

# Human Computer Interaction

Dr. Ayman Ezzat

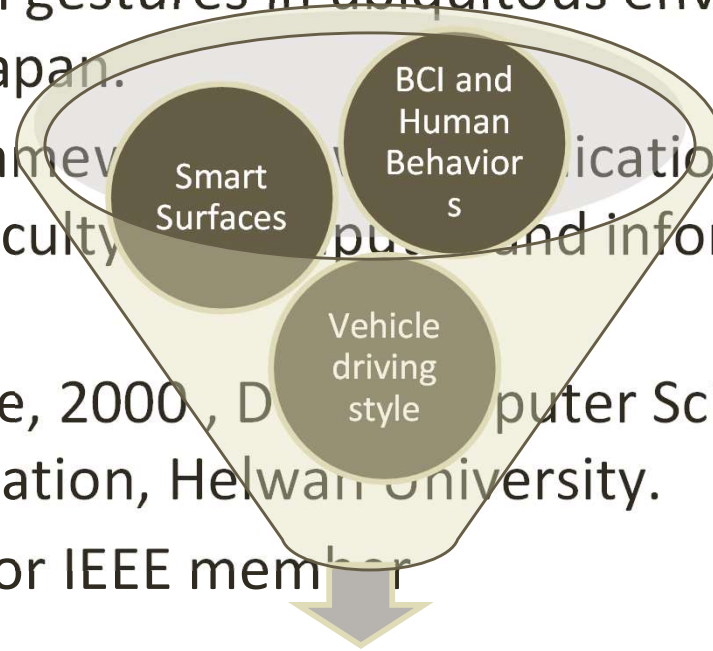
Spring 2024

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# Biography

- Phd, “Interaction with gestures in ubiquitous environments” ,2011, Tsukuba University, Japan.
- Msc.,”Building OO Frameworks for Applications”, 2004, Dep. Computer Sceince, Faculty of Computer and information, Helwan University.
- Bsc. Computer Science, 2000 , Dep. Computer Science, Faculty of Computer and information, Helwan University.
- ACM SIGCHI and Senior IEEE member



## Human Computer Interaction

Journal

Conference

15

15

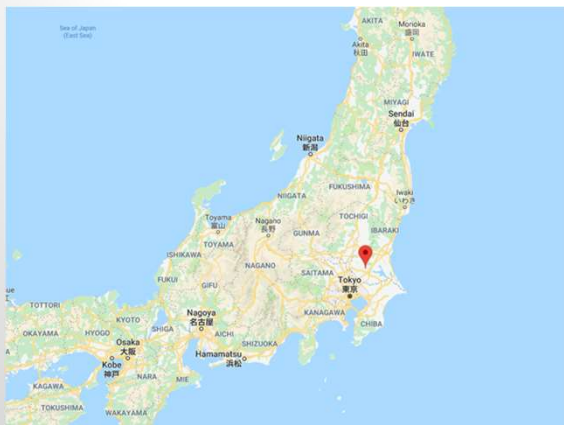


Ayman Atia

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Verified email at fci.helwan.edu.eg - [Homepage](#)  
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| <input type="checkbox"/> | TITLE                                                                                                                                                                                     | CITED BY | YE AR |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------|
| <input type="checkbox"/> | Brain computer interfacing: Applications and challenges<br>SN Abdulkader, A Atia, MSM Mostafa<br>Egyptian Informatics Journal 16 (2), 213-230                                             | 145      | 2013  |
| <input type="checkbox"/> | Interaction with tilting gestures in ubiquitous environments<br>A Atia<br>International Journal Of UbiComp 1 (3), 1-13                                                                    | 17       | 2010  |
| <input type="checkbox"/> | Recognizing driving behavior and road anomaly using smartphone sensors<br>AH Ali, A Atia, MSM Mostafa<br>International Journal of Ambient Computing and Intelligence (IJACI) 8 (3), 22-37 | 12       | 2017  |



# Topics

- Overview of ID / HCI
- PACT Framework for Designing Interactive Systems
- Human Cognition
- Interaction Devices and Interaction Types
- Design Principles and the overall Design Process
- Conceptual and Physical Design
- Interaction paradigms
- Evaluating Interactive Systems

# Why Usability is Important

**UI**



**UX**



# Interactive Designers

- Their goal is to design interactive systems that are enjoyable to use, that do useful things and that enhance the lives of the people that use them.
- They want their interactive systems to be accessible, usable and engaging.
- In order to achieve this they believe that the design of such systems should be human-centred.
- That is, designers need to put people rather than technology at the center of their design process.

# Past PC

- Not considering users who used the PC
- Systems developed by programmers who used computers for  
even
- Des

Welcome to DOSBox v0.74-3

For a short introduction for new users type: **INTRO**  
For supported shell commands type: **HELP**

To adjust the emulated CPU speed, use **ctrl-F11** and **ctrl-F12**.  
To activate the keymapper **ctrl-F1**.  
For more information read the **README** file in the DOSBox directory.

**HAVE FUN!**  
The DOSBox Team <http://www.dosbox.com>

Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>mount e e:\  
Drive E is mounted as local directory e:\

Z:\>e:  
E:\>\_

AB CDEFGH  
= I G! F3

Speed scroll - Account Balance  
Including Quic

Forgetting  
have not h

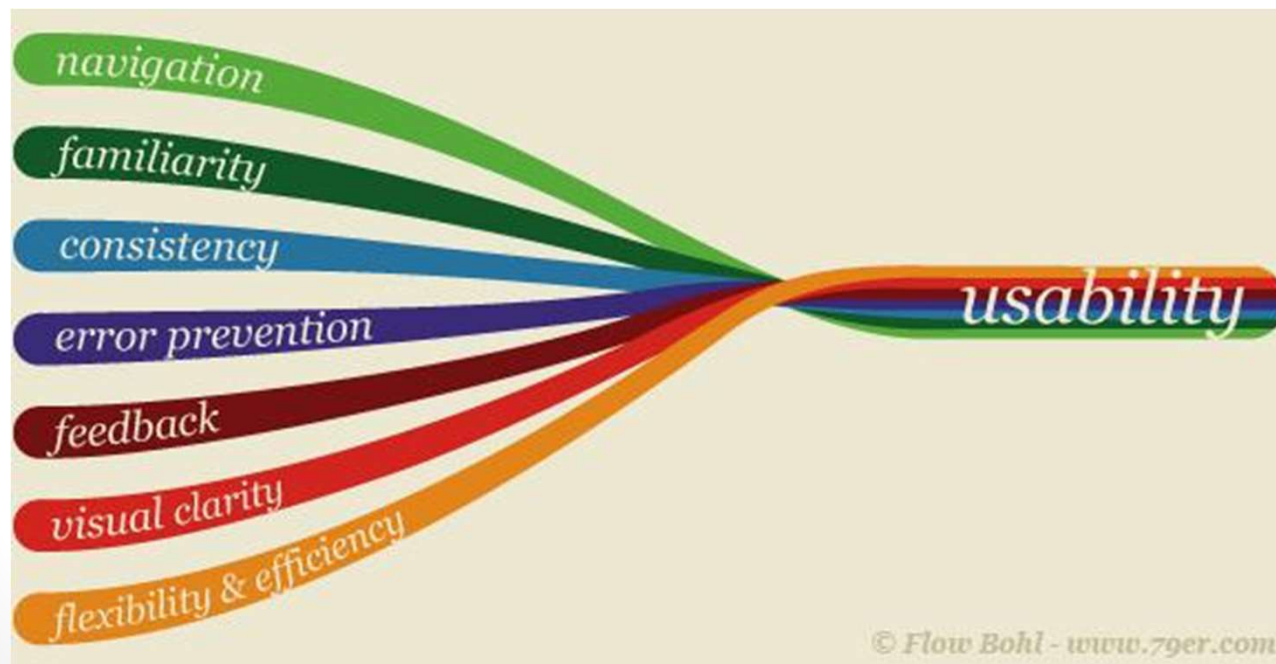
# Now PC

- Web and mobile dramatically changed the age of HCI
  - E-commerce
  - E-Guiding
  - E-Learning
  - E.....
- Before the immediacy of e-commerce, usability problems were only discovered after purchase.
- If you bought a nice looking MP3 player and brought it home only to find it was difficult to use, you could not take it back!
- The shop would say that it delivers its functions, all you had to do was to learn how to operate it properly. (read the manual)



# Web usability

- Customers look to **usability**
- If the system is hard to use, or if they do not understand it, they will go somewhere else to make their purchase.
- People are learning that systems do not have to be hard to use and are becoming more critical about the design of other products, such as their MP3 players too.



# Bad designs <http://www.baddesigns.com/>

**www.ARNGREN.net** (Fra 07.11.2004) [2294854](#) [Index](#)

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 Motorsykkel-Mini  
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 Rakett-Fly  
 RC-Produkter  
 Robot-Hund  
 Robot-Stevner  
 Roboter  
 Solcelle-Ryggesak  
 Star Wars  
 Sykkel-PC  
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 Traktor (elektrisk)  
 TV-Ur & Armbr. Ur  
 Walkie Talk

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**Always Two There Are**

Whether you select the [widescreen collector's edition](#) or the [standard edition](#) of *Star Wars: Episode I, The Phantom Menace*, the Force will be with you. And choose your [battle games](#) and [action figures](#) wisely in our [Star Wars Store](#).

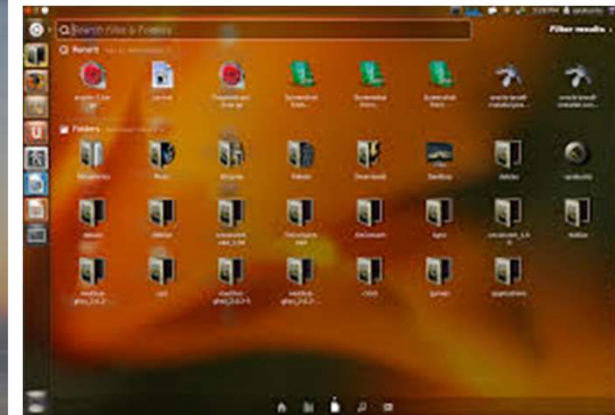
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- Popular *Star Wars* Books

# Interactive systems

- Mac OS
- The iPod is an information appliance designed and optimized for a limited set of functions.
- The **AIBO** is a programmable product for fun and Companionship.
- Some interactive systems are concerned with helping people cooperate and create communities.

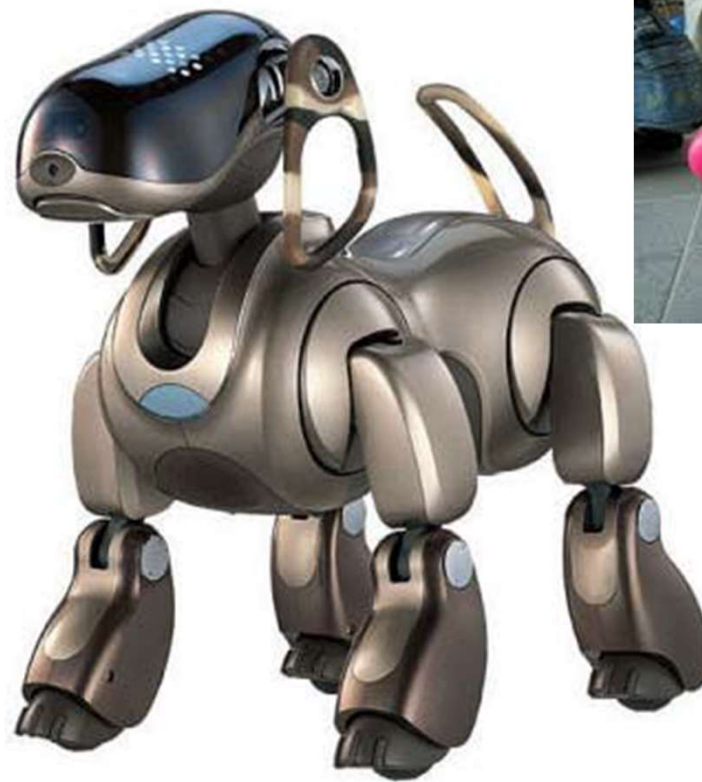
# Mac OS – Ubuntu and Win 10



# Modern mp3 players

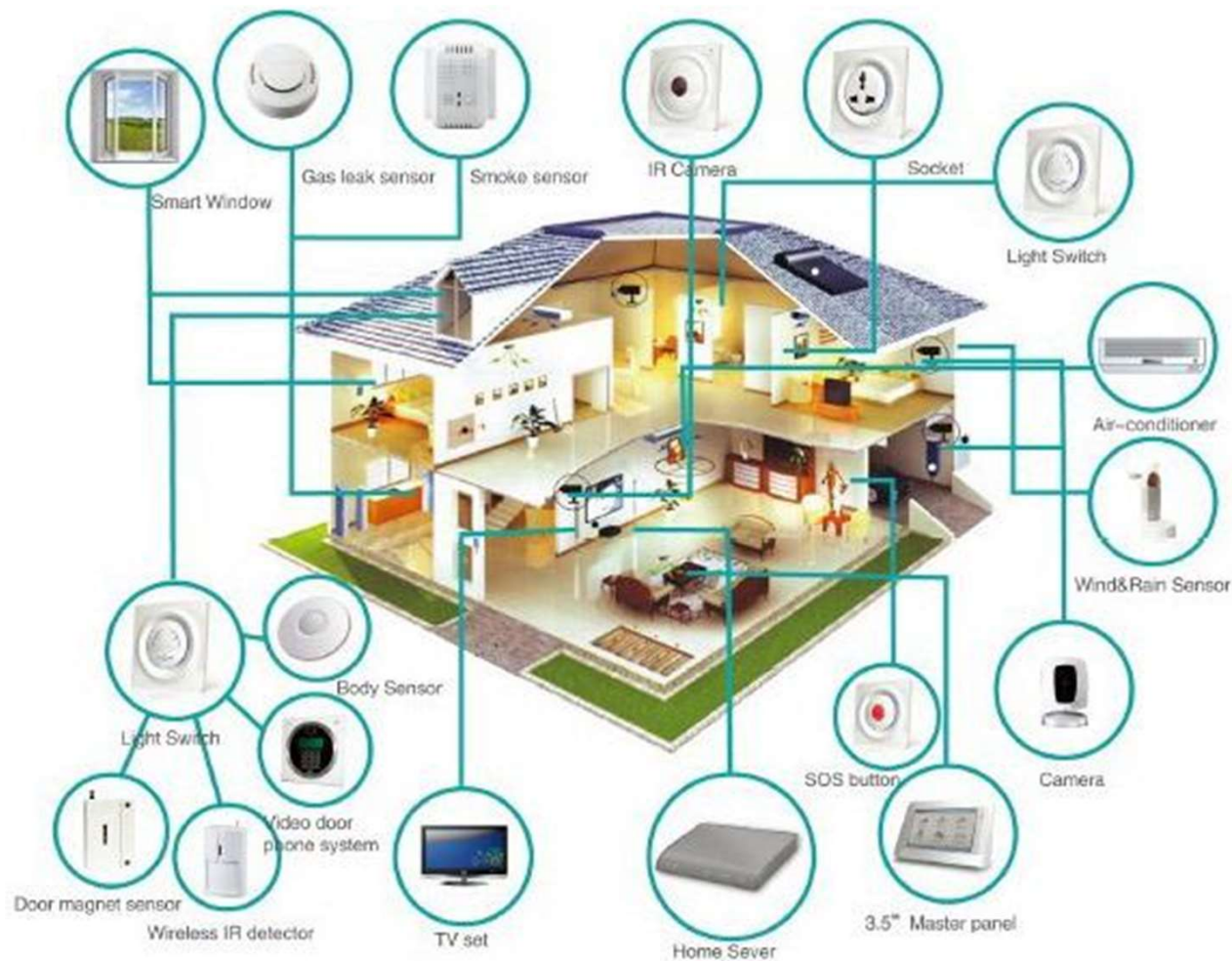


# Sony AIBO





# Smart Home



# Elements of Interactive Systems

- **Technologies** - what can technology do? What content does something have?
- **People** - who will use it, who will be affected by it?
- **Activities** and **contexts** - what will people have to do in what circumstances?



# Design

- The creative process of specifying something new and
- The representations that are produced along the way
  - e.g site map, blueprints, sketches, etc.
- It typically involves much iteration –
  - both problem and solution evolve during design
- Our materials are **interactive systems**... we work within and shape this medium
  - Such as cameras, phones, web sites, DVDs, computer applications... any device or system that is *interactive*

# Interactive Systems

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# User Interface

- All those parts of the system we come into contact with...
- **Physically** we might interact with a device by pressing buttons or moving levers and the interactive device might respond by providing feedback through the pressure of the button or lever.
- **Perceptually** the device displays things on a screen, or makes noises which we can see and hear.
- **Conceptually** we interact with a device by trying to work out what it does and what we should be doing. The device provides messages and other displays which are designed to help us do this.

# Input / Output

- Input
  - – some methods are needed to enter commands (tell the system what we want it to do)
  - – We also need to be able to navigate through the commands and the content of the system
  - – We need to enter data or other content into the system
- Output
  - – So the system can tell us what is happening - provide feedback
  - – So the system can display the content to us.

# Designing interactive system

- .... is more than just designing the user interface .... is more than designing the input, output and content
- It is about designing the whole human-computer interaction
- It is about designing the human-human interaction that is often enabled *through* devices
- It is about designing whole **environments** of interlinked **devices** and **objects**
  - – Think of designing museum exhibits, or an amusement park
  - – Or an airport, a hotel lobby or a shopping mall

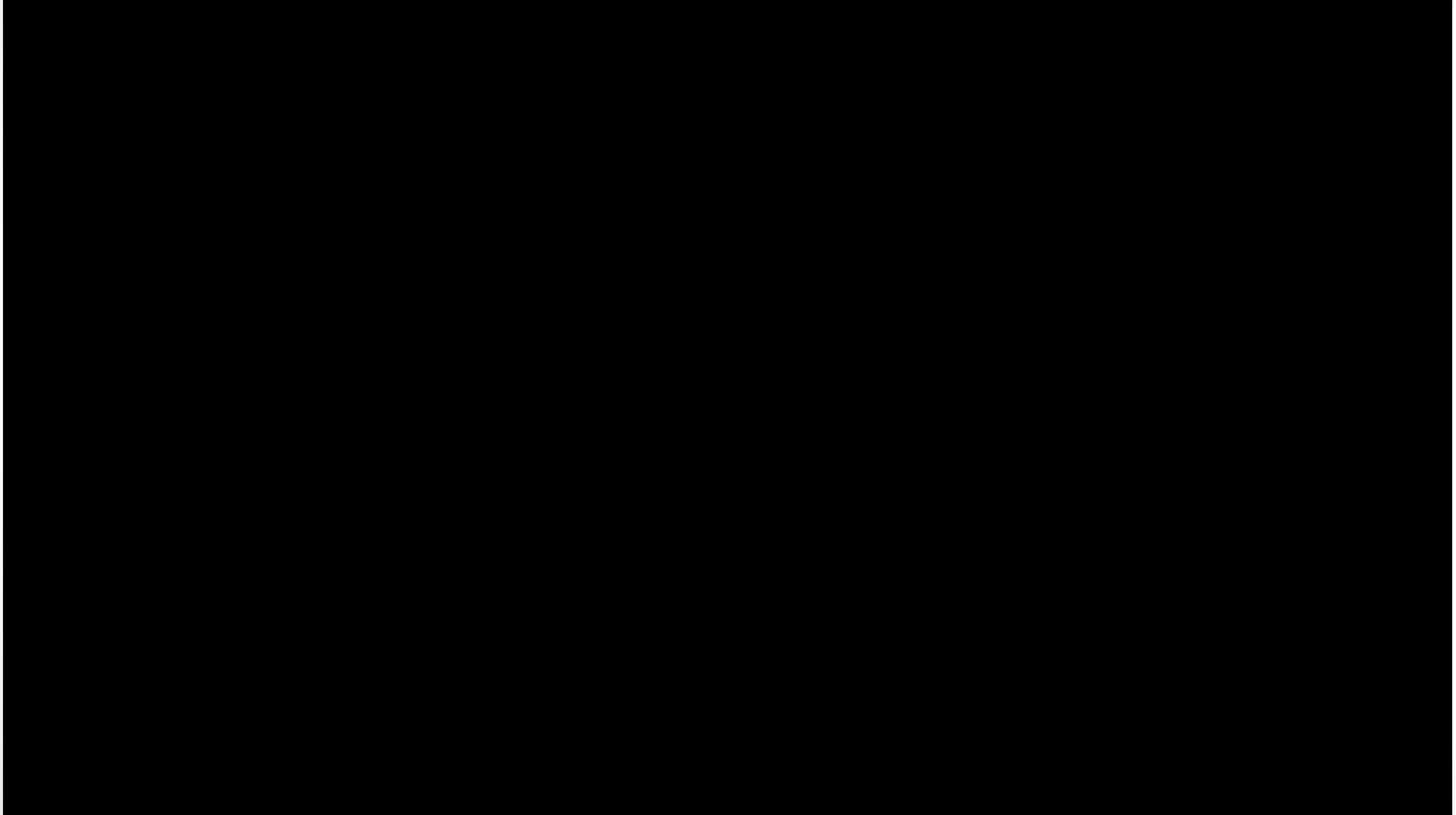




# Exercise

- Divide into groups of .....
- Each group select (Museum, Airport, Restaurant)
- Please answer the following questions
  - What is the problem faced for each system
  - What idea can help to solve the problems mentioned
  - What technologies you will use
  - Do you think this parameters will be included
    - Time to do activity
    - Personality of the one using your system
    - Emotions of the person
    - Education level

# Interactive Museum



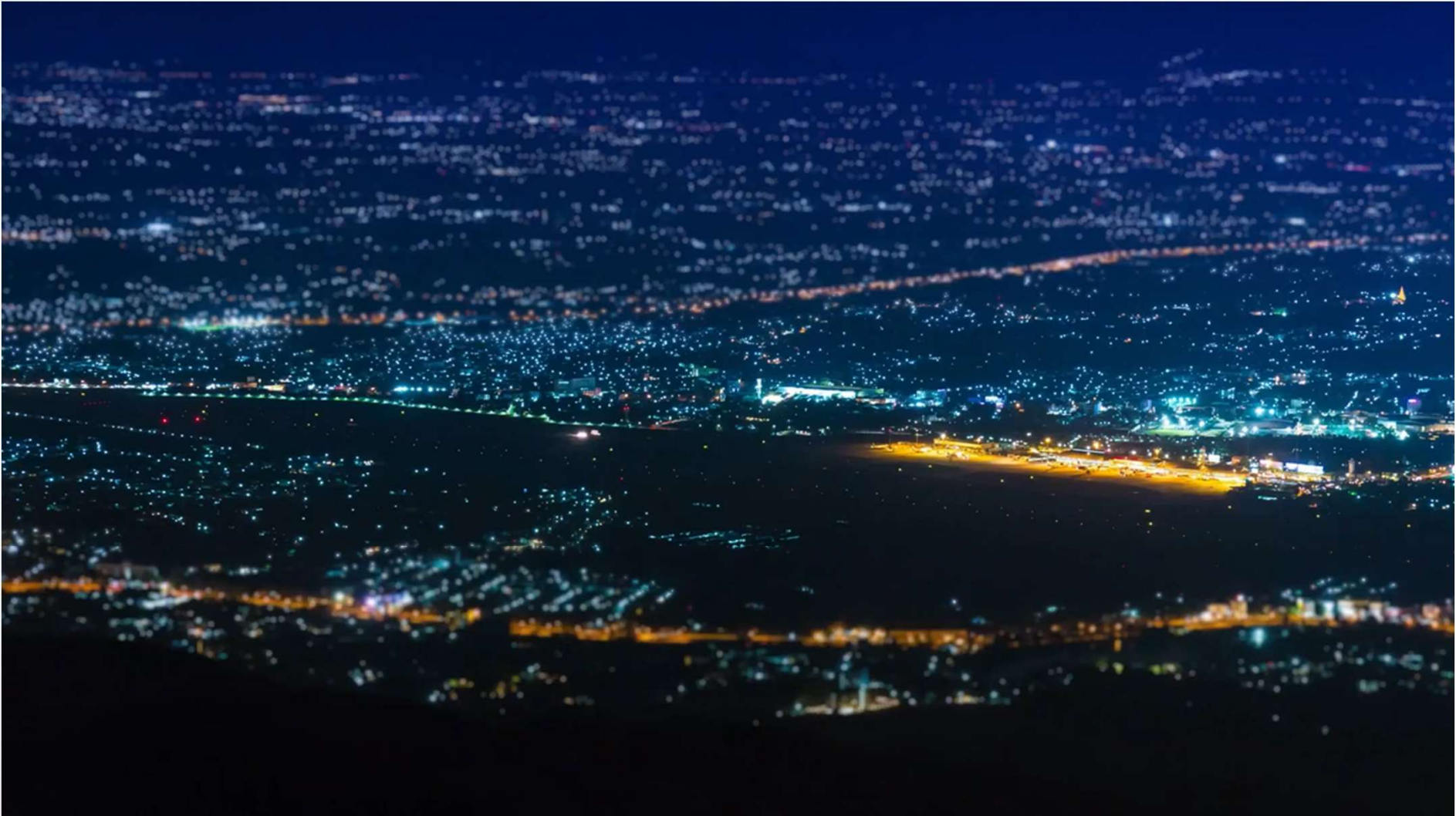
# Interactive Museum 2



# Inamo Restaurant



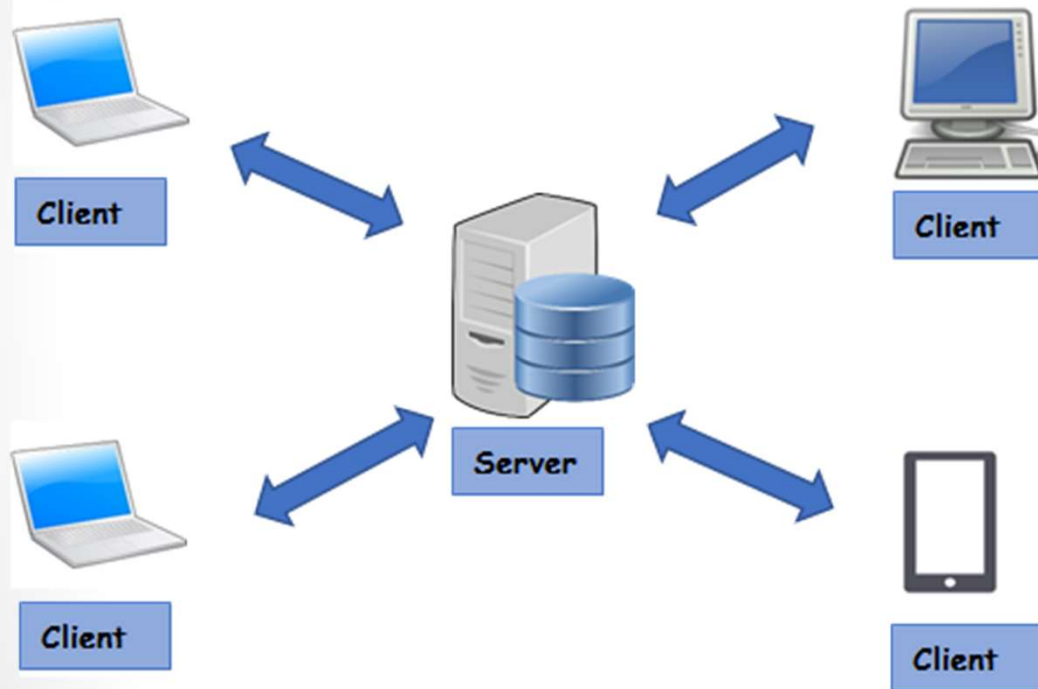
# Smart Air-Port



# Being Human Centered

- We take a human-centred approach to designing interactive systems. That means...
- thinking about what people want to do rather than just what the technology can do
- designing new ways to connect people with people
- involving people in the design process
- designing for diversity

# Moving from computer center arch. To human center arch.



# Some History for HCI

- 1950s - computers invented
- 1960s - first screen and mouse developed
- 1970s - business start to take up computers seriously.

First internet created

- 1980s - Arrival of microchip and micro-computers
- 1984 - Apple Macintosh (Xerox Star). Games consoles arrive. First conferences on HCI
- 1990s - World Wide Web arrives
- ... and so on to Ubiquitous Computing



Mark Weiser 1999

# What is Ubiquitous Computing (ubicomp)

- **Ubicomp** is a post-desktop model of human computer interaction in which information processing has been thoroughly integrated into everyday objects and activities.
- Integrate computers seamlessly into the world
  - invisible, everywhere computing.
  - Often called **pervasive/invisible computing**.
- Computers are mostly not invisible , they dominate interaction with them.
- *Ubicomp* is about making computers invisible.

<http://cs.calstatela.edu/wiki/images/c/c8/Ubiquitouscomputing.ppt>

Ubiquitous computing = mobile computing + intelligent environment.

### **Technology View**

- Computers everywhere – embedded into fridges, washing machines, door locks, cars, furniture.
- Intelligent environment.
- Mobile portable computing devices
- Wireless communication – seamless mobile/fixed.

### **User View**

- Invisible – implicit interaction with your environment.
- Augmenting human abilities in context of tasks

# Early work

Tabs:

- very small – smart badge with user info, calendar, diary, etc.
- allow personalized settings to follow a user
- Carried around by a person
- Hundreds in a room
  - Remote controllers
  - Badges
  - Tags / Labels (RFID)
  - Locating system (tags as library catalogs)
  - Animate static physical objects (active calendar, a



105mm X 73mm X 24mm  
215g

# PADs

- Foot-scale Ubicomp devices
  - A sheet of paper / tablet PC.
  - Portable computers but not laptop metaphor
- Tens in a room
  - Like scrap papers that can be grabbed with a unique ID.

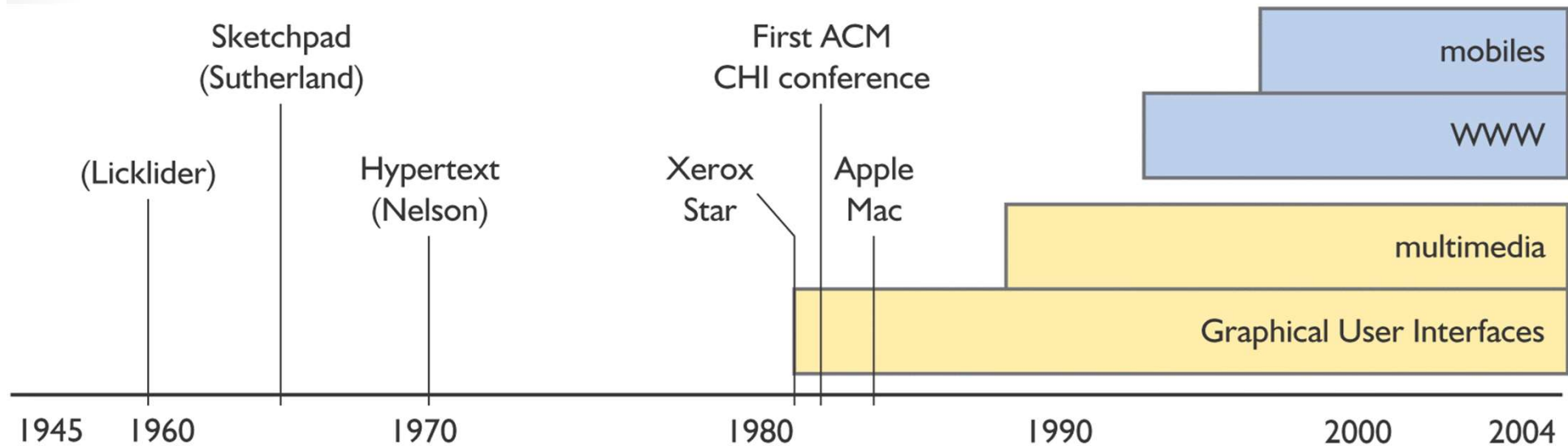


# Boards and large display

- larger display – whiteboard size.
- Personalized electronic bulletin boards.
- Multiple pens.
- Meeting capture.
- Lots of bandwidth available because they're plugged into the wall
- White board with e-chalk
  - Shared white board with remote participants.
- Video screen.
- Electronic Bookcases

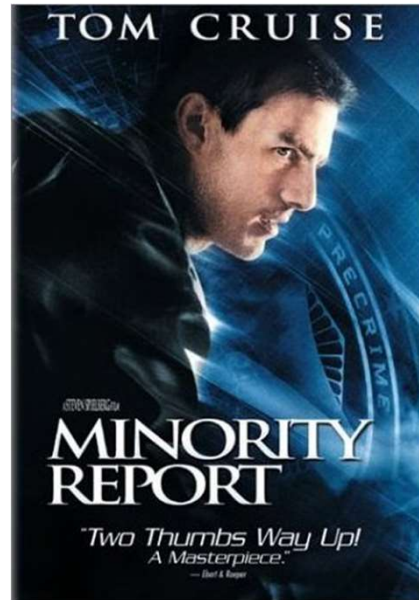


# Interactive system time line



# Where are we headed 1/2?

- Science and Drama

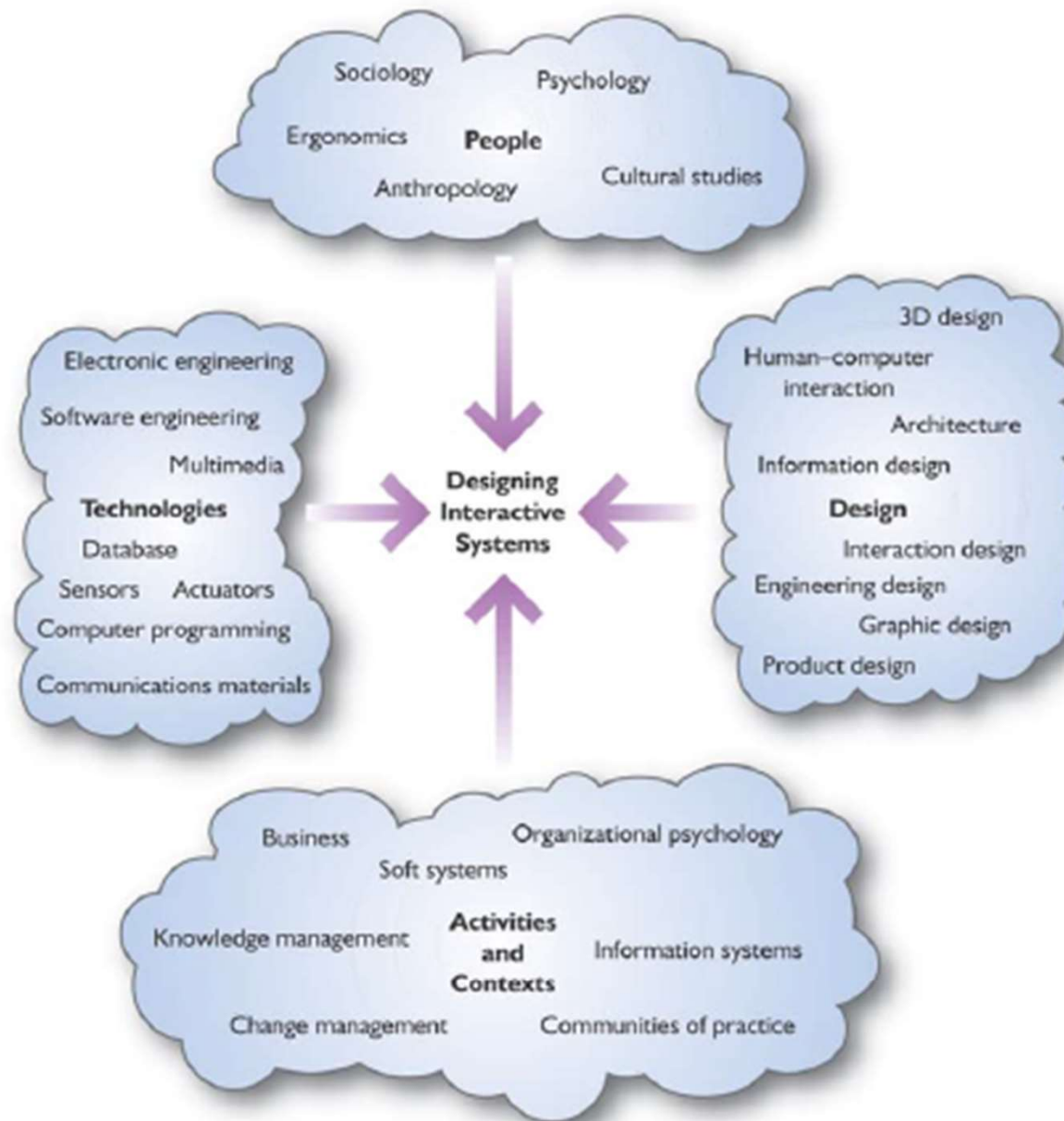


# Where are we headed 2/2

- Everyday things requiring everyday skills to use
- With a clear, focused function
- Provide peer-to-peer interaction
- And have a direct user interface - physical interaction
- Support the idea of 'closure' - completing a task
- Allow you to do things on impulse
- Are personalizable and portable

# The Skills of the Interactive Systems Designer

- **Knowing about people**
  - – Sociology, anthropology, psychology, culture
- **Knowing about technologies**
  - – Software, communications, materials, database, etc.
- **Knowing about activities and contexts**
  - – Communities of practice, information systems, organizations, knowledge management
- **Knowing about design**
  - – Fashion, interior, information design, architecture, product design



Disciplines contributing to interactive systems design

# Human Computer Interaction



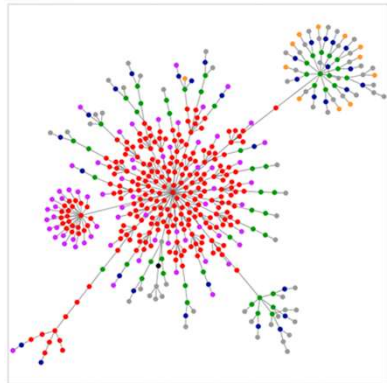
Large display screen



Smart surfaces



Head mounted/small displays



Visualization



BCI



Intuitive interfaces



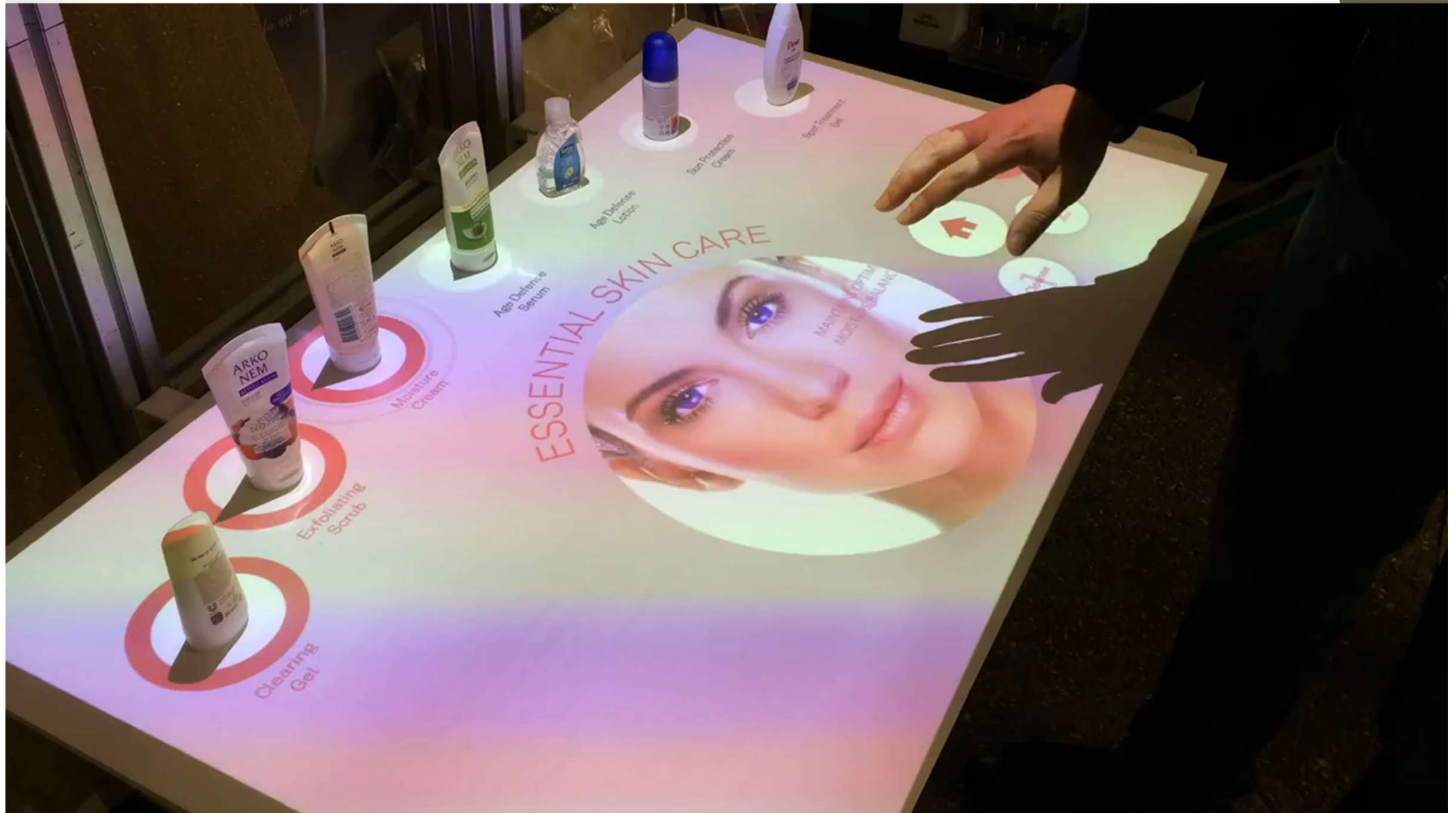
Augmented reality



TUI

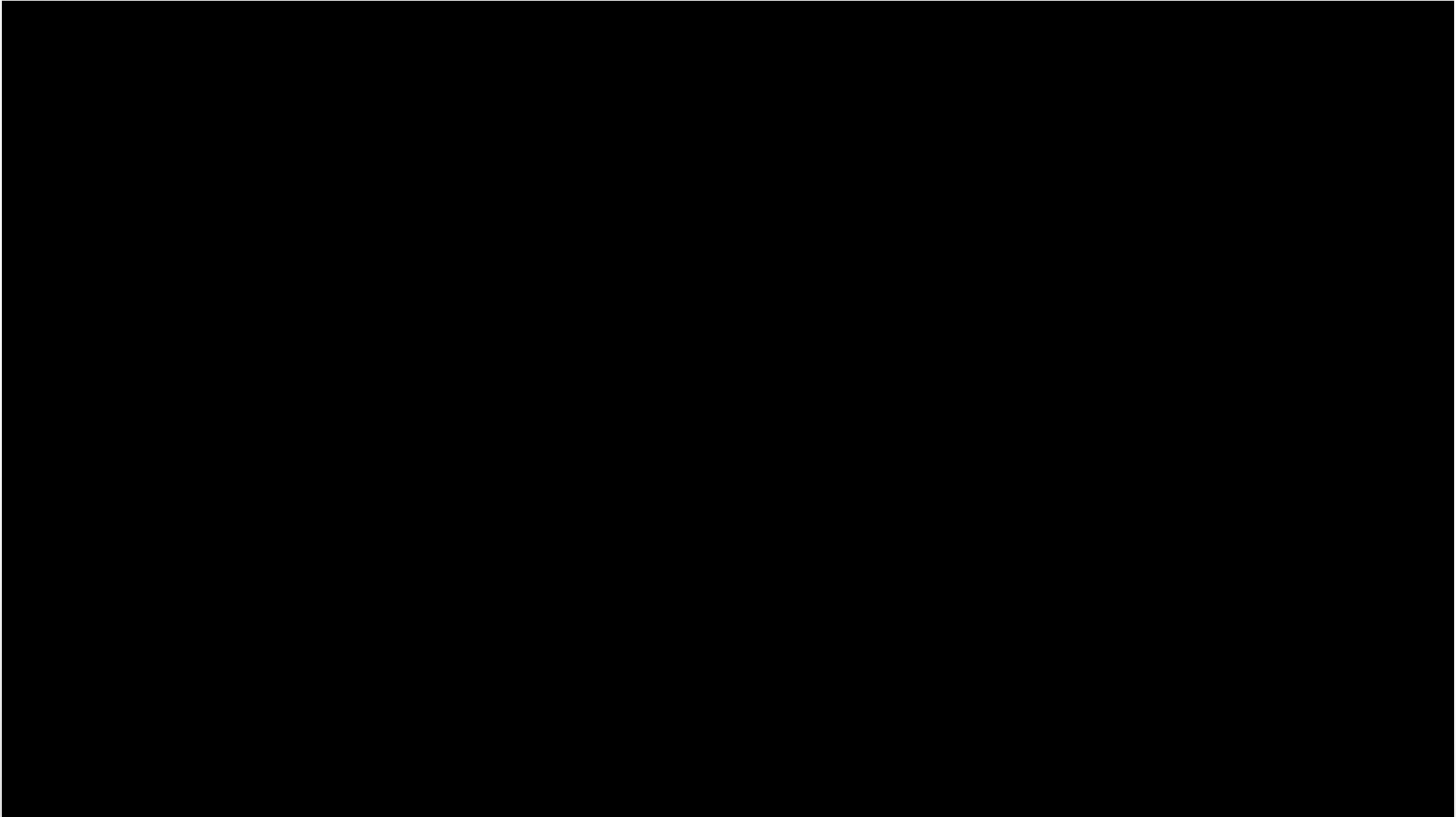
Die display

# Smart Surfaces

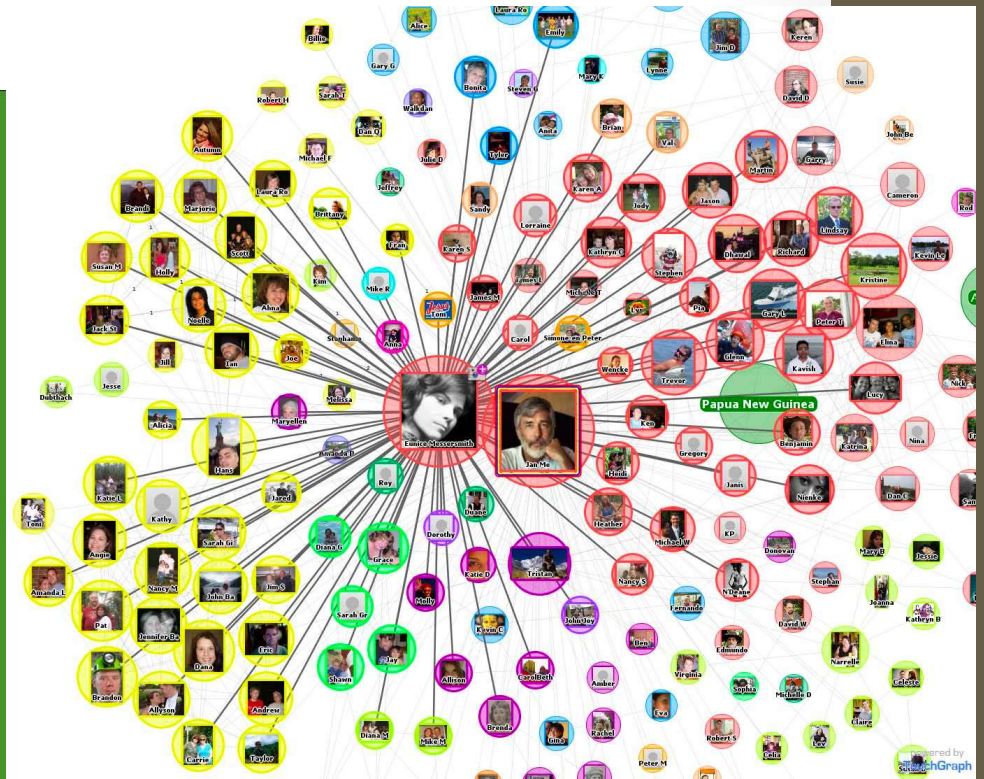
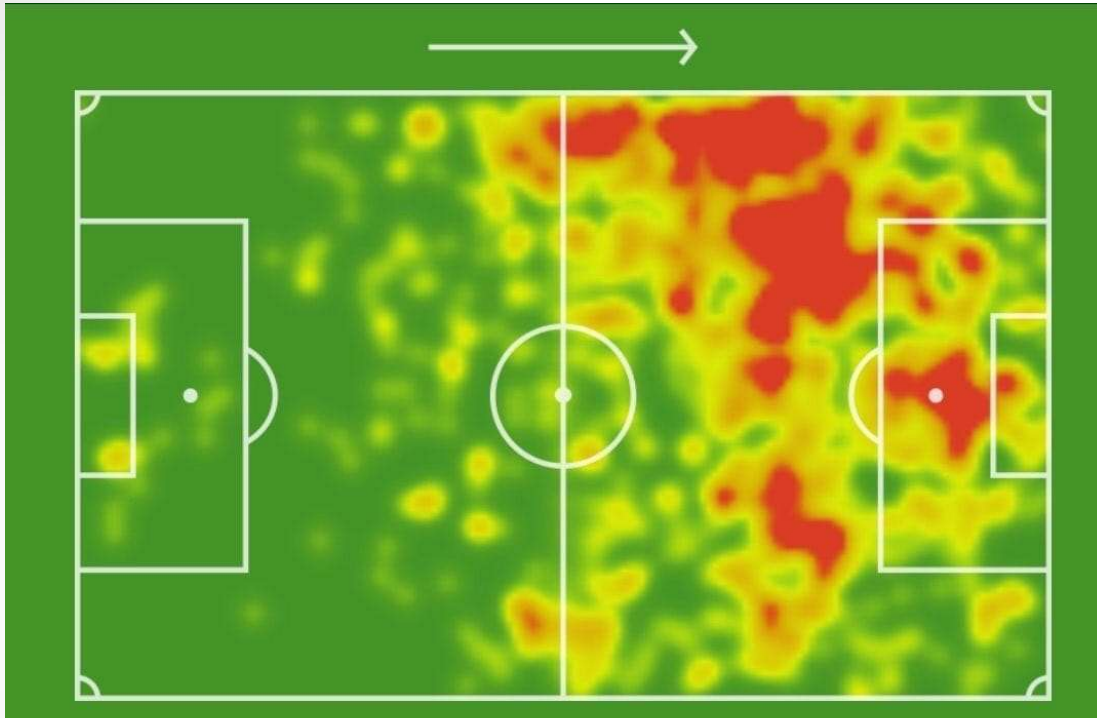


# Head mounted displays

- [Video Microsoft Holo Lens](#)



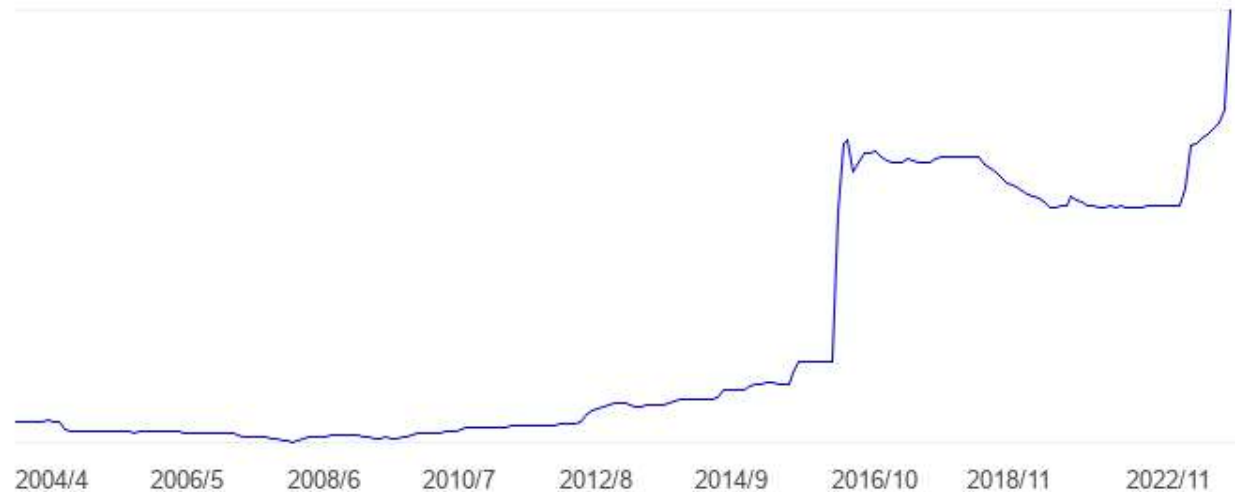
# Visualization



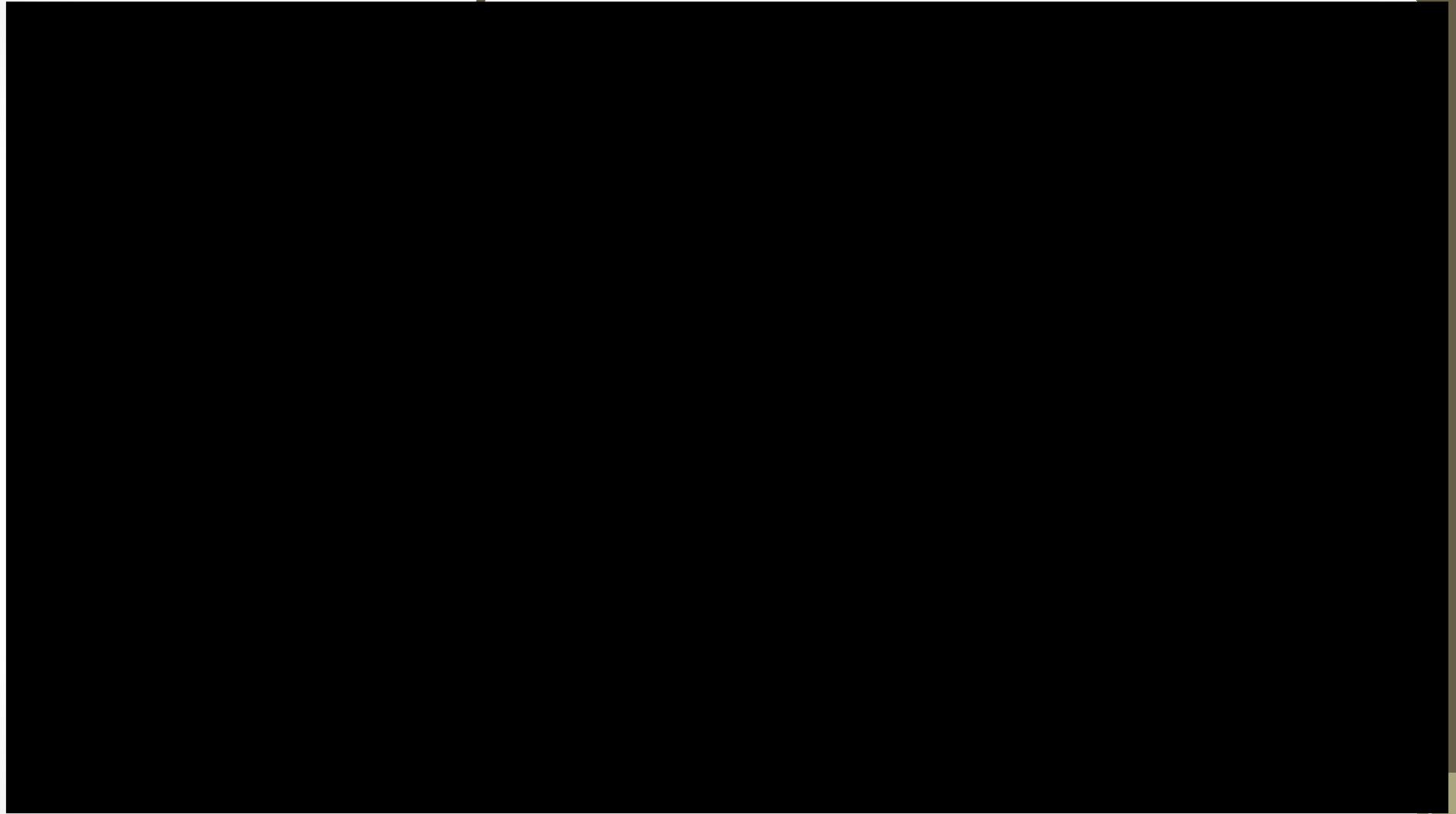
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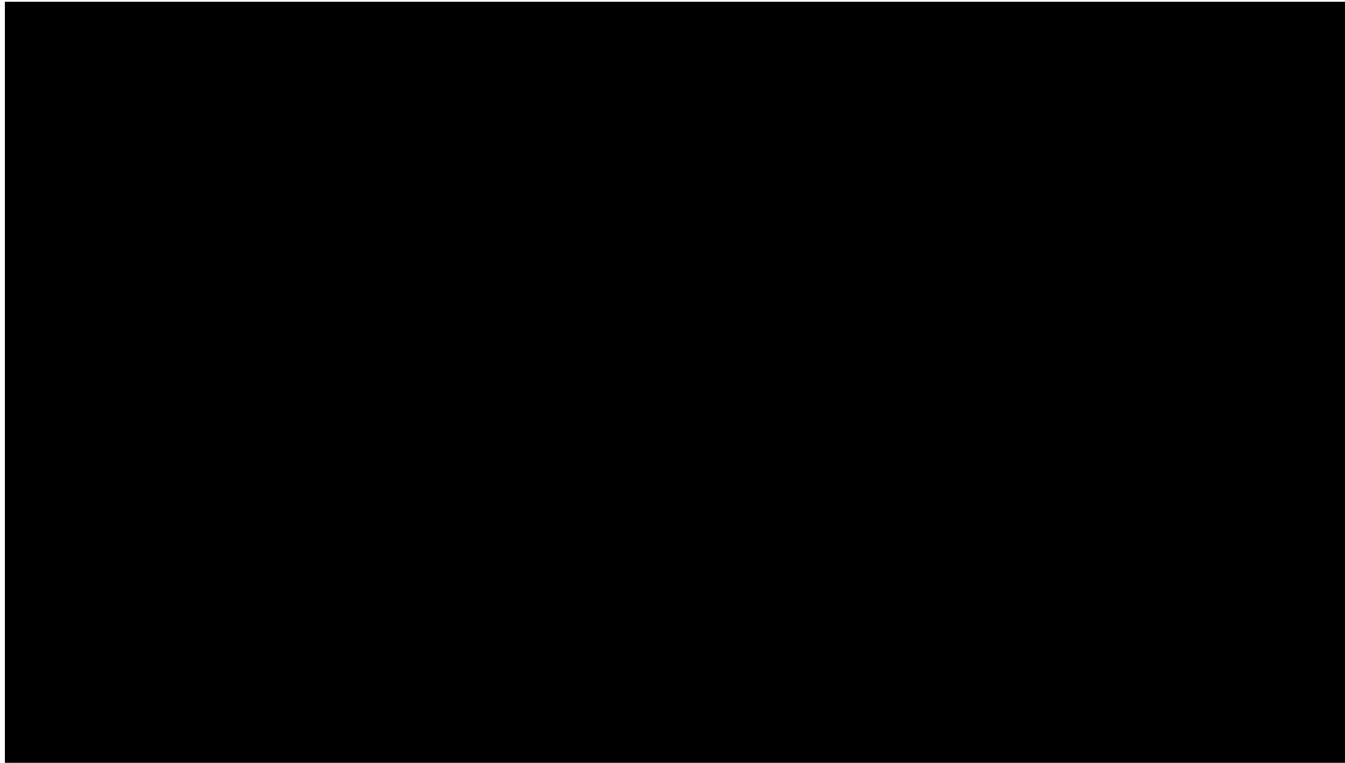
# Brain computer interfaces



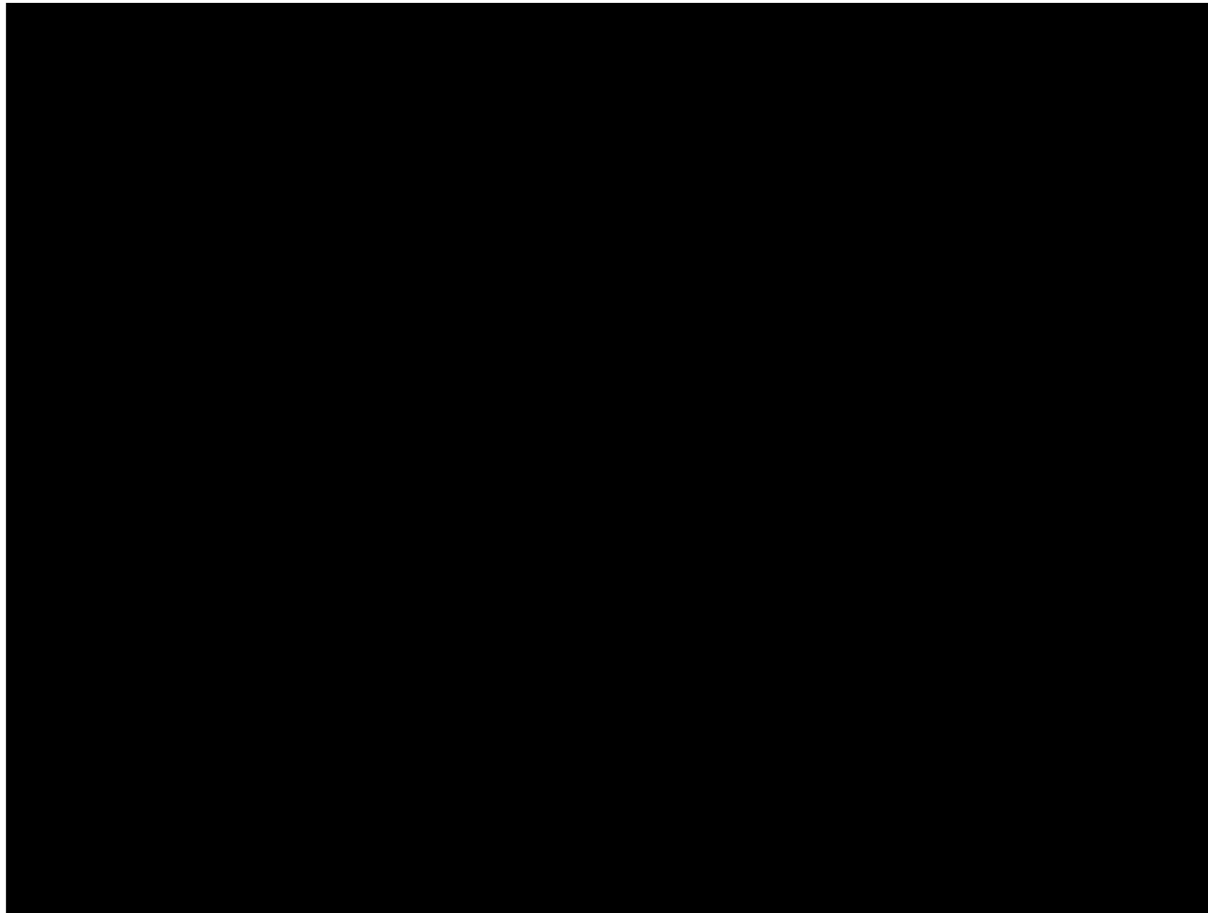
# Intuitive Interfaces



# Augmented Reality



# Tangible User Interface



# Assignment 1

- Write 1 paragraph for the future of any of the above technologies in 2035

# Test your self

- **[www.kahoot.it](http://www.kahoot.it)**