- Improve themselves over time
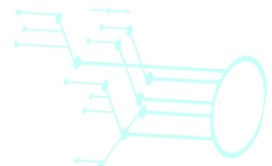
Class Discussion

- Can someone explain why AI needs lots of algorithms instead of just one?

- What would happen if a self-driving car used a bad algorithm?

- Which of your favorite apps do you think use smart algorithms?

Key Functions of AI

- Learning from data (Machine Learning)
- Understanding language (Natural Language Processing)
- Recognizing images (Computer Vision)
- Making smart decisions (Expert Systems)
- Speaking & listening (Speech Recognition)
- Acting physically (Robotics)
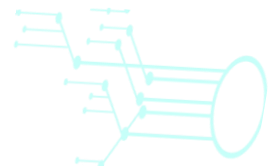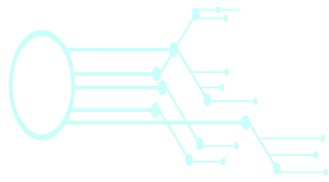
Machine Learning (ML)

Machine Learning (ML) is a subset of artificial intelligence that focuses on developing algorithms that allow computers to learn from and make decisions or predictions based on data.

For example, tech companies like Google, Microsoft, use **machine learning algorithms** to automatically detect and filter out spam messages from your inbox.

Machine Learning (ML)

Core Concepts

Data-Driven: ML systems use historical data to identify patterns and relationships.

Model Training: A model is trained on a dataset to recognize trends, make predictions, or classify information.

Continuous Improvement: With more data, models can be retrained or fine-tuned to improve accuracy.

Types of Learning

- **Supervised Learning**: Learning from labeled data (e.g., email spam detection).

- **Unsupervised Learning:** Finding patterns in unlabeled data (e.g., customer segmentation).

- **Reinforcement Learning:** Learning through trial and error (e.g., game-playing agents
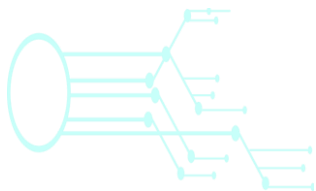
Neural Networks

Neural Networks are computing systems inspired by the structure and function of the human brain. They are used to detect complex patterns and relationships in data.

For example, a computer can tell the difference between a cat and a dog in a photo using a Convolutional Neural Network (CNN) which are a special type of neural network designed to process and "understand" images.

Neural Networks

Core Concepts

Architecture: Composed of layers (input, hidden, and output) with nodes (neurons) that process data.

Activation Functions: Determine the output of a node (e.g., ReLU, sigmoid).

Back propagation: A training process where the model adjusts weights based on error.

Deep Learning: Uses multiple hidden layers in neural networks for tasks such as image and speech recognition.

Use Cases

- Voice recognition in digital assistants (e.g., Siri, Alexa).

- Image tagging and facial recognition.

- Stock market predictions.

Natural Language Processing (NLP)

NLP is a field of AI that enables machines to understand, interpret, and respond to human language in a meaningful way.

For example, in voice assistants like Siri, Google Assistant, or Alexa, if you give a prompt such as:

"Hey Siri, remind me to call Mom at 6 PM"

What NLP does is that it processes your speech, understands the intent behind the command, and sets a reminder accordingly.
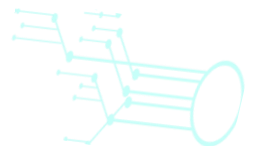
Natural Language Processing (NLP)

Core Concepts

- **Syntax and Semantics Analysis:** Understanding grammar and meaning.

- **Sentiment Analysis:** Identifying emotional tone in text.

- **Named Entity Recognition (NER):** Detecting proper nouns like names, places, etc.

- **Language Generation:** Creating text responses or translations.

Common Applications

- Chatbots and virtual assistants.
- Language translation tools (e.g., Google Translate).
- Text summarization and grammar checking (e.g., Grammarly).
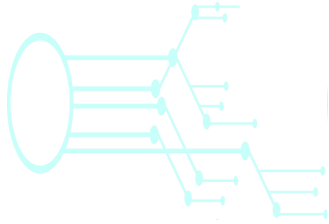
Computer Vision

Computer Vision is the technology that enables computers to interpret and process visual information from the world.

Main Functions:
- **Image Classification:** Identifying what an image contains.
- **Object Detection:** Locating specific items in images or videos.
- **Facial Recognition:** Matching faces in real-time with stored data.
- **Image Segmentation:** Separating different elements in a visual.

Applications:
- Medical imaging (e.g., detecting tumors).
- Surveillance and security.
- Autonomous vehicles (understanding surroundings).

Types of AI

A. Narrow AI (Weak AI): AI specialized in a single task and Operates under predefined parameters; cannot generalize.

- **Examples:** Spam filters, facial recognition, recommendation systems.

B. General AI (Strong AI): AI that can perform any intellectual task a human can and can reason, plan, learn, and understand across diverse domains.

C. Superintelligence: An AI that surpasses human intelligence in all aspects.

Application/Benefits of AI

Business: Automation, customer insights, data analytics

Healthcare: Faster diagnoses, treatment recommendations

Finance: Fraud detection, credit risk assessment

Marketing: Personalized advertising and targeting

Everyday Life: Smart homes, virtual assistants, recommendations

Question

In what ways does AI improve human efficiency or decision-making?

Ethical & Social Impacts

- **Bias & Fairness**: AI can reinforce societal biases if not properly trained or tested.
- **Privacy Concerns**: Data surveillance raises issues about consent and freedom.
- **Job Displacement**: Automation is reshaping the workforce, reskilling is key.
- **Use in Policing/Warfare**: Powerful but potentially dangerous without regulation.

Question

Which industry do you think AI is disrupting the most right now and how?
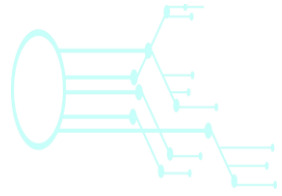
Trends & Future Outlook

- **Generative & Multimodal AI**: Merging text, image, and audio creation.

- **Artificial General Intelligence (AGI)**: Still theoretical, but hotly debated.

- **Sustainability**: AI supports climate solutions but consumes significant energy.

- **AI Governance**

- **Scenarios**: AI can lead to equity or control. Direction depends on our choices.
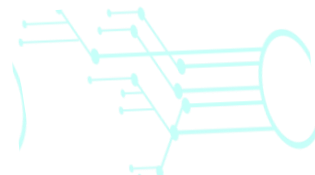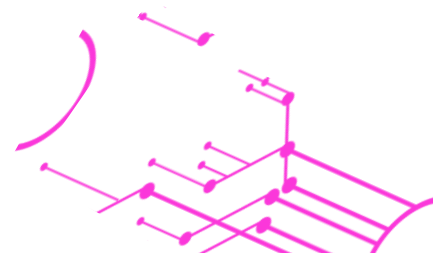
Conclusion

- AI is actively shaping industries and our daily lives

- Understanding AI is critical in a digital world

- It offers opportunities for innovation and efficiency

- Ethical use of AI is vital for responsible development
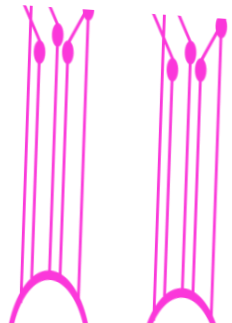
The future of AI is full of potential, stay informed and adaptable.

Thank you!