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HCI Assignment 2

Q.1 What is meant by design in HCI ?

→ In HCI, design refers to the process of creating user interfaces, systems & interactions that are intuitive efficient & effective for users.

The goal of design in HCI is to ensure that the technology is usable & meets the needs of intended users.

• Aspects of design :-

1. User centered design (UCD)

   It focuses on involving users & getting their preferences throughout the design process.

2. Interaction design

   It deals with designing interactive design elements.

3. Interface design

   concentrates on the layout, look & feels of the user interface (UI)

Q.2 What is meant by basic design ? detailed design ?

→ BASIC DESIGN

The purpose of this stage in HCI is focused on conceptualizing the overall user experience & interaction flow.

At this stage, designers create on overall frame work

for the user interface. This includes defining key
screens, user journeys, etc. The goal is to establish how users will interact
with the system at a high level.

- DETAILED DESIGN
  The purpose is to, design the specifics of the
  user interface & user design are fully developed.
  It refines the basic design by adding precise details
  regarding the appereance, behaviour & the
  interaction elements of the system.

Q.3 Explain the system architecture of Hand gesture
     recognition system using the HCI design

→ 1. Input layer:
   It includes various parts:
   - sensors & cameras
   - Data collection

2. Pre-processing layer
   - Gesture segmentation
   - Feature extraction

3. Recognition layer
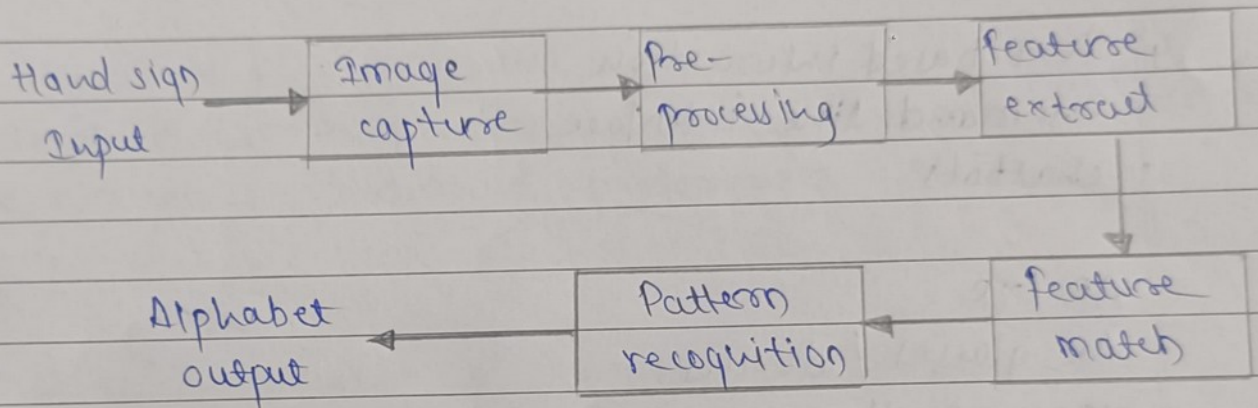   - Machine learning (deep learning models)

4. Interaction layer
   - Gesture-to-command mapping
   - feedback mechanism

5. UI layer
 - Visual display
 - Interaction design
6. Testing & iteration
 - usability testing
 - continuous improvement

```
Hand sign  →  Image    →  Pre-      →  feature
Input         capture      processing   extract
                                          │
                                          ↓
Alphabet   ←  Pattern   ←  feature
output        recognition   match
```

system architecture for hand gesture
recognition system

Q.4 list down various ways of "people to interact
 computer".

→ People can interact with computers in various ways,
 depending on the technology.

1. Graphical user interface
 It can be of 2 types (the interaction)
 - mouse & keyboard
 - touch screen

2. Voice interaction
   - voice commands
   - speech recognition

3. Gesture based interaction
   - Hand Gestures
   - Touchless interfaces

4. Text based interaction
   - command line interface
   - chatbots

5. AR/VR
   - AR glasses / devices
   - VR controller
   - full body tracking
   - mobile AR

Q.5 Explain the importance of human characteristics in design

→ Human characteristics play a crucial role in design, particularity, Human computer interaction.

1. Usability & accessibility
   It Includes understanding how users think, process information & some problems.

2. User satisfaction and experience
Human emotions and motivations significantly influence how users perceive & interact with a product.

3. Safety and error prevention
Humans are prone to making errors, especially when systems are complex or unintuitive.

4. Interaction & engagement
understanding how users typically behave, including their routines, habits & preferences. etc.

Q.6 What is the concept of human consideration in design of business systems? Explain with example.

→ The concept of human consideration in the design of business system revolves around ensuring that the system is designed with the users needs, abilities, behaviours and experiences in mind.

- key aspects
1. user centered design
The system is designed with a focus on the end-users, ensuring that mui needs roles, tasks a challenges within the business process.

2. security & privacy
The system should consider users need for security & privacy.

- Example
- scenario : A company is implementing an EMS to handle tasks.

- The aspects to be considered are :
1. user-centered design
2. ease of use
3. Efficiency & productivity
4. Accessibility
5. Feedback
6. security & privacy
7. support

Q.7 Discuss about different human interaction speeds.

→ It refers to the rate at which people can perform various tasks when interacting with technology.

1. Typing speeds.
   The average typing speed on a standard keyboard ranges from 40 to 60 rupm.

2. Voice interaction speed
   users may need to slow down or repeat commands if the system is prone to errorcrosses.
   This may affect the speed.

3. **oiutnq speod**
It can vary bayed on the uers **Farnilarty** oith
the device, sewitivity settings & the size of
the target.

4. Getun Iueyation speed
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Ye toquized quicty conporsed to the moe comple<
gestures.

rompone penfoomonce vs peancee
> fenformaue t prseerance ase 2 important concepts
in Hel d wability tuie.

• PERFORMANCE
It refers to how effectively a wer Can Compleke tay'ky
wing a system.
- It is **obiedree**
- It is meaured wing :
|:**ie** on tok
2. Errors rate
3. Throughput
- critical for systems where efficieney, accuracy &
Speeds ane **impontant**.
- eq: A business application even a CRM system
miqe poi rsitze penformuee.

PREFERANCE
- It refers to a users subjective feelings, opinion & satisfaction with a system.
- It is subjective in nature.
- It depends on individual users tastes, experiences & emotions.
- Measured using tools like:
1. surveys
2. interviews
3. feedbacks
4. Questionnaires
- It is important for user satisfaction.

Q.9 Elaborate different methods of gaining understanding of users.

→ understanding users is a foundational aspect of designing effective & user-centered systems, products or services.

1. user interviews
- It provide deep & qualiative insights
- It may be challenging

2. Surveys & questionnaires
- It is suitable when you have to collect data from a large audience.

9. Ethnogapie studiu tiNolve obsersuwo wy iu Heirs notal evisbnt to wudars tondhere behanior contexts.

4. Contextual inquiry
Its purpose is to gathor details into how weros interrait with a System or procers in context

10. What is miller's tao? eplan with 4lo help of an example

→ milles loo rees to-the Ca copt that an average Dunpben' of obets an individu ad can hold in their memory is about 7 ± 2.

It imphey hat hunon mind can manaqe arsound 7 pieces or 7 ± 2 pieces of information at a time

las imtatia appliay to shent tero t coking memory, which is sucical ftaky like problem solving, reasoning and comprehension.

oolviug

ExAMPLE
Imagine you are trying to memorize a phon numbers with 10 digits.
only a feuo can memorize all 10 in one go.
others yererally can memorize either 5 or 9 numbers.

Q.11 Elabonte voniouw deiqu qwdelis to have suitable in HCI systems.

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ofeedbak & tepowiNees
Provide wewos with ti mey & tofos matie fedbek to leoep 4hem \fored aboud the systm

3. Useo coufrol & flexibility
Give weros coutrool over the system & allows them to interoet with a.

4. Error prevention & recovery
The system shoued have minimum possibility of eroors.

5. Simplicity & minimoulisim.
keep the ide face as simple ay posSible Teduig corpesity

Q.12 Explain design principles in detail.

→ Some of the key design principles are:

1. **Balance**

   It refers to the distribution of visual weight within a design.

2. **Contrast**

   It involves using opposing elements.

3. **Emphasis**

   It refers to making one part of the design more standing out that others.

4. **Proportion**

   It refers to relationship between sizes of different elements.

5. **Repetition**

   It involves using same/similar elements throughout a design.

Q.13 Describe different theories used in HCI in detail.

→ The different theories are:-

1. **Cognitive load theory**

   It focuses on the amount of mental effort being used in working memory.

   It suggests that the human brain has limited capacity for processing information & load.

2. Active theory
   It is a framework for studying hurman
   aetiuity as complex, socially stimulated
   pheno heu
   It focues on the relattowip between the
   individual & their environment & including
   tho tools they uwe thoin goals and the
   Corpuu ty out.

3. Fitti Law
   It predicts the time equed to rapidly move
   to a target area, such as a button or a
   toutool.
   - It suggests that longers & lose longes are
   ates to sele.