**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!**

**ANSWER 1.**

· **Cost Comparison Websites**: Information Sciences - compares the prices

· **Ordering Foodstuffs Online**: Information Sciences - manages the orders

· **Google Home**: Machine Learning, NLP - It listens to your voice and responds.

· **Alexa**: Machine Learning, NLP - Takes your voice commands and acts on them.

· **Siri**: Machine Learning, NLP - Understands what you say and answers.

· **Facial Recognition**: Machine Learning, Computer Vision - Identifies people's faces.

· **Facelock**: Machine Learning, Computer Vision - Uses your face to unlock devices.

· **Chatbots**: Machine Learning, NLP : Communicates with you like a human.

· **Faceapps**: Machine Learning, Computer Vision - Edits your face in pictures.

· **Snapchat Filters**: Machine Learning, Computer Vision -Adds fun effects to your face in selfies.

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

**ANSWER 2.**

No, the information collected by different applications is not always moral in nature. Data collection often happens in ways that are not secure, where private information can be exposed to risks. Many applications share this data with third parties or use it openly for their own research and modeling without clear consent from users. Such practices are unethical because they violate individuals' privacy, breach trust, and use private data for business gains without proper transparency. Even if data collection is necessary for improving services, it should always prioritize user consent, data security, and respect for privacy. When these standards are not met, data collection becomes morally wrong.

**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?**

**ANSWER 3.**Autonomous vehicles, or self-driving cars, were invented to enhance road safety by minimizing human errors, reduce traffic congestion, and offer convenient transportation for those unable or unwilling to drive. These vehicles utilize advanced software and hardware systems that work together to ensure safe navigation and prevent collisions.  
  
S**oftware logic and hardware**

**Environmental Awareness**: Uses sensors like LIDAR, radar, and cameras to detect surroundings.

**Planning and Control**: Includes systems for route planning, decision-making, and vehicle movement.

**Software Platforms**: Often uses the Robot Operating System (ROS) for steering and braking, along with custom software for computer vision and machine learning.

**Hardware**: Requires powerful processors (like NVIDIA and Intel) and specialized automotive components.  
  
**Legislation**   
Legislation for autonomous vehicles includes requirements for permits to test on public roads, with some areas mandating accident reporting. Laws are being created to clarify responsibility in accidents, and governments are establishing safety standards while protecting data privacy.

**Moral issue**Moral issues with autonomous vehicles include tough decisions in crashes, unclear responsibility for accidents, potential bias against certain individuals, and job losses in driving-related fields. These concerns highlight the ethical challenges of integrating self-driving cars into society.

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

**Health Care**

**Environment**

**Agriculture**

**ANSWER 4.**

#### 1. Healthcare

* **CovNet** = Boosts early illness detection by scanning medical images and cutting down on mistakes.
* **IBM Watson Health** = Quickens medical choices by studying patient info and suggesting tailored care plans.
* **PathAI** = Sharpens diagnosis precision by examining tissue samples with AI technology.
* **Butterfly iQ** = Delivers handy, AI-driven ultrasound scans for easier health checks on the go.

#### 2. Environment

* **AquaAI** = Tracks water purity instantly to keep drinking water safe and manage it wisely.
* **Google’s AI for Climate Change** = Forecasts climate shifts to fight pollution and lower carbon output.
* **DeepMind’s AI for Energy Efficiency** = Fine-tunes power use in tech hubs to slash waste.
* **IBM’s Green Horizon** = Estimates air quality trends and improves clean energy solutions.

#### 3. Agriculture

* **CropX** = Enhances watering methods for eco-friendly farming and stronger harvests.
* **AgriBot** = Guides crop care and pest solutions using smart AI insights.
* **eFarm** = Offers live data to help farmers grow more and use resources better.
* **Blue River Technology** = Targets weeds with AI precision to protect crops and reduce chemicals.

**Q5. Consumers who bought this too bought this…’ we frequently see this when we shop on Amazon. What is the principle behind this phrase?  
  
ANSWER 5.**

The phrase "Consumers who bought this also bought this..." is based on the idea of collaborative filtering. This method looks at buying patterns among users to find similarities in what people like. Basically, if many customers buy the same items, the system assumes that these customers have similar tastes. So, when you see recommendations on sites like Amazon and Flipkart, it suggests products that others with similar buying patterns have also chosen. This approach improves the shopping experience by helping consumers find new products that match their interests based on what other shoppers have bought.

**Q6. COMPLETE THE FOLLOWING**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **task environm.** | **observable** | **determ./ stochastic** | **episodic/ sequential** | **static/ dynamic** | **Discrete/**  **continuous** | **agents** |
| **crossword puzzle** | **Fully Observable** | **Deterministic** | **Episodic** | **Static** | **Discrete** | **Single Agent** |
| **chess with clock** | **Fully Observable** | **Deterministic** | **Sequential** | **Dynamic** | **Discrete** | **Multi-Agent** |
| **poker** | **Partially Observavable** | **Stochastic** | **Sequential** | **Dynamic** | **Discrete** | **Multi-Agent** |
| **back gammon** | **Fully Observable** | **Stochastic** | **Sequential** | **Dynamic** | **Discrete** | **Multi-Agent** |
| **taxi driving** | **Partially Observavable** | **Stochastic** | **Sequential** | **Dynamic** | **Continous** | **Multi-Agent** |
| **medical diagnosis** | **Partially Observavable** | **Stochastic** | **Episodic** | **Static** | **Discrete** | **Single Agent** |
| **image analysis** | **Fully Observable** | **Deterministic** | **Episodic** | **Static** | **Continous** | **Single Agent** |
| **partpicking robot** | **Partially Observavable** | **Deterministic** | **Sequential** | **Dynamic** | **Continous** | **Single Agent** |
| **refinery controller** | **Partially Observavable** | **Stochastic** | **Sequential** | **Dynamic** | **Continous** | **Single Agent** |