FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
Lab Exercise -- 1

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FUNDAMENTALS OF AI

ASSIGNMENT NO 1

Q1. Categorize the taking after beneath Information Sciences, Machine Learning, Computer Vision and NLP.

The most recent innovative progressions have made our lives convenient.

Google Domestic, Alexa and Siri have been a gigantic offer assistance to non-tech adroit individuals. Highlights like Facial acknowledgment and Facelock have included extra security to our contraptions. These headways have moreover contributed in making our needs more receptive and helpful. Presently you'll indeed check the costs with Cost comparison websites and arrange foodstuffs online with chatbots. Did you know that you simply can indeed discover how you're attending to see once you develop ancient? Faceapps and Snapchat channels have made this possible!

Information Sciences	Machine Learning	Computer Vision	NLP
Cost Comparison Websites	Google Assistant	Facial acknowledgement	Google Assistant
Online Food Booking Websites(Arrange foodstuffs online)	Alexa	Facelock	Alexa
	Siri	FaceApps	Siri
		Snapchat	Chatbots

Q2. Is information which is collected by different applications moral in nature? Legitimize your answer

The morality of data collection depends on how openly and responsibly companies handle our personal information.

When Data Collection is Ethical
- <u>With Consent & Transparency</u> – If an app like Google Fit asks before tracking your steps, that's fair.
- <u>For Security & Protection</u> – Banking apps encrypt your data to keep it safe.
- <u>To Improve User Experience</u> – Spotify uses your listening history to suggest better playlists.

When Data Collection is Unethical
- <u>Without Permission</u> – The Facebook–Cambridge Analytica scandal misused personal data.
- <u>Selling Data Secretly</u> – Some free apps collect and sell your info without telling you.
- <u>Unnecessary Access</u> – A flashlight app asking for your location is a red flag.
- <u>Weak Security</u> – The Yahoo breach exposed billions of users due to poor safeguards.

Data collection isn't always bad—it helps make services better. But when companies exploit, deceive, or fail to protect our information, it becomes unethical.

That's why privacy laws like GDPR(General Data Protection Regulation) —to give us control over our own data.

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Q3. Autonomous vehicles or self-driving cars are already a reality in some cities around the world. What was the reason behind this invention? What software logic and hardware are needed to allow these cars to drive without hitting pedestrians or other vehicles? What legislation had to be passed to allow these cars on the road? Are there any moral issues?

- Why Were They Invented?
→ Self-driving cars were developed to reduce accidents, improve traffic flow, and increase accessibility for people who can't drive, like the elderly or disabled.

- Software & Hardware Needed
→ AI & Machine Learning – Helps cars recognize and react to surroundings.
→ Sensors (LiDAR[Light Detection and Ranging], Cameras, Radar) – Detects objects, pedestrians, and other vehicles.
→ GPS & Mapping – Ensures accurate navigation and route planning.
→ Control Systems – Adjusts speed, braking, and steering to avoid collisions.

- Laws & Regulations
Countries have introduced laws to ensure safety and accountability:
→ The U.S. has self-driving car testing guidelines set by the National Highway Traffic Safety Administration (NHTSA).
→ The EU enforces strict safety standards before allowing autonomous cars on the road.
→ Some regions require a licensed human driver to override the system if needed.

- Moral Issues
→ Safety vs. Liability – If an accident happens, who is responsible—the car's owner, the manufacturer, or the AI?
→ Decision-Making in Crashes – Should the car protect its passengers or pedestrians in a no-win situation?
→ Job Losses – Autonomous vehicles may replace professional drivers, affecting employment.

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Q4. Discuss the latest inventions w.r.t AI enabled machines in the following field of

Health Care

Environment

Agriculture

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1. Health Care
- AI-Assisted Diagnostics – Google's DeepMind AI detects diseases like diabetic retinopathy and lung cancer with high accuracy.
- Surgical Robots – Da Vinci Surgical System enhances precision in complex surgeries.
- AI Drug Discovery – AlphaFold predicts protein structures, accelerating drug development.

2. Environment
- AI for Climate Prediction – IBM's Green Horizons uses AI to forecast pollution levels.
- Waste Sorting Robots – ZenRobotics automates waste management and recycling.
- Wildlife Conservation – Google's Wildlife Insights helps track endangered species using AI-powered cameras.

3. Agriculture
- Precision Farming – John Deere's AI tractors optimize planting and harvesting.
- AI-Powered Drones – SkySquirrel drones analyze crop health and detect diseases.
- Automated Weeding Machines – Ecorobotix reduces herbicide use by targeting weeds precisely.

Q5. Consumers who bought this too bought this…' we frequently see this when we shop on Amazon. What is the principle behind this phrase?

The phrase "Consumers who bought this also bought..." is based on the Collaborative Filtering principle in Recommendation Systems.

- Principle Behind It
→ Collaborative Filtering works by analyzing purchase patterns and user behavior to recommend products frequently bought together. It relies on:
→ User-User Similarity – Recommends items liked by users with similar interests.
→ Item-Item Similarity – Suggests products that are frequently bought together.

- Example
If many users buy a phone case along with a smartphone, Amazon suggests the case to new buyers of the phone, increasing cross-selling opportunities.
This AI-driven approach enhances user experience, boosts sales, and keeps customers engaged.

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Q6. COMPLETE THE FOLLOWING

Task	Observable	Deterministic/Stochastic	Episodic/Sequential	Static/Dynamic	Discrete/Continuous	Agents
Crossword Puzzle	Fully	Deterministic	Episodic	Static	Discrete	Single
Chess with Clock	Fully	Deterministic	Sequential	Static	Discrete	Multi
Poker	Partially	Stochastic	Sequential	Static	Discrete	Multi
Backgammon	Partially	Stochastic	Sequential	Static	Discrete	Multi
Taxi Driving	Partially	Stochastic	Sequential	Dynamic	Continuous	Multi
Medical Diagnosis	Partially	Stochastic	Sequential	Static	Discrete	Single
Image Analysis	Fully	Deterministic	Episodic	Static	Continuous	Single
Part-Picking Robot	Fully	Deterministic	Sequential	Dynamic	Continuous	Single
Refinery Controller	Fully	Stochastic	Sequential	Dynamic	Continuous	Single

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