

Chapter-3

Interaction
Designing
Interactions

The interaction

Overview → ① Interaction models help us to understand what is going on in the interaction between user and system. (user factors and system factors)

② Ergonomics looks at the physical characteristics of the interaction and how these influence its effectiveness.

Communication

3 terms of interaction

3.1

① Domain → The areas of work under study

② goal → what you want to achieve

③ task → how you go about doing it

(goal fulfil करना या कार्य)

goals of interaction:

1) Develop usable products

2) Usability means to learn, effective to use and provide an enjoyable.

3) Involves all stakeholders in the design process.

WIMP Interface
Interactivity

3.2 → Models of interaction

Working in multidisciplinary teams:

different backgrounds विभिन्न पाठ्यस्त्र, different perspectives and ways of seeing and talking about things अनुसन्धान के लिए।

Advantages: More ideas and designs generated.

Disadvantage: Difficult to communicate and progress forward the designs being created.

Two Models of interaction:

① Norman's Model (The execution-evaluation cycle)

② Abowd and Beale framework.

Abowd and Beale framework

Interaction framework (प्रक्रिया संरचना)

4 part → ① User / task

② input

③ system / core

④ output

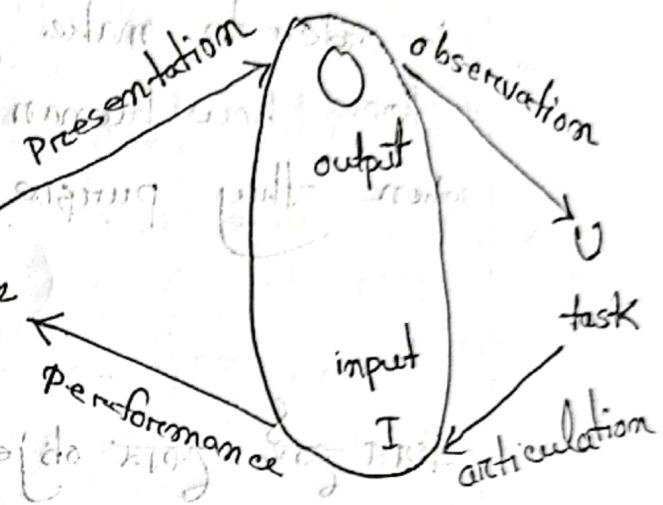
Details about interaction framework

1. Core: The system language is

known as core language

which understand by system

(mainly machine language)



2. Task: The user language

referred as user task language understand by the user. (natural language)

3. Articulation: Users produced some input to the system

in various forms (keyboard as input process)

4. Performance: System performs actions on these

input.

5. Presentation: System presents the output to the user

6. Observation: User observe those output

action on them.

Donald Norman's Model

In order to make good decisions it is important to know how human beings are making decisions when they pursue an objective.

Aim of this model.

जो वस्तु के साथ व्यक्ति वस्तु का व्यवहार करता है वह वस्तु के साथ व्यवहार करता है।

प्रयत्न के द्वारा व्यक्ति वस्तु का व्यवहार करता है।

प्रयत्न के द्वारा व्यक्ति वस्तु का व्यवहार करता है।

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1. Gulf of execution: where we tend to

discover the object's properties.

2. Gulf of evaluation: where we get feedback

related to our interaction.

7 stages of donald norman's model:

1) Establishing the goal

2) Foreseeing the intention

3) Specifying the action sequence.

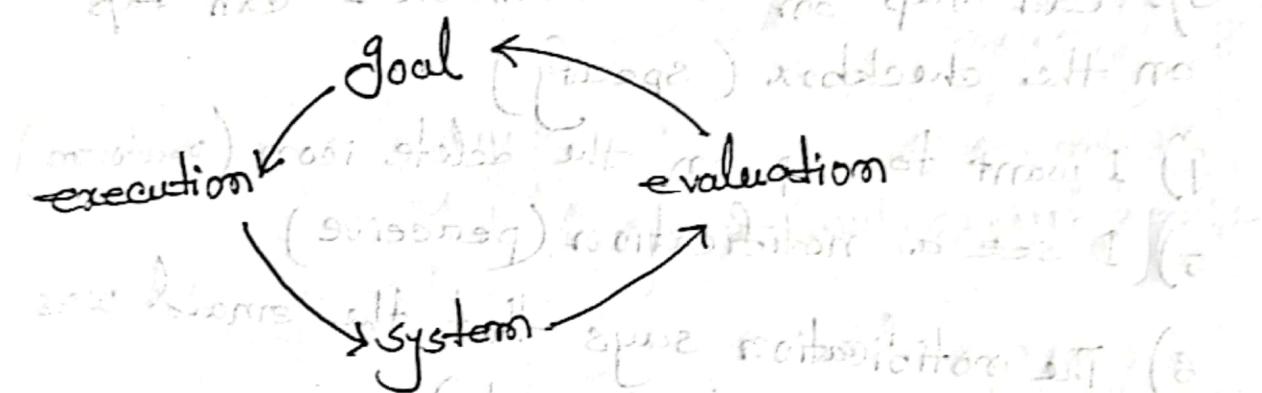
4) Executing the action

execution

Evaluation

- 5) Perceiving the system state.
- 6) Interpreting the system state.
- 7) Evaluating the system state with respect to the goals and intentions.

Execution and Evaluation Loop



- 1) goal → goal establish
- 2) Execution → 3rd stage →
 - ① formulates intention
 - ② specifies actions at interface
 - ③ executes action
- 3) evaluation → 3rd stage →
 - ① perceives system state
 - ② interprets system state
 - ③ evaluates system state with respect to goal.

Example:

- 1) I would like to get rid of the emails that I don't need. (objective/goal)
- 2) I would like to delete these emails. (Plan)
- 3) I can tap on the item, or I can tap on the checkbox (specify)
- 4) I want to tap on the delete icon (perforom)
- 5) I see a notification (perceive)
- 6) The notification says that the email was moved to trash (interpret)
- 7) The email was deleted (compare)

- * Gulf of execution is the difference between the user's formulation of the actions to reach and the actions allowed by the system
 - * Gulf of evaluation is the distance between the physical presentation of the system state and the expectation of the user.

Gulf of execution

Slip → ① Understand system and goal
② Correct formulation of action
③ incorrect action

↓
better interface design use space
(better screen design, button size)

Mistake → ① If you don't know about system, so you may not even formulate the right goal.

3.4 - Ergonomics

Ergonomics is study of psychology and system fluid constraints which is concern in HCI.

* 4 key elements in understanding human factors

1) Liveware → human

2) Hardware → tools

3) Software → more physical tools

4) Environment → situation in which the system interact.

Ergonomics always 4th case

1) Arrangement of controls and displays

2) Physical environment of interaction

3) health issue

4) use of colours

① Arrangement of controls and display: It is the set of frequently used controls which arrange logically, so user get easily read it.

Example: MS word \hookrightarrow আবর্ত Insert \rightarrow Picture, table etc
insert কর্তৃ, এবং অঙ্গাঙ্গ আবর্ত কর্তৃত
সুবিধা হবে।

② Physical environment of interaction: It is focus on standing, moving and sitting position we used app.

Example: দোন device/app use করা time-এ আবাসীয় movement
করান হচ্ছে, যেমন step counter app করা কর্তৃত হচ্ছে

③ Health issue: It include physical postures, poor arrangement of devices, back pain, eye strain etc.

Example: Excessive interaction with long time may effects issues with back pain, eye strain. এই জন্মে
অযোগ্য হতে পারে। Physical position, environmental
conditions, Lighting, Noise, keyboard mouse \rightarrow position
proper chair এবং ডিস্প্লে কর্তৃত হোল্ড।

Topic 4. Use of colour: Every colour has its own culture and identity. So, area, culture এবং বিভিন্ন রাষ্ট্রের মধ্যে কলর

select করা:

select করা:

example: Battery sever mode & Green colour

signal & green → go, different meaning

so select the করা different করা

3.5 - Interaction Style

* Interaction can be seen as dialogue between user and system.

Common interaction styles:

1) Command line interface

2) Menus

3) natural language

4) question/answers and query dialogue

5) form-fills and spread sheets

6) WIMP

7) point and click

8) 3D interfaces.

Command line interaction

Command মানে স্থানত রেখে আব কোন himto আন্তর্বে না।

Example → Unix system, Git.

Advantage → ① flexible

② Technical background এর প্রযুক্তির জন্য

③ Suitable for repetitive tasks.

④ Offers direct access to the system

functionality.

⑤ allows user initiative

⑥ Cheap

Disadvantage:

- ① low visibility
- ② requires substantial training and memorization.
- ③ not useful for inexperienced users.
- ④ poor error handling.

Natural language interface

Most attractive language for communication with computers. but difficult to understand by machine.

Example- C, C++, Java, Audio, Video call.

Advantages: ① no need to learn syntax

② easy to handle by everyone

Disadvantage: ① can not be applied generally.

② requires classification dialog

③ requires more keystrokes

④ unpredictable result

Menu style interaction

Set of options displayed on the user display

- * User based on recognition not recall, item names and icon must be carefully chosen.
- * Menu screen space (Solution - Pulldown, pop-up, cascading menus, iconic menus)

Advantages:

- ① reduce learning time & keystrokes
- ② structures decision making
- ③ easy to support error handling

Disadvantage:

- ① too many menus for complex tasks
- ② can be slow for frequent users.
- ③ consumes screen space

Question/Answer interface / Query language

Question/ Answer:

- ① information system - use ইয়ে
- ② interface language questions
- ③ আছি use করতে পারে but restricted functionality

Query language (SQL):

- (1) database রয়েছে information retrieval করতে বেশি।
use করুন তার নথিগুলো সেখানে।
- (2) Expert person হ্যাঁ use করতে পারবেন
database structure and language syntax
বুঝে (কাউন্ট করতে কুমুদ করতে আসুন) এবং

Form fills and spreadsheets interface

Form fills:

- * Primarily for data entry & query data retrieval
- * Screen like paper form
- * Data put in relevant place
- * Requires → 1) good design of form interface
 2) obvious correction facilities

- Advantages:
- (1) Simplifies data entry
 - (2) requires modest training

- Disadvantages:
- (1) consumes screen space
 - (2) context and application depends
 - (3) Uses menu style in parameter filling.

Interactivity

How user interacting with different type of interface.

① speech driven interface

→ rapidly improving (dialogue बदला प्र०)

example → airline reservation

yes/no ans फिरो राम

② look and feel.

→ icons, windows, pointers, menus

appearance + behaviour = look and feel

③ initiative

→ काज करके यहाँ तक पहुँचने के लिए उपयोग करता है।

आप computer पर इसी काज तक पहुँचने के लिए

इस्तम्य customize करते हैं।

④ Error and repair.

→ always error ignore करा याए ना solve कराए

जैसे, ग्राहन: app is not responding

Context of Interaction

Interaction affected by social and organizational context.

- ① Other people → desire to impress, competition, fear of failure.
- ② Motivation → fear, allegiance, ambition, satisfaction.
- ③ Inadequate systems → cause frustration and lack of motivation
- ④ The social and organizational factors may have an influence on the user's interaction with the system. These may not be factors over which the designer has control.

*wonders having
experience*

Experience, engagement and fun

Experience: People system for use করতে পারতু এমন আবশ্যিক system আনালেই হবে না। আনন্দ মূল system ফি যদি বাবে use করতে চাই, এমন জোড়াটা কর্তৃ বানাতে হবে। real life experience দ্রুতভাবে try করতে হবে।

যেমন- online shopping site পর কর্তৃ icon দিয়ে
real cart করতে হবে।

Designing experience: গেম লিঙ্গার্ড ও icon-এ click
করতে সুন্দর surprise cracker রূপালী। মেজন- congratulation
in facebook.

Excitement

hiddenness

suspense

surprise

Physical design:

constraint for cooker design:

- ① ergonomic → minimum button size.
- ② physical → high-voltage switches and big
- ③ legal and safety → high cooker controls from child.
- ④ Context and environment → easy to clean.
- ⑤ aesthetic → must look good.
- ⑥ economic → not cost too much.

Fluidity: physical structure and manipulation

of the device naturally relate to the logical functions it supports.

মুছন phone-এর Yes button right এবং No button left এবং মুছন

no left এবং yes right এবং মুছন

Managing value: ক্ষেত্র system বাস্তি হতে were

শুধুমাত্র যুক্তি কার্য নাও হতে আবশ্যিক both were

owner এবং

মুদ্রণ - Paid system -> cost আনা গালি

- * For an interaction 3 things are important:
 - experience, engagement, fun.

* Criteria of interface goodness testing

(1) designing experience

(2) physical engagement

(3) Managing value

Chapter - 4

Paradigms

* Why paradigms of interaction?

Objective of an interactive system → allow the user to achieve particular goals in some application domain.

Two open concern/question → to about

① How can an interactive system be developed to ensure its usability? → make user interface user-friendly

② How can the usability of an interactive system be demonstrated or measured?

→ measured by having a number of test users use the system to perform a pre-specified set of tasks, though it can also be measured by having real users in the field perform whatever tasks they are doing away.

What are paradigms?

paradigms for interaction is new computing technologies creating a new perception of the human computer interaction

P- paradigm

we can analyze systems by applying the 5W + H.

1) what / how

2) where / when

3) who / why

Details of paradigms

1. Batch Processing: The grouping together of several processing jobs to be executed one after another by a computer without any user interaction. (Interpersonal computing)

2. Time sharing: A single computer could support multiple users. (Interactive computing)

3. Networking: A computer network is a group of computers that use a set of common communication protocols over digital interconnections for the purpose of sharing resources located on or provided by network nodes.

Advantages

4. Graphical Display (VDU):

- More suitable medium than paper.
- Computer for visualizing and manipulating data.

5. Microprocessor: A controlling unit of a micro-computer, fabricated on a small chip capable of performing ALU operations and communicating with the other devices connected to it.

6. WWW: Simple, universal protocols and mark-up languages made publishing and accessing easiest way. * Critical mass of users lead to a complete transformation of our information economy.

7. Ubiquitous Computing: It is a paradigm in which the processing of information is linked with each activity or object as encountered.

[Example → জাতীয় অবস্থা technologies.]

[Paradigm Shift].

* Initial paradigm → Batch processing to pc

* Middle paradigm → ① Window System and WIMP Interface

② Metaphor

③ Direct manipulation

④ Language versus action

⑤ Hyper text

⑥ Multimodality

⑦ Computer Supported cooperative work (CSCW)

⑧ WWW

* Advance/Recent paradigm → ① Agent based

Interface

② Ubiquitous computing

initial paradigms

Video display units → More suitable medium than paper.
computers for visualization and manipulating data.

Programming toolkits → the right programming toolkit provides building blocks to producing complex interactive systems.

Personal computing → more powerful, easier to user.

Window systems and the WIMP interface → humans can pursue more than one task at a time.

* Windows used for dialogue partitioning, to "change the topic"

WIMP → Windows, icons, menus, pointers.

Metaphors: Relating computing to other real world activity is effective technique of teaching.

Example: financial analysis and spreadsheets.

problems → ① Some tasks do not fit into a given metaphor

② cultural bias.

Direct manipulation → what you see is what you get. It replaces language with action.

Language vs Action →

1) Visibility of the objects of interest.

2) Incremental action at the interface with rapid feedback on all actions.

3) Reversability of all actions, so that users are encouraged to explore without several penalties.

4) Syntactic correctness of all actions, so that every user action is a legal operation.

5) Replacement of complex command languages with actions to manipulate directly the visible object.

read Imitate

Language vs action → what people do while communicating, how they create a common reality by means of language and how communication brings about a coordination of their activities.

Hyperfext → Hypermedia and multimedia. It is a text which contains links to other texts.

advantage → 1) presents material at the appropriate level.

- 2) Tracking of readers.
- 3) Readers responses.

Disadvantage → 1) No credibility for the original author.

2) information may be unreliable.

3) Hyperfext's can present misleading information

Multimodality → a mode is a human communication channel. emphasis on simultaneous use of multiple channels for input and output.

problem → removes ~~abilities~~ of single users ~~special~~

can no longer neglect the social aspects
to erosion [of] user societies is shown [in] work
(email) ~~and~~ [with] interactions with [the] work

Agent-based interfaces → Computer programs

that provide personalized assistance to users
with their computer based tasks

Example → message / email / Number filtering
(block)
→ to prevent (e-mail) viruses

Problems with ~~not~~ ptibilities of a ~~special~~

decentralized user monitoring (e-mail)

robot control has a best possible (e-mail)

problems occur as it shows a ~~ptibility~~ of

difficult to see anomalies in e-mails. Instead
highly low ~~high~~ not elements