Designing a Human Computer Interface Systems Tasks and Techniques

M. Mayilvaganan [1], D. Kalpana devi[2]

[1] Associate Professor, Department of Computer Science, PSG College of Arts and Science, Coimbatore, Tamil Nadu, India

[2] Research Scholar (PHD), Department of Computer Science, PSG College of Arts and Science, Coimbatore, Tamil Nadu, India

E-mail- mayilvaganan.psgcas@gmail.com

Abstract— This paper focus on goal of Human computer interface system which are used to analysis a skill for human user by interacting with the system. It can be evaluate by problem solving, assessment activity, creativity and other process based on metrics in systematically. It can be used to develop an idea for software tool to evaluate the skill of human user through usability metrics.

Keywords— Interaction techniqies and task, Interaction style, Goal of Human Computer Interface, Function of User Interface, Design phase model, natural language, cognitive model

INTRODUCTION

Cognition is the act or process of knowing an intellectual process by which knowledge is gained from perception or ideas. A cognitive model have been developed for examine the development of skill levels from novice to expert. Scope of knowledge is accumulated information, problem solving schemas, performance skills, expertise, memory capacity, problem representation ability, abstraction and categorization abilities, synthesis skills, long-term concentration ability, motivation, efficiency and accuracy.

Skill levels of computer users are among the most important factors that impact their performance in performing computer-based tasks. Accomplishing a task with a minimum outlay of time and effort is essential to the skilled performance of that task. Skills are learned with practice and experience. Novice users perform tasks by recognition, i.e., they use knowledge in the world to plan and accomplish tasks, whereas skilled users use knowledge in the head to accomplish tasks.

Human Computer Interface (HCI) can be describes communication between user and the system. The major goal is to improve through interface between users and computers specifically to analyse the skill factor of the human user through systematically by the method of cognitive models.

- Designing the best possible interface with respect of
  usable metrics for evaluating the skill set in optimal way of ability of the human user.
- Implementing the methods in interface design by cognitive models.
- Evaluating and comparing interfaces.
- Developing new interaction techniques with interface.
- Developing descriptive and predictive models and theories of interaction.

INTERACTION TECHNIQUES AND TASKS

The basic interaction techniques are the ways to use input devices high-quality user interfaces are in many ways the last frontier in providing computing to a wide variety of users to enter information into the computer. The four basic interaction tasks are Position, Text, Select and Quantify.

The unit of information input in a position interaction task is of course a position. For example, a selection task can be carried out by using a mouse to select items from menu using keyboard to enter the name of the selection, presenting a function key, or using a keyboard to enter the name of the selection, presenting a function key, or using a speech recognizer. A mouse is often used for both positioning and selection.

Interaction task are different from the logical input devices. The error rate measures the number of user error for interaction. The error rate affects both speed of learning and speed of use. If it is easy to make mistakes with the system, the learning takes longer and speed of use is reduced as the user must correct any mistake.

The goal is to teach user interface designs that "serve human needs" while building feelings of competence, confidence, and satisfaction. Topics include formal models of people and interactions, collaborative design issues, psychological and philosophical design considerations, and cultural and social issues.

INTERACTION STYLES

After completion of task analysis and identification of task objects, the interface designer [7] chooses any primary interaction style.

In Direct Manipulation presents task concepts allows easy learning, allows easiness, avoid an errors, encourages exploration, affords high subjective satisfaction. The operations are invoked by actions performed on the visual representations typically using a mouse. This command is not invoked explicitly by such traditional means as menu selection or by key board; rather the commands are implicit in the action on the visual representation.

In menu selection, shorten learning, reduces keystrokes, structure of decision making, permits dialog- management tools and allows easy support of error handling. Menu selection is the interaction style in which user reads a list of items to selects the most appropriate item to his/her task and observe the effect.

In form fill-in interaction style, data entry is easy to arrange, requires modest training, it gives convenient assistance, prompting increases efficiency, permits use of form management tools, use of tools facilitates from development. The user sees the blank data entry fields that can be filled by moving cursor among the fields either required data. In form fill-in the user, an operator must know the labels of different fields, permissible data and method of data entry.

In command language style, it is flexible to use, appeal to power users, supports user initiatives and allows convenient creation of user defined macros. It provides a strong feeling of control for frequent users. In this style the user is supposed too learn the syntax for his/ her task. An example MS DOS prompt where the user's command can be executed to perform his/ her task. The major drawbacks of this interaction style are

- Error rate is typically high
- Retention may be poor
- Training is necessary
- Error messages and online assistance are difficult to provide.

In natural language, relieves burden of learning syntax, extremely desirable. It can be defined as the operation of performing tasks by computers by people using a familiar natural language to give commands and receive response.

In this interaction style the computer system is trained in such a way that it performs the user task by requiring command through human voice. The main advantage of his interaction style is that there is no need to learn command syntax or to select items from menus. The problems with natural language interaction lie not only in computer implementation but also desirability for large number of uses for a huge number of tasks.

Designing a User Interface

In HCI, design methodologies aim to create user interface that are usable with ease and efficiently operate. Designers apply rigorous and systematic user interface design techniques to develop designs for hardware and software.

The role of the interface designer is to create a software device that organizes the content and that presents the content on the screen [1]. These three areas are information design, interactive design and media design.

According from Ben Shneiderman [5], the golden rules of interface design make an interface designer's life easier and pave the way to the creation of a successful interface.

- A good interface should be able to perform the task effectively for which it is designed.
- It should be highly interactive in nature.
- It should be flexible to use. It should provide high usability.
- It should increase the speed of learning.
- It should reduce burden on user's memory.
- It should maintain consistency across applications.
- It should make inner working transparent to users.
- It should ensure that the user is always in control.
- It should provide feedback to user actions. In error's messages polite language should be used. The error messages should suggest rectification.
- The transition from beginner to an expert should be fast and smooth.
- There should be a minimal requirement of training.
- Error recovery should be easy for the user. The system should not halt on simple errors.
- The features of the application should be easy to identify. There should be online help system.

- There should be less errors and the system should be predictable.
- There should be some guidance messages to show current system status and progress of last command.
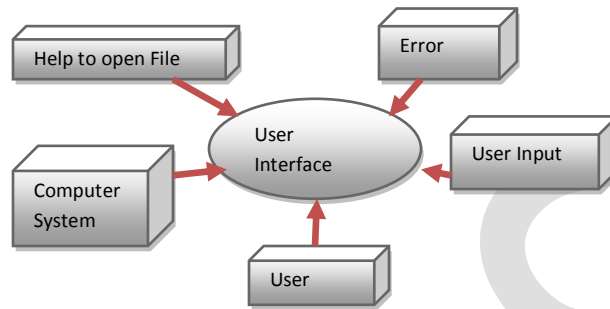
Function of User Interface

Fig: 2. Function of User Interface

Good interfaces are designed to match existing trends and to feed on the knowledge of the user [6]. Figure.2 shows the function of interface which experience in a wide variety of systems and applications suggests that the use of sophisticated computer technology in the human interface, such as computer display, control and operator aids, raises, serious issues related to the way human operate, trouble shoot and maintain the systems in respect way.

HCI DESIGN MODELS

The main discipline contributing to HCI is Ergonomics and human factor, Computer Science, Language psychology, Sociology, Ethnography, semiotic and branching, Software Engineering and design. Water fall model, Star model, Iterative design or the circular model are generally used for designing a user interfaces.
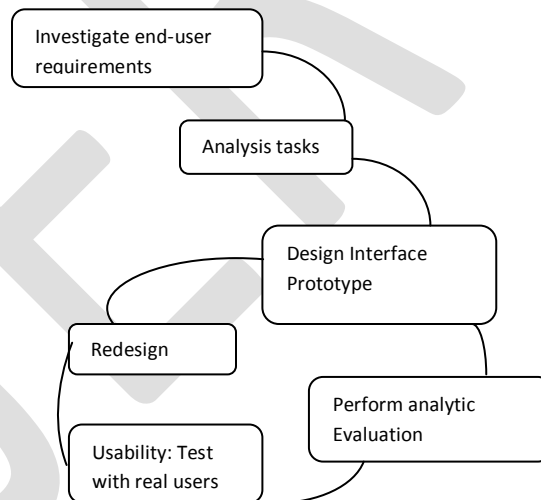

Fig.3 A system lifecycle for system interface design

Figure.3 shows the models are also used to design the entire software [9] but with some difference of phases and transition among phases. The important phases are Requirement Analysis, Task Analysis and Evaluation of prototypes, Implementation, operation and Maintenance. These are the basic model of software developing phases, which are used to develop the user interface model foe analyzing the expert of human factor.

CONCLUSION

In this paper, it can be concluded that the Human Computer Interface System is to be capable of being learned by new target of users to allow tasks to be performed with no delays of time period. Through the HCI design and model it can be determine to develop

for examine the human factor experts determines the exact task, the context and important characteristics of the user. The evaluator then mentally walkthrough the actions necessary, attempting to predict the user behavior, problems likely to be encountered and strategies used to solve the problem.

REFERENCES:

[1] B. Shneiderman and C. Plaisant, "Designing the User Interface: Strategies for Effective Human-Computer Interaction" (4th edition), Pearson/Addison-Wesley, Boston (2004).

[2] B.A. Myers, "A brief history of human-computer interaction technology", ACM interactions, 5(2), pp 44-54 (1998).

[3] J. Nielsen, Usability Engineering, Morgan Kaufman, San Francisco (1994).

[4] Card, S., Moran, T., & Newell, A. (1983). "The psychology of human–computer interaction", Hillsdale, NJ, USA: Lawrence Erlbaum.

[5] Stephen hill, "The human computer Interface",1995, Thomson learning.

[6] International Organization for Standardization [ISO]. (1999, May). Human-centered design processes for interactive systems (Standard No. 13407). Geneva, Switzerland: ISO.

[7] Mayhew, D J. (1992). Principles and guidelines in software user interface design. Englewood Cliffs, NJ, USA: Prentice Hall.

[8] Rosson, M., & Carroll, J (2002). Usability engineering: Scenario-based development of human-computer interaction. San Francisco: Morgan Kaufmann.

[9] Coronado, J., Casey, B., 2004. A multicultural approach to task analysis: capturing user requirements for a global software application. In: Diaper, D., Stanton, N.A. (Eds.), The Handbook of Task Analysis for Human-Computer Interaction. Lawrence Erlbaum Associates, pp. 179–192.

[10] Card, S. k., Moran, T. P., and Newell, A. 1983, "The Psychology of Human-Computer Interaction". Lawrence Erlbaum, Hillsdale, N.J