COLLEGE OF
COMPUTER STUDIES

QUEZON CITY
UNIVERSITY

WEEK 6-7
The User Interface

HCI101 - INTRODUCTION TO HUMAN COMPUTER INTERACTION

v2020

USER INTERFACE

- The user interface (UI) of a computer program is the part that handles the output to the display and the input from the person using the program. Designing user interfaces for interactive systems is a task that
- The user interface has been recognized as one of the most important elements of a software project. It had been estimated that 48% of work on a project goes into the design and implementation of the user interface depends, among other things, on the designer's creativity.

Efficiency of a User Interface

- There are two types of efficiency at play in a user interface. The first is the ease with which it allows a user to perform a task, as perceived by the user. Time plays only a minor role. This type of efficiency can be enhanced by providing sensible defaults, choices adapted to the user's expectations and shortcuts.
- Efficiency in a more technical sense is the time required to perform a certain action: how fast can a menu be drawn, how fast a typed sentence can be parsed.

- Clearly, efficiency is something to strive for. But there is the strange effect that computers can sometimes be too fast. At least that is sometimes claimed with the following example: slow compilers force programmers to think more about their code, resulting in fewer editcompile cycles than programmers who rely on the compiler to find errors, eventually leading to faster development.

Types of User Interface

- Paradigms, metaphors, mental models and personas are driving forces behind the user interface and design employed in a particular system. There are three commonly recognised user interfaces in use today.
- Graphical User Interface, which is possibly the most familiar to most users; the Voice User Interface, one that is rapidly being deployed in many aspects of business; and the Multi-Modal Interface, a relatively new area of research that combines several methods of user input into a system.

Graphical User Interface

- Graphical user interfaces make computing easier by separating the logical threads of computing from the presentation of those threads to the user, through visual content on the display device. This is commonly done through a window system that is controlled by an operating system's window manager.
- The WIMP (Windows, Icons, Menus, and Pointers) interface is the most common implementation of graphical user interfaces today.

Voice User Interface

- Voice User Interfaces (VUIs) use speech technology to provide people with access to information and to allow them to perform transactions.
- VUI development was driven by customer dissatisfaction with touchtone telephony interactions, the need for cheaper and more effective systems to meet customer needs, and the advancement of speech technology to the stage where it was robust and reliable enough to deliver effective interaction.

- A Voice User Interface is what a person interacts with when using a spoken language application. Auditory interfaces interact with the user purely through sound. Speech is input by the user, and speech or nonverbal audio is output by the system
- auditory interfaces provide opportunity to use non-verbal audio such as background music and earcons to create an auditory environment for the user, and thus creating a unique —sound and feel‖ for a business or application

- Aside from speech recognition systems, other speech technologies include Text-to-Speech Synthesis and Speaker Verification. Speaker Verification involves collecting a small amount of a person's voice to create a voice template, which is used to enrol a person into a system and then compare future conversation. The system can be used, for example, to replace personal identification numbers .

- Text-to-Speech technology, on the other hand, synthesises text into speech. The technology has improved significantly in recent times, and although it does not yet duplicate the quality of recorded human speech, it is still a good option for creating messages from text that cannot be predicted, such as translating web pages for blind users

- VUIs are comprised of three main elements

- Prompts, also known as system messages, are the recorded or synthesized speech played to the user during the interaction.

- Grammars are the possible responses users can make in relation to each prompt. The system cannot understand anything outside of this range of possibilities.

- Dialog logic determines the actions the system can take in user's response to a prompt.

Multi-modal User Interface

- Multi-modal interfaces attempt to address the problems associated with purely auditory and purely visual interfaces by providing a more immersive environment for human-computer interaction. A multimodal interactive system is one that relies on the use of multiple human communication channels to manipulate the computer. These communication channels translate to a computer's input and output devices.

- The value of an interface that can interpret a user's emotions has applications in fields ranging from business management, safety, and productivity, to entertainment and education. For example, if a program could recognise that the user was getting frustrated, it could modify its behaviour to compensate

- When evaluating the text-and-GUI-based Mentor System application used by students from Curtin University to assist with their assignments, Marriott [2003] found that personality conflict occurred between the system and some users. For example, one user became intensely annoyed at the beeping sound the program made, while another user found the program to be discourteous. Marriott suggests that incorporating a dynamically adjusting module into the user interface could eliminate or reduce some of these problems

Other User Interface

- Many other paradigms for human-computer interaction exist. Perhaps one of the best known paradigms is the World Wide Web. The web itself did not provide any technological breakthroughs, because all the required functionality, such as transmission protocols, hypertext and distributed file systems, already existed. The breakthrough came with the advent of the browser and HTML, which enabled easy access to information on the internet, first through academia and then through business and leisure circles

Next week

User Interface Principles

- User Interface Principles comprises mainly of User Familiarity, Consistency, Minimal Surprise, Recoverability, User Guidance and User Diversity help guide the design of user interfaces. When making user interface design decisions, the human factors are the critical factor for the design principles.

- The following principles are fundamental to the design and implementation of effective interfaces, whether for traditional GUI environment for the web [

The principle of User Profiling

- One of the main objectives of User Profiling is to create the user interfaces so as to make the work of the user easier. The interface is the key in providing the user with the ease of making use of even the most complex applications in an efficient and simplified manner. User models works on the theory of creating profile of all the possible users. As a result, a detailed description of the user's specification such as user's goal, user's skill, user's experience and user's needs, etc. can be formulated in an organized manner

The principle of Exposure

- The principle of Exposure says that the user should be aware of all the functions & functionality that is available to him via the interface. The interface is to provide an environment that should be able to concentrate and the sensory details of the environment rather than the perfection of abstraction. The interface should be designed in such a way that it is Sensible to the general population, rather than being only Intuitive.

The principle of Coherence

- There's been some argument over whether interfaces should strive to be Intuitive, or whether an Intuitive interface is even possible. However, it is certainly arguable that an interface should be coherent in other words logical, consistent and easily followed.
- Internal Consistency means that the program's behaviors make sense with respect to other parts of the program.
- External Consistency means that the program is consistent with the environment in which it runs

The principle of State Visualization

- Each change in the behavior of the program should be accompanied by a corresponding change in the appearance of the interface. One of the big criticisms of modes in interfaces is when a program that many of the class is bad example programs have modes that are visually indistinguishable from one another.

The principle of Shortcut

- The principle of Shortcut says that in order to achieve a task or to get a work done, the accessing methods should not only be abstract but concrete too. Once a user has become experienced with an application, she/he will start to build a mental model of that application. She/he will be able to predict with high accuracy what the results of any particular user gesture will be in any given context

The principle of Focus

- The principle of Focus states that some aspects of the User Interface enjoy more attention of the user than others. The user finds same attributes and aspects of the user interface more attractive as compared to others. The human mind is a highly non-linear and has a perfect coordination with the eyes. Thus our eyes are more observant towards animated areas rather than the static are in an application.

The principle of Help

- There are five basic types of Help: Goal-Oriented, Descriptive, Procedural, Interpretive and Navigational [47]. A help browser or tool tips can be useful in responding to questions related to procedural help, but these can sometimes be more efficiently addresses using cue card', interactive guides, or wizards which guide the user through the process step –by-step.

The principle of Safety

- The principle of Safety states that the interface should develop confidence amongst the user by providing them a feeling of safety. The User Interface should ensure that the novice user should not feel him at risk while accessing the program: i.e. he should not feel unsafe while navigating, accessing or a doing a task. A certain level of comfort should be provided to the user, in almost all the situation.

The Principle of Context

- The principle of Context states that the user's activity should be limited to a well defined context unless significant reason is there to support his freedom to access more.
- Each user action takes place within a given context the current document, the current selection, the current dialog box.

The principle of User Testing

- The principle of User Testing states that the inevitable defects in the design of the user interface should be spotted. Generally, it is the fundamental defects in a user interface that the designer of the interface can spot. There are however various kinds of defects that are not easy to spot. The testing of user interface is actually the process of testing of the interface using actual end users.

Human Factors Based User Interface Design

- Before designers start designing of user interface they need information about the target users. These factors can be very important in other development activities, primarily in analysis and design, as many early design decisions are based on these specifications. Considering human factors early in the development process goes a long way toward improving quality of the system.

- Specifying details about users and contexts is important as designers should become familiar with users' psychological characteristics(for example ,cognitive abilities, motivation), level of experience, domain and task characteristics, cultural background, as well as their physical attributes (for example, age, vision and hearing)

The End.