GRAPHIC INTERFACES & IXD

Definitions and resources

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Sensor Variable Font: *Semantic interfaces through variable fonts*

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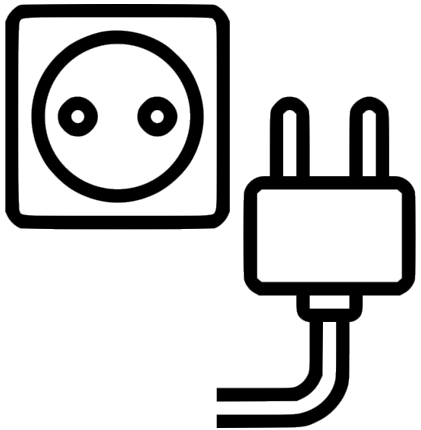
What is an interface?

Contact surface

In the field of computing is used to name the **functional connection** between two systems to enable the **exchange of information.**

- **User** interfaces (person-device)
    - hardware (keyboard)
    - software (OS)
- **Physical** interfaces (USB)
- **Logical** interfaces (API)



User interface

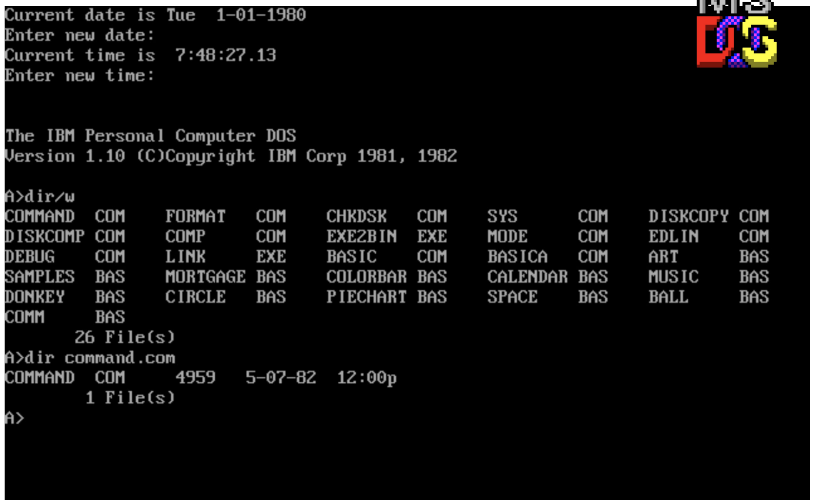
The user interface is the **means** by which the user can communicate with a device and comprises all **points of contact** between the two.

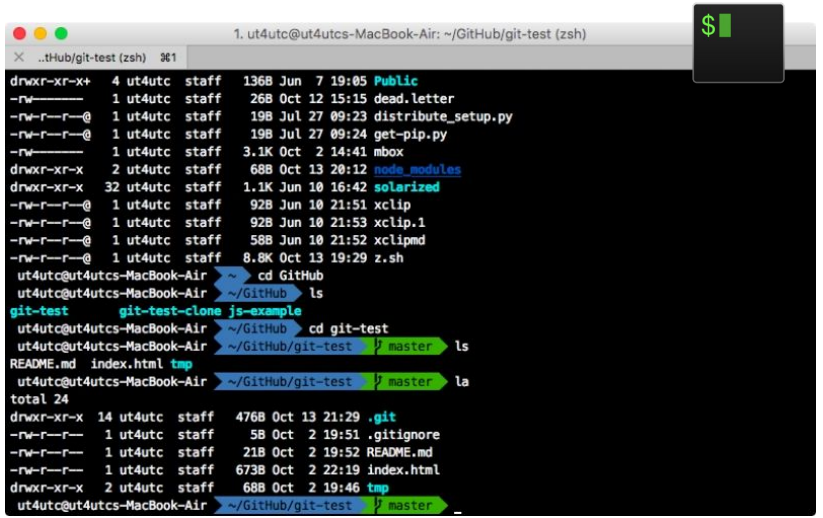
If we look at how the user can interact with an interface, we have several types, which correspond to the evolution over time of user interfaces.

CLI

Command Line Interface

Also known as **alphanumeric** interfaces or **command interpreters**. Allows users to give **instructions** to a computer program through a simple line of text.





CLI

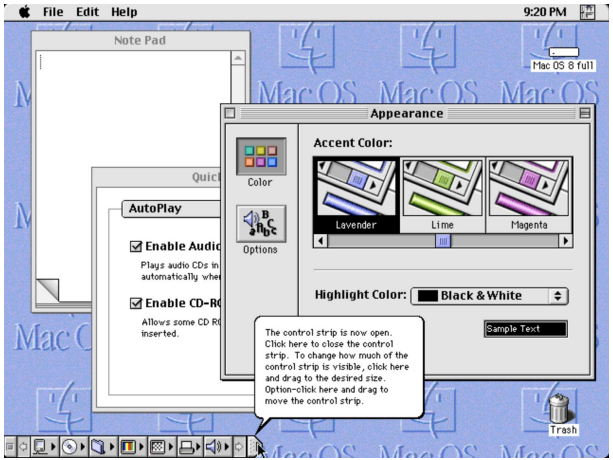
Command Line Interface

The most commonly used hardware interface for CLI is **keyboards**.

GUI

Graphic User Interface

They are the interfaces we refer to when we say UI. Graphic interfaces use a set of images and **graphical metaphors** to represent available information and actions. They allow **faster and more intuitive communication**.



GUI

Graphic User Interface

The most commonly used hardware interface for GUIs is the **mouse**.

Douglas Engelbart, early '60s

Apple. Mouse evolution

NUI

Natural User Interface

This type of interface allows users to interact **without using command systems or input devices**.
It makes use of **gestural movements** of the body, or voice.

NUI

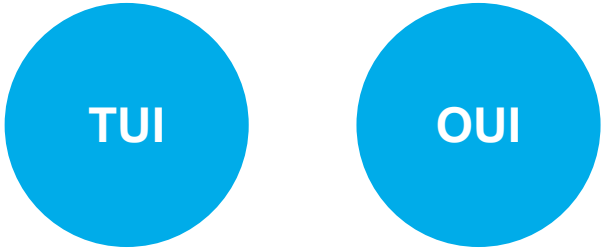
Bill Buxton, head researcher at Microsoft, says that NUIs "**exploit the skills** we have acquired throughout our entire existence, **minimizing cognitive load** and therefore distraction. He also states that NUIs should always be designed with the c**ontext of use** in mind.

Joshua Blake has created a list of **4 rules to design NUIs**:

- **Instant experience**. A NUI should take advantage of the existing skills and knowledge of the users.
- **Progressive learning**. A NUI should have a clear learning path and allow both novice and expert users to interact in a natural way.
- **Direct Interaction**. The interaction with a NUI must be direct and adapted to the context of the user.
- **Cognitive load**. Whenever possible, priority should be given to the use of innate skills and simple user skills.

Concepts related to NUI

As far as the NUIs are concerned, there are some related concepts in the current literature that are worth stopping at.



TUI

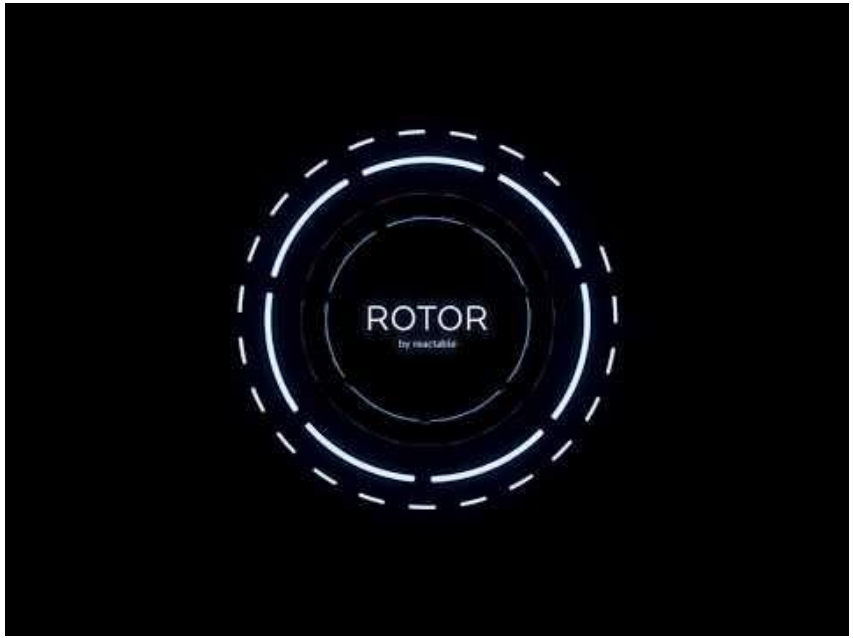
Tangible User Interface

Tangible user interfaces are based on the use of **physical objects** that integrate a technology capable of generating a **digital representation**, becoming a significant resource for the development of **phygital** implementations (which unites the two characteristics: physical and digital). TUIs are based on three concepts:

- **Interactivity through physical contact**
- Practicality for use in **everyday environments**
- Ease of use in **collaborative environments**

TUI

Tangible User Interface



https://reactable.com/

OUI

Organic user interface

They are defined as **non-flat screen** user interfaces, i.e. interfaces with **multiple or flexible screens**. The term "Organic" derives from organic architecture, and refers to the adoption of a **natural way of designing** following the guidelines of "the ecological".

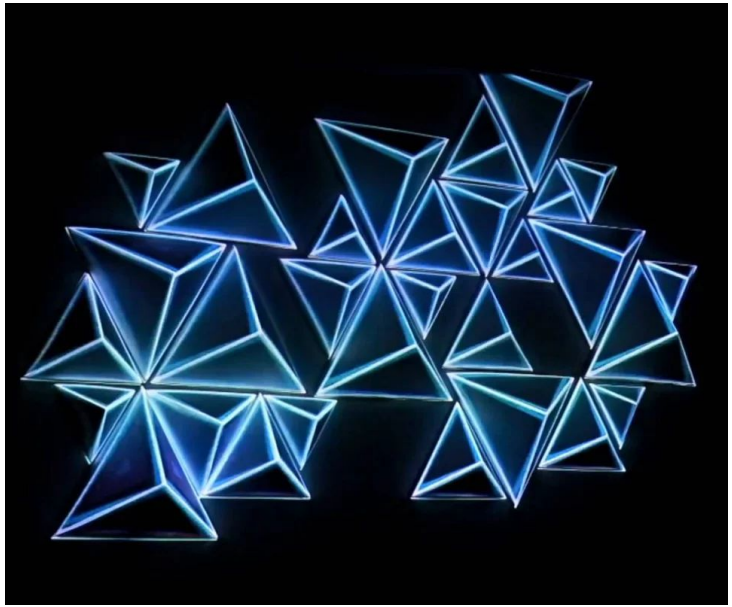
According to Vertegaal and Poupyrev, there are 3 general types of OUIs:

- **Flexible** or **deformable** interfaces
- **Shaped** interfaces (not-flat)
- **Driven** or **kinetic** interfaces

OUI

Examples

OLED technology



video/projection mapping

Interaction Design

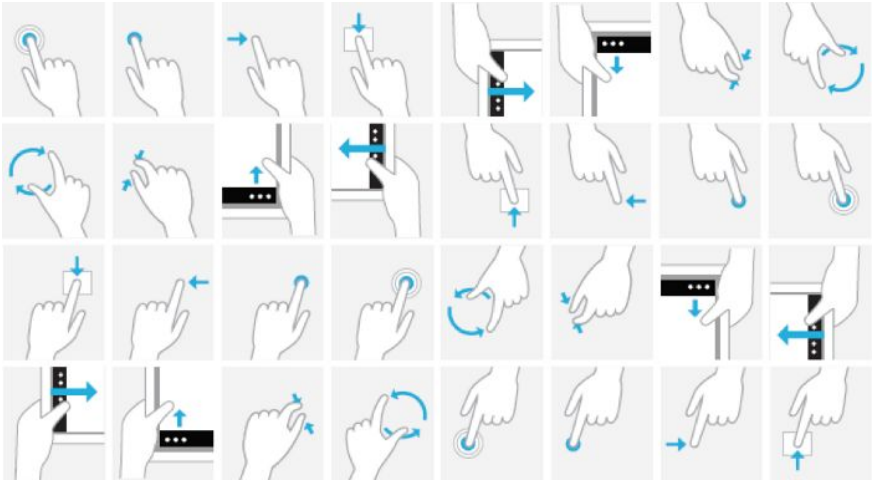
According to the Interaction Design Association (IxDA):

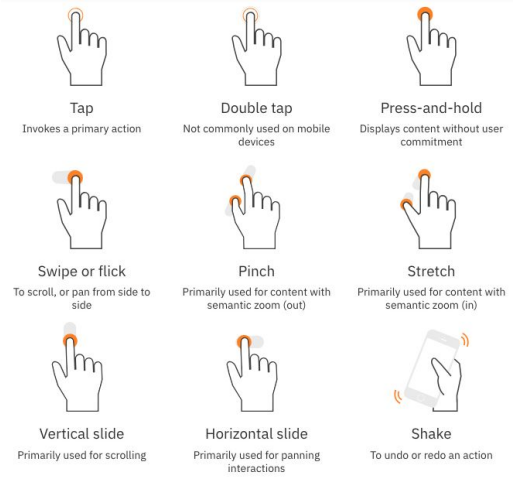
"Interaction Design defines the **structure** and **behavior** of interactive systems. The work of interaction designers focuses on creating **meaningful relationships** between people and the products/services they use, whether they are computers, mobile devices, or other emerging devices, such as those related to the Internet of Things (IoT)."

Design interactions

1. Do define how to interact

Establish if there is **hardware** in the interface with which the user must interact. Or, for example, if it is a mobile app, it will be necessary to define which **gestures** cause which results. Another example could be **keyboard commands** for advanced users





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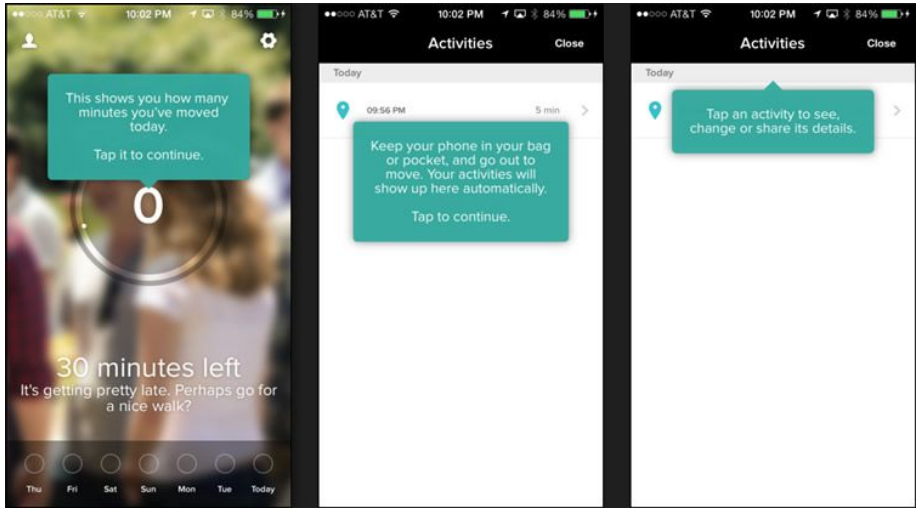
Design interactions

2. Do give clues about behavior

A button should look like a button, so it's important that its appearance, shape, or size show that it can be clicked. The same applies to all other circumstances surrounding the button, including tooltips, warnings, or labeling.



Design interactions

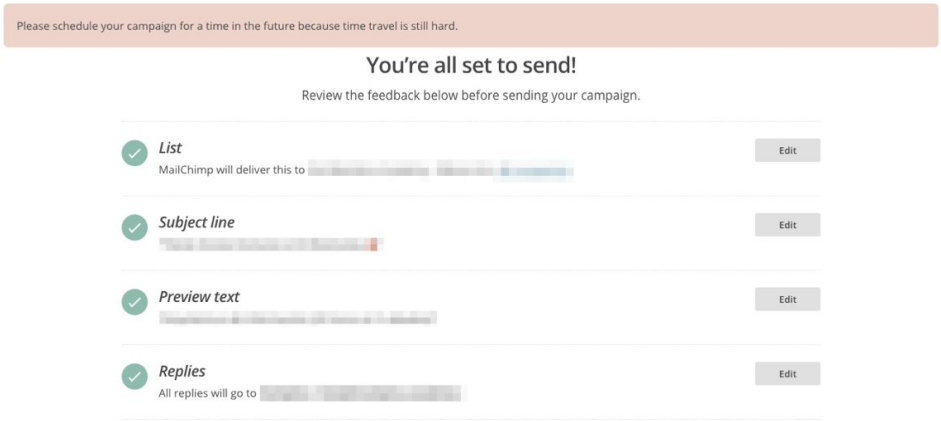
3. Do anticipate errors

We must **anticipate errors** and design so that users can **prevent** them or **recover** from them. A good example are the forms: among other things we must indicate to the user if he must fill all the fields and mark as optional those that can be skipped, as well as validate each field to know if it has been filled well or not. Also indicate how the user could recover from an error.

Design interactions

4. User feedback

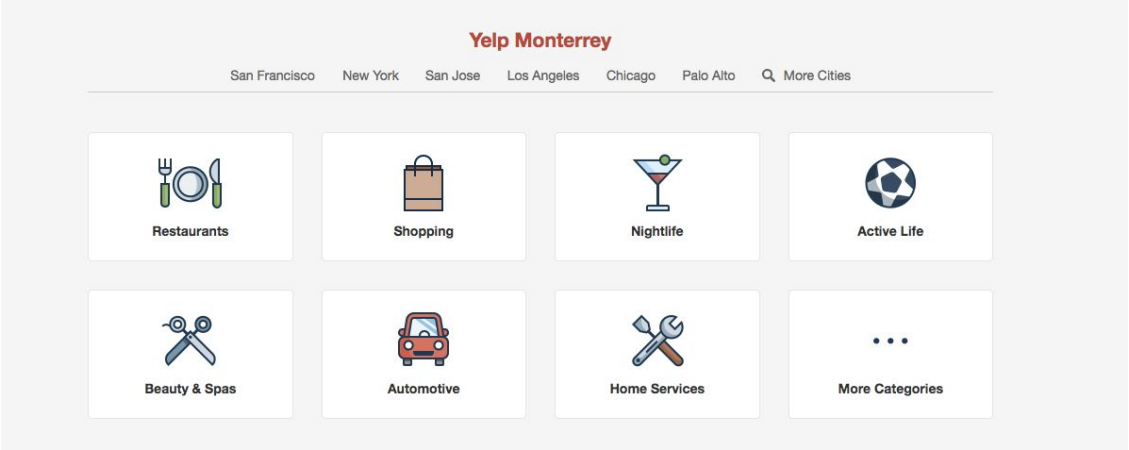
When the user **executes an action**, the **system must respond** by letting him know if it was **effective or not**. Otherwise you will not have information about the state of the system and this can lead to a loss of information or other undesirable scenarios.



Design interactions

6. Do simplify as much as you can

Another law, in this case the **Hicks Law** is going to help us with simplification. This law says: "**The time it takes to make a decision increases as the number of alternatives increases**. It helps users with their decision-making by simplifying the interface.



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Thank you very much for your attention