Interaction styles

- We now discuss the tools and artifacts needed to create exciting, stimulating, and usable interaction styles to enhance user experiences
- Computers originally were controlled mostly by keyboard and mouse.
- As computing advanced, more direct (or “natural”) pointing and gesture interfaces emerged as well as the desire to “talk” to the interface using speech.

- Direct manipulation Interfaces

- The three principles and attributes of direct manipulation

- 1. Continuous representations of the objects and actions of interest with meaningful visual metaphors
- 2. Physical actions or presses of labeled interface objects (i.e., buttons) instead of complex syntax
- 3. Rapid, incremental, reversible actions whose effects on the objects of interest are visible immediately

- Using these three principles, it is possible to design systems that have these beneficial attributes:
- Novices can learn basic functionality quickly, usually through a demonstration by a more experienced user.
- Experts can work rapidly to carry out a wide range of tasks, even defining new functions and features.
- Knowledgeable intermittent users can retain operational concepts.
- Error messages are rarely needed.
- Users can immediately see whether their actions are furthering their goals, and if the actions are counterproductive, they can simply change the direction of their activity.
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- Users experience less anxiety because the interface is comprehensible and because actions can be reversed easily.
- Users gain a sense of confidence and mastery because they are the initiators of action, they feel in control, and they can predict the interface's responses

- Translational distances with direct manipulation

- The effectiveness and reality of the direct-manipulation interface are based on the validity and strength of the metaphor chosen tonrepresent the actions and objects.
- Using familiar metaphors creates easier learning conditions for users and lessens the number of mistakes and incorrect actions.
- Adequate testing is needed to validate the metaphor.
- Special attention needs to be paid to the user characteristics such as age, reading level, educational background, prior experiences, and any physical disabilities.

- ***Weak* direct manipulation** is basic direct manipulation.
- There is a mouse, trackpad, joystick, or similar device translating the user's physical action into action in the virtual space using some mapping function.
- The translational difference is large because interaction is completely indirect.
- For example, the user moves the mouse on a 2-D desk within a small circumscribed region and the mouse moves on the screen (again 2-D).
- The mapping function is not always fully understood and processed correctly by the user, sometimes the user will actually run the mouse off the surface of the desk.
- Weak direct manipulation was used with early game controllers that provided buttons and joysticks

- **Medium** direct manipulation is the next step moving along the continuum.
- The translational distance is reduced. Instead of communicating with the virtual space with the device, the user reaches out and touches, moves, and grabs the entities in the onscreen representation.
- Examples of this include touchscreens (mobile, kiosk, and desktop). This is still limited by the glass of the screen; the world is beyond the glass.
- **Strong** direct manipulation involves actions such as gesture recognition with various body parts. It may be the user's hand, foot, head, or full body (whatever controls the action) that is "virtually" placed inside the physical space.
- The users can see their hand in the 3-D space and can grasp, throw, drop,

- **I*mmersive* direct manipulation**. direct manipulation is combined with virtual reality The users put on glasses or some other device and they are inside the space.
- The users can see themselves and can walk/fly through the space by walking, leaning in, and so forth—the scenery changes with the moves

- Advantages and disadvantages of direct manipulation

- *Advantages*
- Visually presents task concepts
- Allows easy learning
- Allows easy retention
- Allows errors to be avoided
- Encourages exploration
- Affords high subjective satisfaction
- *Disadvantages*
- May be hard to program
- Accessibility requires special attention

- **Reading assignment : Section 7.4, 7.5 and 7.6**