

FUNDAMENTALS OF AI

ASSIGNMENT NO 1

1. Categorization & Deeper Analysis

From the following passage, identify which parts relate to Information Sciences, Machine Learning, Computer Vision, and NLP.

“The most recent innovative progressions have made our lives convenient. Google Home, Alexa and Siri have been a huge help to non-tech users. Features like Facial Recognition and FaceLock have added extra security to devices. Price comparison websites and chatbots make shopping easier. FaceApps and Snapchat filters even let us see how we might look when we grow old.”

Tasks:

- Categorize each example into its correct domain.
- For each category, identify one modern research challenge (e.g., bias in NLP, adversarial attacks in CV).

Q2. Data Ethics & Regulation

Many applications collect personal data.

Tasks:

- Discuss whether this is ethical or unethical, using at least two ethical frameworks (e.g., utilitarianism, deontology).
- Evaluate GDPR (Europe) and DPDP Act (India, 2023) in regulating such practices.
- Suggest one technical safeguard (like differential privacy, federated learning) that could make data collection more ethical.

Q3. Autonomous Vehicles – Beyond Basics

Autonomous vehicles are now a reality in some cities.

Tasks:

- Explain the motivation behind autonomous vehicles (social, economic, and environmental).
- Detail the software logic (perception, planning, decision-making) and hardware stack (sensors: LiDAR, radar, cameras; compute: GPUs).
- Analyze legislative challenges: pick one country and explain the legal changes required.

Q4. AI-Enabled Machines

Discuss the latest AI inventions in the following fields:

- Healthcare → Choose one system (e.g., IBM Watson, PathAI, DeepMind’s AlphaFold). Analyze both benefits and risks.
- Environment → Pick one project (e.g., AI for Climate Change Prediction, Smart Grids). Discuss the accuracy vs interpretability trade-off.

Q5. Recommender Systems

We often see “Customers who bought this also bought this” on Amazon.

Tasks:

- Explain the principle (collaborative filtering, association rule mining).
- Critically analyze the problems of recommender systems .

Q6. COMPLETE THE FOLLOWING

task environm.	observable	determ./ stochastic	episodic/ sequential	static/ dynamic	discrete/ continuous	agents
crossword puzzle						
chess with clock						
poker						
back gammon						
taxi driving						
medical diagnosis						
image analysis						
partpicking robot						
refinery controller						