1. Identifying Agents and Environments – List five real-world AI agents with their environment, sensors, actuators and goals.

List of 5 real-world AI agents, along with their environments, sensors, actuators, and goals

1. Autonomous Car (e.g., Tesla Autopilot)

- **Environment:** Roads, traffic, pedestrians, weather conditions
- **Sensors:** Cameras, LiDAR, radar, GPS, ultrasonic sensors
- **Actuators:** Steering, throttle, brake, signal indicators
- **Goal:** Safely navigate to a destination while obeying traffic rules and avoiding collisions

2. Smart Home Thermostat (e.g., Nest)

- **Environment:** Indoor home environment (temperature, humidity, occupancy)
- **Sensors:** Temperature sensor, humidity sensor, motion detector, Wi-Fi module
- **Actuators:** HVAC controls (heater/cooler on/off)
- **Goal:** Maintain comfortable temperature efficiently, save energy based on occupancy

3. Voice Assistant (e.g., Amazon Alexa)

- **Environment:** Human-inhabited space (home, office)
- **Sensors:** Microphones, sometimes cameras
- **Actuators:** Audio speakers, smart device signals (e.g., lights, alarms)
- **Goal:** Understand and fulfill user voice commands (e.g., play music, control devices, answer questions)

4. Warehouse Robot (e.g., Amazon Kiva System)

- **Environment:** Warehouse floor with shelves and other robots
- **Sensors:** Cameras, RFID readers, proximity sensors, wheel encoders
- **Actuators:** Wheels, lifting arms, directional motors
- **Goal:** Pick and deliver inventory items to specific locations efficiently and safely

5. Email Spam Filter

- **Environment:** Incoming email stream on a mail server
- **Sensors:** Email text, metadata (sender, subject, links), user feedback
- **Actuators:** Classifier label (spam/ham), email routing (inbox or spam folder)
- **Goal:** Classify and filter out unwanted/spam messages with high accuracy

6. Self-Checkout Kiosk (e.g., in supermarkets)

- **Environment:** Store checkout area, interacting with products and customers
- **Sensors:** Barcode scanner, weight sensors, cameras, touchscreen input
- **Actuators:** Display screen, speaker, payment terminal, receipt printer
- **Goal:** Accurately scan items, calculate total, handle payment, and reduce checkout time without human cashiers

7. Drone Delivery System (e.g., Zipline or Amazon Prime Air)

- **Environment:** Outdoor airspace, wind/weather conditions, GPS-based location data
- **Sensors:** GPS, altimeter, gyroscope, cameras, proximity sensors
- **Actuators:** Propellers, navigation control surfaces, package drop mechanism
- **Goal:** Deliver packages autonomously to precise locations safely and efficiently

8. Autonomous Vacuum Cleaner (e.g., Roomba)

- **Environment:** Home floors with furniture, pets, and humans
- **Sensors:** Infrared sensors, bump sensors, cliff sensors, gyroscope, cameras
- **Actuators:** Wheels, vacuum motor, rotating brushes, sound system
- **Goal:** Navigate and clean floors thoroughly while avoiding obstacles and stairs

9. Facial Recognition System (e.g., airport security systems)

- **Environment:** Public access points like airports, office buildings, or phones
- **Sensors:** Camera input (static or video), sometimes infrared sensors
- **Actuators:** Access control system (e.g., gates), alerting systems
- **Goal:** Identify or verify individuals based on facial features for security or personalization

10. Stock Trading Bot (e.g., algorithmic trading systems)

- **Environment:** Digital financial markets and trading platforms
- **Sensors:** Real-time financial data, market news feeds, economic indicators
- **Actuators:** Trade execution APIs (buy/sell orders), portfolio rebalancing tools
- **Goal:** Maximize profit or minimize risk through rapid and data-driven trading decisions