

Lab Sheet-1

Aim- What is AI and its 10 applications.

Date- 18/08/2024

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Introduction to Artificial Intelligence (AI)

Artificial Intelligence, or AI, is a fascinating field of computer science dedicated to creating systems that can simulate human intelligence. These systems are designed to handle tasks that traditionally required a human touch—whether that’s recognizing patterns, making decisions, or even understanding and processing language.

Think of it this way: we humans learn by trial and error. We make mistakes, we learn from them, and we improve. AI follows a similar principle. It’s built to learn from vast amounts of data, refining its performance over time, just like a chess player who studies their losses to improve future strategies.

The roots of AI stretch back further than you might think. In the 1950s, Alan Turing laid the groundwork with his famous Turing Test, which was designed to assess whether machines could exhibit behaviour indistinguishable from humans. From there, we’ve seen rapid advances, like the creation of ELIZA, the first chatbot, in the 1960s, and IBM’s Deep Blue in 1977, which shocked the world by defeating a chess grandmaster. Fast forward to today, and AI has seeped into our everyday lives, from Apple’s Siri to the ambitious research of OpenAI, co-founded by Elon Musk in 2015.

Two key types of AI are worth noting:

- **Weak AI (Narrow AI):** These systems are designed to excel at specific tasks. They don't "think" in the way humans do but are incredibly efficient within their domains—think of virtual assistants or recommendation algorithms.
 - **Strong AI:** This is the ultimate vision—an AI that could genuinely think, learn, and adapt like a human. It doesn't exist yet, but it's a target many in the field are working toward.
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Applications of AI

AI isn't just an abstract concept; its impact is real and far-reaching, revolutionising industries and changing the way we live.

1. AI in Education

- **Personalised Learning:** Imagine a tutor who knows exactly what you need to focus on, tailored to your strengths and weaknesses. That's what AI is doing for education. By personalising learning materials, it's helping students of all levels progress more efficiently.
- **Task Automation:** Teachers and administrators are getting a helping hand from AI, which can handle everything from grading papers to organising research. This frees up more time for educators to focus on teaching and engaging with students.
- **AI in Exams:** Ever worried about cheating in online exams? AI is already helping by monitoring students through cameras and microphones, flagging anything suspicious so that the focus remains on learning.

2. AI in Healthcare

- **Medical Diagnosis:** Human error in healthcare can be fatal, but AI helps minimise those risks. It can sift through complex medical histories and provide faster, more accurate diagnoses than even seasoned professionals.
- **Drug Discovery:** Drug development is notoriously slow and expensive. But AI is speeding things up by analysing potential side effects, optimising clinical trials, and even helping to design new drugs.
- **Robotic Surgery:** AI-assisted robots are already being used in surgeries, offering unparalleled precision and reducing recovery times for patients. They're not replacing surgeons, but they're providing incredible support in the operating room.

3. AI in Finance

- **Fraud Detection:** AI is like a digital detective, spotting patterns and anomalies in transactions that could indicate fraud. It's providing an extra layer of security in a world where online transactions are the norm.
- **Algorithmic Trading:** AI-driven algorithms are transforming the stock market. These systems can analyse huge amounts of data in seconds and execute trades faster than any human, making them a powerful tool for investors.
- **Risk Management:** Financial institutions rely on AI to predict and manage risk, helping them make more informed decisions in an unpredictable market.

4. AI in Transportation

- **Autonomous Vehicles:** Self-driving cars aren't just a sci-fi dream anymore. AI is powering these vehicles, helping them navigate roads,

avoid accidents, and potentially revolutionise how we think about transportation.

- **Traffic Management:** AI is also tackling congestion, analysing traffic patterns in real time to optimise the flow of vehicles and reduce bottlenecks.
- **Route Optimization:** From delivery trucks to ride-sharing services, AI is finding the fastest, most efficient routes, saving time, fuel, and money.

5. AI in Customer Service

- **Chatbots and Virtual Assistants:** You've probably interacted with a chatbot before. These AI-powered assistants handle basic customer inquiries, freeing up human employees to tackle more complex issues.
- **Sentiment Analysis:** Companies are using AI to sift through mountains of customer feedback, analysing it for trends and emotions, helping businesses improve their services based on real-time sentiment.
- **Personalised Recommendations:** Whether it's Netflix suggesting your next binge-watch or Amazon recommending your next purchase, AI is behind the scenes, making these suggestions more accurate and personalised than ever.

6. AI in agriculture

- **Precision Farming:** AI systems enable farmers to optimize resource usage, including water, fertilizers, and pesticides, by analyzing data from drones, satellites, and IoT devices. Machine learning algorithms predict the best times to plant, irrigate, and harvest crops based on environmental data, increasing yields and reducing waste.
- **Automated Machinery:** AI-driven machinery such as drones and robots perform agricultural tasks like planting seeds, applying fertilizers, and

harvesting crops autonomously. For example, AI-enabled robots can pick fruits, monitor crop health, and remove weeds, saving labor costs and enhancing agricultural productivity.

7. AI in Cybersecurity

- **Threat Detection:** AI is crucial in identifying potential security breaches and cyberattacks by analyzing network traffic, user behavior, and patterns. AI-powered systems detect anomalous activities that indicate malware, phishing attempts, or unauthorized access. These systems improve as they learn from previous attacks, enhancing security over time.
- **Automated Incident Response:** AI-driven security systems can autonomously respond to cybersecurity threats. For instance, if a breach is detected, AI can isolate affected parts of the network, shut down compromised systems, or apply patches without human intervention. This rapid response limits the damage and reduces the time required for manual interventions.

8. AI in Entertainment

- **Content Creation:** AI is being used to generate original music, artwork, and even movie scripts. AI systems like OpenAI's GPT models can write coherent stories or articles, while others can compose music that mimics the styles of famous composers. In video games, AI algorithms are used to create adaptive, intelligent NPCs (non-player characters) that can learn and evolve based on player actions.
- **Recommendation Systems:** Platforms like Spotify, YouTube, and Netflix use AI algorithms to recommend content to users based on their viewing, listening, or browsing history. These recommendation engines

analyze patterns of user engagement, preferences, and similarities between users to predict content they might enjoy.

9. AI in Retail

- **Recommendation Engines:** E-commerce platforms like Amazon and Netflix use AI-powered recommendation engines to suggest products, movies, or content to users. These systems analyze browsing behavior, purchase history, and preferences to make personalized recommendations, improving customer experience and boosting sales. Collaborative filtering and content-based filtering are two common AI techniques used in recommendations.
- **Supply Chain Optimization:** AI helps retailers manage their supply chains more efficiently by forecasting demand, optimizing inventory levels, and planning deliveries. Machine learning models analyze historical sales data, market trends, and external factors (like weather or holidays) to predict when products will be in high demand, helping retailers avoid stockouts or overstocking.

10. AI in Manufacturing

- **Predictive Maintenance:** AI systems use sensors and data analytics to monitor the condition of industrial equipment in real-time. Machine learning models predict when equipment is likely to fail or require maintenance, allowing companies to perform repairs before breakdowns occur. This reduces downtime and maintenance costs, ensuring more efficient production lines.
- **Quality Control:** In manufacturing, AI-driven computer vision systems inspect products for defects. These systems can detect even the smallest imperfections, such as cracks, scratches, or misalignments, at high speeds and with greater accuracy than human inspectors. AI ensures that only products meeting the highest standards are shipped to customers.

Lab Sheet-2

Aim- Write a python program to load and display a csv file.

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CODE

```
import pandas as pd
data = pd.read_csv("C:/Users/hp/Downloads/Untitled spreadsheet - Sheet1
(2).csv")
print("CSV Data:\n")
print(data)
```

OUTPUT

CSV Data:

	Name	Age	Department	Salary	Hire Date
0	John Doe	28	Engineering	75,000	2018-06-12
1	Jane Smith	34	Marketing	65,000	2016-09-21
2	Bob Johnson	41	HR	80,000	2015-03-15

Akanksha Ranjan

Roll no-23619003