ITEC 101: HUMAN-COMPUTER INTERACTION

Week 2 - Introduction to Advanced HCI

1. Introduction to Advanced HCI

Human-Computer Interaction (HCI) has evolved significantly, integrating artificial intelligence (AI), augmented reality (AR), virtual reality (VR), and intelligent systems. Modern HCI focuses on usability, accessibility, and interaction models to enhance user experience.

2. Artificial Intelligence

Definition of AI

Artificial intelligence (AI) is a set of technologies enabling computers to perform advanced functions such as language translation, data analysis, and decision-making. It integrates multiple disciplines, including computer science, data analytics, hardware and software engineering, linguistics, neuroscience, and psychology.

Applications of AI

- Data Analysis: AI processes large datasets beyond human capability.

- Automation: AI-driven automation reduces human intervention in repetitive tasks.

- Natural Language Processing (NLP): AI enables voice assistants and chatbots.

- Decision Making: AI assists in making informed business decisions.

3. Augmented Reality vs. Virtual Reality

Key Differences

- Augmented Reality (AR): Enhances real-world environments with digital overlays.

- Virtual Reality (VR): Creates entirely immersive, computer-generated environments.

Uses of AR

- Visualization: Superimposes digital images, aiding in medical and engineering fields.

- Instruction & Training: Enhances learning with real-time information.

- Interaction: Improves machine-human interactions using virtual control panels.

Uses of VR

- Entertainment: Enhances gaming and immersive media experiences.

- Healthcare: Simulates medical training and surgical procedures.

- Education: Creates virtual classrooms and enhances remote learning.

- Training: Simulates real-world scenarios for skill development.

4. Principles of Interaction Design

Interaction design ensures digital products are intuitive and user-friendly. Don Norman outlines six principles:

1. Visibility: Users should easily understand available actions.

2. Feedback: Clear response to user actions.

3. Constraints: Limits to prevent user errors.

4. Mapping: Logical placement of controls and functions.

5. Consistency: Standardized behavior across systems.

6. Affordance: Elements should indicate their functionality.

5. Human-Centered vs. System-Centered Design

Human-Centered Design (HCD)

- Focuses on user needs and usability.

- Ensures accessibility and intuitive design.

System-Centered Design

- Prioritizes system efficiency over user experience.

- Often lacks accessibility considerations.

HCD is widely preferred due to its user-friendly nature and engagement benefits.

6. Evolution & Future Trends in HCI

Early HCI

- Text-based interfaces.

- Introduction of Graphical User Interfaces (GUIs).

Modern HCI

- UX design and mobile interaction.

- Intelligent and adaptive interfaces.

Future Trends

- AI-driven user experiences.

- Brain-computer interfaces.

- Enhanced AR/VR applications.

Conclusion

Advanced HCI integrates various technologies to enhance user interaction with digital systems. AI, AR, and VR are shaping the future of user experience, making interactions more intuitive and accessible.