CS 627 Homework 1

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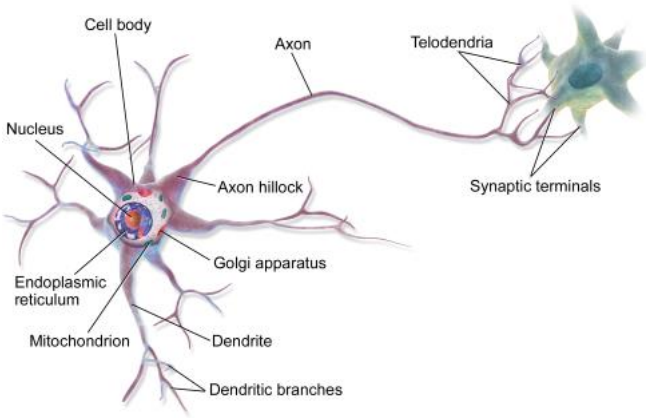
(a).Definition of Artificial Intelligence.

In my own definition and some research I tend to understand that AI is the creation of computer systems or machines that can perform tasks typically requiring human intelligence. These systems aim to mimic or enhance human cognitive abilities, enabling machines to perform complex functions like visual perception, speech recognition, decision-making, and even creative work, with varying levels of autonomy.

(b).Brain Neuron Diagram with Labeled Parts



(c) PEAS Components for Various AI Systems

i) E-commerce Recommendation System

Performance measure:

Accuracy of recommendations, customer satisfaction, conversion rate, revenue increase, relevance of product suggestions.

Environment:

User data (browsing history, past purchases, preferences), product catalog, seasonal trends, market demand.

Actuators:

Displaying recommended products to users on the platform, sending personalized emails, notifications, or ads.

Sensors:

Tracking user behavior (clicks, time spent on products, search queries), customer feedback, purchase history, browsing patterns.

ii) Drone Surveillance System **Performance measure:**

Area coverage, image quality, real-time data capture, object recognition accuracy, low false alarm rate, battery efficiency.

Environment:

Outdoor environments, varying terrains, buildings, people, weather conditions (rain, wind, etc.), time of day.

Actuators:

Propellers for movement, camera orientation controls, communication modules for transmitting data, alert systems (e.g., lights, alarms).

Sensors:

Cameras, accelerometers.

iii) Personal Assistant AI

Performance measure:

Response accuracy, natural language understanding, user satisfaction, speed of response, task completion rate.

Environment:

User's device (phone, smart speaker, etc.), internet, voice input from users, surrounding sounds, context of the query (e.g., location, time).

Actuators:

Voice synthesis, display of information on screen, integration with third-party apps (sending messages, controlling smart home devices).

Sensors:

Microphones (for detecting voice commands), touch sensors (for manual input), location data (GPS), calendar/scheduling data.

iv) Smart Home Energy Management System

Performance measure:

Energy savings, comfort of inhabitants, reduction in electricity costs, efficiency of energy consumption.

Environment:

Household electrical systems, weather conditions, user preferences, time of day, occupancy levels.

Actuators:
Smart plugs, dimmers.

Sensors:
Temperature sensors, motion detectors.

v) Smart Nursing Home

Performance measure:
Resident safety, health monitoring accuracy, emergency response time, quality of care, comfort and ease of use for residents.

Environment:
Indoor environment (nursing home rooms, hallways), resident behavior, daily routines, medical needs, emergency situations.

Actuators:
Automated alarms (in case of falls or medical emergencies), door locks, lighting, HVAC systems and medical equipment controllers.

Sensors:
Motion detectors (for falls), heart rate monitors, blood pressure sensors, temperature sensors, location tracking, sleep monitors, cameras.

References

1. R Martinez - Nev. LJ, 2018 - HeinOnline: Distinguishing between types & definitions
2. DJ Amit, DJ Amit – 1989, The world of attractor neural networks
3. M Tiboni, A Borboni, C Bregoli, C Amici - Sensors, 2022, Sensors and actuation technologies in exoskeletons
4. Sharma, R. (2019). Understanding PEAS in Artificial Intelligence. AI Magazine