

The background features a dark blue gradient with faint, light blue circular patterns and a scale. The scale is a large arc on the left side, with numbers ranging from 140 to 260 in increments of 10. There are also several smaller circles and dashed lines scattered across the background.

# CIS 421 INTERACTION DESIGN

**ABDULLAH BIN KASEM BHUIYAN**

**CHAPTER 2**

**UNDERSTANDING AND CONCEPTUALIZING INTERACTION**

# UNDERSTANDING THE PROBLEM SPACE

- What do you want to create?
- What are your assumptions?
- Will it achieve what you hope it will?

# A FRAMEWORK FOR ANALYSING THE PROBLEM SPACE

- Are there problems with an existing product?
- Why do you think there are problems?
- Why do you think your proposed ideas might overcome these ?
- How would you see people using it with their current way of doing things?
- How do you think your proposed design ideas support, change, or extend current ways of doing things?

# FROM PROBLEM SPACE TO DESIGN SPACE

- Having a good understanding of the problem space can help inform the design space
  - e.g. what kind of interface, behavior, functionality to provide
- But before deciding upon these it is important to develop a conceptual model

# CONCEPTUAL MODEL

- Need to first think about how the system will appear to users (i.e. how they will understand it)
- A conceptual model is a high level description of:
  - “the proposed system in terms of a set of integrated ideas and concepts about what it should do, behave and look like, that will be understandable by the users in the manner intended”

## FIRST STEPS IN FORMULATING A CONCEPTUAL MODEL

- What will the users be doing when carrying out their tasks?
- How will the system support these?
- What kind of interface metaphor, if any, will be appropriate?
- What kinds of interaction modes and styles to use?

Always keep in mind when making design decisions how the user will understand the underlying conceptual model

# VARIOUS CONCEPTUAL MODELS

There are many ways to classify conceptual models. We are going to classify them based on-

- Activities and objects, and
- Interface metaphors

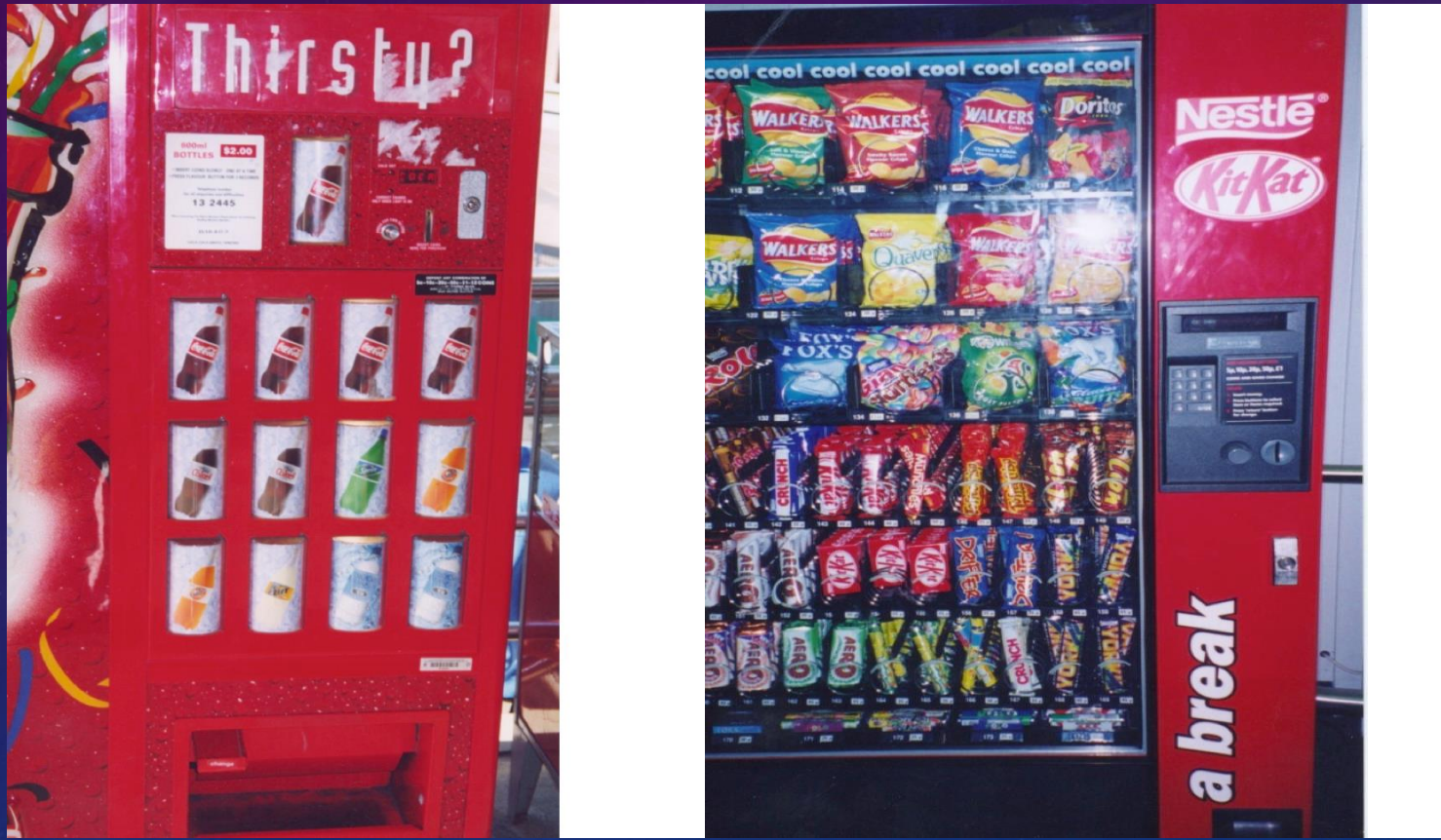
# CONCEPTUAL MODELS BASED ON ACTIVITIES

- **Giving instructions**
  - issuing commands using keyboard and function keys and selecting options via menus
- **Conversing**
  - interacting with the system as if having a conversation
- **Manipulating and navigating**
  - acting on objects and interacting with virtual objects
- **Exploring and browsing**
  - finding out and learning things

# 1. INSTRUCTING

- Where users instruct a system and tell it what to do
  - e.g. tell the time, print a file, save a file
- Very common conceptual model, underlying a diversity of devices and systems
  - e.g. word processors, VCRs, vending machines
- Main benefit is that instructing supports quick and efficient interaction
  - good for repetitive kinds of actions performed on multiple objects

# WHICH IS EASIEST AND WHY?



## 2. CONVERSING

- Underlying model of having a conversation with another human
- Range from simple voice recognition menu-driven systems to more complex ‘natural language’ dialogs
- Examples include timetables, search engines, advice-giving systems, help systems
- Also virtual agents, toys and pet robots designed to converse with you

# PROS AND CONS OF CONVERSATIONAL MODEL

- Allows users, especially novices and technophobes, to interact with the system in a way that is familiar
  - makes them feel comfortable, at ease and less scared
- Misunderstandings can arise when the system does not know how to parse what the user says
  - e.g. child types into a search engine, that uses natural language the question: “How many legs does a centipede have?” and the system responds:

### 3. MANIPULATING

- Involves dragging, selecting, opening, closing and zooming actions on virtual objects
- Exploit' s users' knowledge of how they move and manipulate in the physical world
- Can involve actions using physical controllers (e.g. Wii) or air gestures (e.g. Kinect) to control the movements of an on screen avatar
- Tagged physical objects (e.g. balls) that are manipulated in a physical world result in physical/digital events (e.g. animation)

# DIRECT MANIPULATION

- Shneiderman (1983) coined the term DM, came from his fascination with computer games at the time
  - Continuous representation of objects and actions of interest
  - Physical actions and button pressing instead of issuing commands with complex syntax
  - Rapid reversible actions with immediate feedback on object of interest

# WHY ARE DM INTERFACES SO ENJOYABLE?

- Novices can learn the basic functionality quickly
- Experienced users can work extremely rapidly to carry out a wide range of tasks, even defining new functions
- Intermittent users can retain operational concepts over time
- Error messages rarely needed
- Users can immediately see if their actions are furthering their goals and if not do something else
- Users experience less anxiety
- Users gain confidence and mastery and feel in control

# WHAT ARE THE DISADVANTAGES WITH DM?

- Some people take the metaphor of direct manipulation too literally
- Not all tasks can be described by objects and not all actions can be done directly
- Some tasks are better achieved through delegating
  - e.g. spell checking
- Can become screen space ‘gobblers’
- Moving a mouse around the screen can be slower than pressing function keys to do same actions

## 4. EXPLORING

- Involves users moving through virtual or physical environments
- Physical environments with embedded sensor technologies

# METAPHOR

- A metaphor is a mapping process from a familiar object to an unfamiliar object, and it provides the framework to familiarize an unknown concept through a mapping process

\*The role of a metaphor in HCI is to facilitate developing, maintaining, and learning the conceptual foundation of the interactive design as well as orienting the user with it

# INTERFACE METAPHORS

- An **interface metaphor** is a set of user interface visuals, actions and procedures that exploit specific knowledge that users already have of other domains.
- The purpose of the interface metaphor is to give the user instantaneous knowledge about how to interact with the user interface.

# CLASS ACTIVITY

Describe the components of the conceptual model underlying most online shopping websites, e.g.

- Shopping cart
- Proceeding to check-out
- 1-click
- Gift wrapping
- Cash till?

# STUDENT ACTIVITY

Identify and justify the components of the conceptual model underlying.....

- Social Media Website
- Education portal
- Online blog

# BENEFITS OF INTERFACE METAPHORS

- Makes learning new systems easier
- Helps users understand the underlying conceptual model
- Can be very innovative and enable the realm of computers and their applications to be made more accessible to a greater diversity of users

# PROBLEMS WITH INTERFACE METAPHORS

- Break conventional and cultural rules
  - e.g. recycle bin placed on desktop
- Can constrain designers in the way they conceptualize a problem space.
- Conflict with design principles.
- Forces users to only understand the system in terms of the metaphor
- Limits designers' imagination in coming up with new conceptual models

# CONCEPTUAL MODELS: FROM INTERACTION MODE TO STYLE

- Interaction type:
  - what the user is doing when interacting with a system, e.g. instructing, talking, browsing or other
- Interface type:
  - the kind of interface used to support the mode, e.g. speech, menu-based, gesture

# MANY KINDS OF INTERACTION STYLES AVAILABLE...

- Command
- Speech
- Data-entry
- Form fill-in
- Query
- Graphical
- Web
- Pen
- Augmented reality
- Gesture



# WHICH INTERACTION TYPE TO CHOOSE?

- Need to determine requirements and user needs
- Take budget and other constraints into account
- Also will depend on suitability of technology for activity being supported
- This is covered in course when designing conceptual models

# SUMMARY

- Important to have a good understanding of the problem space
- Fundamental aspect of interaction design is to develop a conceptual model
- Interaction modes and interface metaphors provide a structure for thinking about which kind of conceptual model to develop
- Interaction styles are specific kinds of interfaces that are instantiated as part of the conceptual model
- Interaction paradigms can also be used to inform the design of the conceptual model

END OF CHAPTER 2

**Any Question?**