LAB MANUAL

SUB-HUMAN MACHINE INTERACTION (HMI)

Department: Computer Engineering

Class: BE COMPUTER

Semester: VIII

Compiled by: Mr. V. V. Parkar.

Academic Year: 2020-21

Rajendra Mane College of Engineering & Technology, Ambav

Department of Computer Engineering

Subject: Human-Machine Interaction

Class: BE COMPUTER **Semester: VIII** **Academic Year: 2020-21**

Experiment List

Sr.No	Name of the Experiment
1.	Aim: To design an interface that can teach mathematics to children of 4-5 years age.
2.	To understand the trouble of interacting with machines and redesign the interface for a washing machine.
3.	To study various technologies for typing and improve one of the existing technologies.
4.	To understand the HCI principles of good screen design by comparing websites.
5.	To understand the use and importance of menus and navigation in web pages.
6.	To realize the use and importance of statistical graphics in GUI.
7.	To understand how to choose the right screen elements.
8.	To realize the use and importance of colors in GUI designing.

Subject In-charge

Mr. V. V. Parkar

Format of Experiment

Experiment No : 1

Aim: To design an interface that can teach mathematics to children of 4-5 years age.

Theory:

i. Who are your end users? Analysis of their behaviour, for example, level of expertise,etc.
ii. What kinds of interfaces will they like and why?
iii. Existing interfaces-analysis and rating.
iv. What will be your choice of screen elements?
v. How will your interface be better than the existing ones?

Implementation: Snapshots of UI

Conclusion: Rating application based on HCI principles.

Sl. No	Principles	Poor	Average	Good	Very good	Excellent
1	*Aesthetically pleasing*					
2	*Compatibility*					
3	*Comprehensibility*					
4	*Consistency*					
5	*Control*					
6	*Efficiency*					
7	*Flexibility*					
8	*Forgiveness*					
9	*Recovery*					
10	*Responsiveness*					

Sr.No	**Details of the Experiment**
1.	Know your client – **a) Children:** **Aim**: To design an interface that can teach mathematics to children of 4-5 years age.

Theory:
i. Analysis of children behaviour e.g. their preferences, interests etc
ii. What kinds of interfaces will they like and why?
iii. Existing apps - analyze and rate them
iv. What will be your choice of screen elements?
v. How will your app be better than the existing ones?
Implementation: Code and /or Snapshots of UI
Conclusion: Rate your application based on HCI principles.

b) Mentally disabled:

Aim: To design the interface of a game for mentally disabled children.

Theory:
i. Analysis of mentally disabled e.g. their behavior, problems, interests…
ii. What kinds of interfaces will they like and why?
iii. Existing apps - analyze and rate them
iv. What will be your choice of screen elements?
v. How will your app be better than the existing ones?
Implementation: Code and Snapshots of UI
Conclusion: Rate your application based on HCI principles.

c) Teenagers:

Aim: To design a digital diary for teenagers.
Theory: A digital diary for young teens, can help them overcome various social pressures they deal with during their teens. This diary should act like a self help tool and deal with incidents like bullying, peer pressure etc.

i. Analysis of teenagers e.g. their problems, interests, needs, etc
ii. What kinds of interfaces will they like and why?
iii. Existing apps - analyze and rate them
iv. What will be your choice of screen elements?
v. How will your app be better than the existing ones?
Implementation: Code and Snapshots of UI
Conclusion: Rate your application based on HCI principles.

d) The older generation:

Aim: To design an online bill pay portal for the older generation.
Theory: Old people find it hard to learn the online payment concept and when they do, they become very sceptical to use it, as they learn of the threats too. But it will be easier for them to pay their utility bills, insurance etc online. Design a system that can help them pay their

	bills on time and educate them on safe online payments. (old people may have visual problems, slow motor skills, color identification issues, etc) i. Analysis of old people e.g. their nature, interests, needs, etc ii. What kinds of interfaces will they like and why? iii. Existing apps - analyze and rate them iv. What will be your choice of screen elements? v. How will your app be better than the existing ones? **Implementation**: Code and Snapshots of UI **Conclusion**: Rate your application based on HCI principles.
2.	**Aim:** To understand the trouble of interacting with machines and redesign the interface for a washing machine. **Theory:** Understand the trouble of interacting with machines - Redesign interfaces of home appliances like microwave oven, land-line phone, fully automatic washing machine. i. Who are your end users? Analyze their behaviour, for example, level of expertise,etc. ii. What kinds of interfaces will they like and why? iii. Existing interfaces-analyze and rate them. iv. What will be your choice of screen elements? v. How will your interface be better than the existing ones? **Implementation**:Snapshots of UI **Conclusion**: Rate your application based on HCI principles.
3.	**Aim:** To study various technologies for typing and improve one of the existing technologies. **Theory:** Understand the various input methods available for interaction – concept generation: Study the various technologies for typing – standard keyboards QWERTY, T9 (predictive text), multi-touch (SWYPE, etc.), gestures and brainstorm on the various ways in which you could improve one of the existing technologies. You could choose any of the different input types. i. Analysis of people who type, their need, skill, device used, etc. ii. Existing methods used for typing. iii. What are the problems of existing methods? iv. What can you introduce to ease out these problems? **Implementation**: Snapshots of UI **Conclusion**: Rate your application based on HCI principles.
4.	**Aim:** To understand the HCI principles of good screen design by comparing websites. **Theory:**

	Identify 3 different websites catering to one specific goal (eg. Goal – on-line shopping and 3 different websites – ebay, amazon, flipkart, zovi, myntra) and perform a competitive analysis on them to understand how each one caters to the goal, the interactions and flow of the payment system and prepare a report on the same. Other websites:music,coding and programming,educational **Implementation**: Snapshots to compare these sites. **Conclusion**: Rate your website based on HCI principles.
5.	**Aim:** To understand the use and importance of menus and navigation in web pages. **Theory:** Describe different types of menus. News websites like CNN are always cluttered with information. It takes the user a few minutes to find his way through and maybe more minutes to look for some specific information. Redesign the news website to make it look less cluttered, provide relevant information (a person sitting in Russia should not get US news as top news), intelligently dig information that he might be interested in based on his searches on the web. i. Analysis of people who read newspapers online and why they read an e-paper. ii. What kinds of interfaces will they like and why? iii. Analyze existing websites based on HCI principles; iv. How will your design be better than the existing ones? **Implementation**: Snapshots of your UI **Conclusion**: Compare your UI with existing websites based on HCI principles.
6.	**Aim:** To realize the use and importance of statistical graphics in GUI. **Theory:** Explain the term statistical graphics. Scenario: Expense tracker: Matt is a young engineer who just finished his summer internship at leading Software Company in the United States. He has never been independent in handling his own finances and after this internship his father has asked him to start managing his money on his own. He is looking for a tool/app/software that would help him budget his finances, create goals and track them, categorize and track his credit card spending and also get insights on the various types of categories he's spending on. Design a tool/app/software that would help Matt manage his personal finances given the above requirement. i. Analysis of your client-his routine, interests, requirements, etc. ii. Analyze 2-3 existing apps – analyse and rate them in short; **Implementation**: Generate charts for dummy expense data in a spreadsheet using any suitable applications like Google spreadsheet, MS Excel and like. One example of the template applications is available at Google Sheets: Free Online Spreadsheets for Personal Use with name **Monthly Budget.**

	Output : Snapshots of your UI **OR** charts prepared using any spreadsheet software. **Conclusion**: Rate your application based on HCI principles.
7.	**Aim:** a) To understand how to choose the right screen elements. OR a) To understand how to select appropriate windows. OR b) To understand how to select appropriate device based controls. **Theory:** I. Explain in short different screen elements. II. Design only a web form using suitable web technologies for student registration to an Engineering college web application. Specifically, accept the student's personal info like name, gender, DOB, mobile, email and other info like enrollment date, department, semester, previous academic details etc. **Implementation**: Snapshots of UI **Conclusion**: Rate your UI based on HCI principles.
8.	**Aim:** To realize the use and importance of colors in GUI designing. **Theory:** Explain various color models in short. For any one of the following S/W applications, 1. Your B.E. project or any other S/W with a GUI or Web UI developed by you 2. Any other S/W application including any web application provide details related to the following points - i. Analysis of the user for the application – preferences, likes, dislikes, etc. ii. What kinds of colors will they like and why? **Implementation**: Snapshots of UI **Conclusion**: Rate your application based on HCI principles.
9.	**Aim:** To understand how to design appropriate icons. **Theory:** Choose a unique domain, design a few icons and show how it can be accommodated on an interface. Form groups each dealing with a separate line of business, eg., medical, greeting cards, law, androids, etc. i. Analysis of your client – their business, customers, etc. ii. Existing icons – analyze and rate them based on the characteristics and guidelines of icon designing. iii. What will be your choice of screen elements? iv. How will your app be better than the existing ones? **Implementation**: Snapshots of UI **Conclusion**: Rate your icons based on usability.

Chart for evaluating HMI applications:

Sl. No	Principles	Poor	Average	Good	Very good	Excellent
1	*Aesthetically pleasing*					
2	*Compatibility*					
3	*Comprehensibility*					
4	*Consistency*					
5	*Control*					
6	*Efficiency*					
7	*Flexibility*					
8	*Forgiveness*					
9	*Recovery*					
10	*Responsiveness*					

Note:
1. All the applications must be designed by following the HMI guidelines.
2. Evaluation of your UI will be based on the HMI principles.
3. Any tool or technology can be used for implementation e.g., VB, DOTNET, JAVA, PHP, etc.