Interaction with the context using technology

Outline

- Interaction with the context
- Smart and ubiquitous computing
- Wearable devices
- Related technologies
- UX design
- User experience

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Interact with the context

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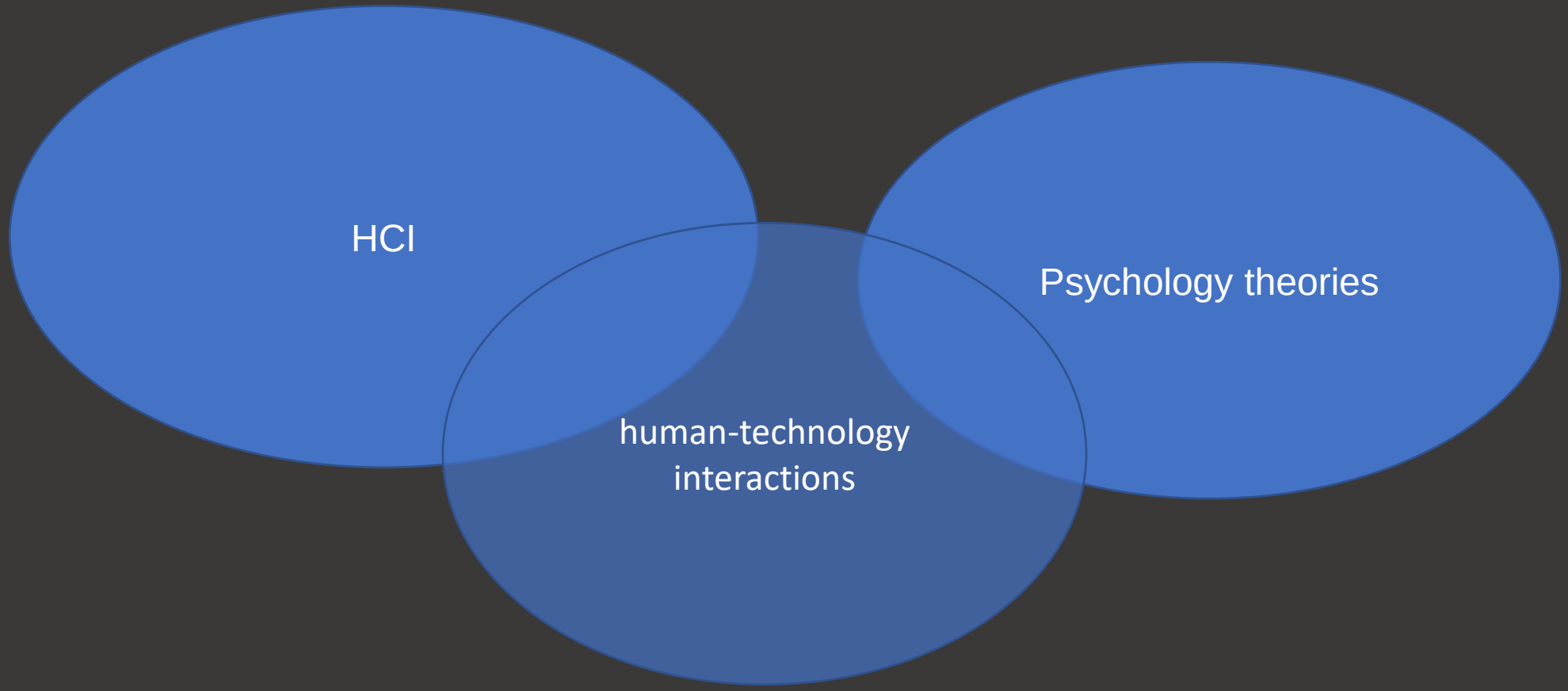
- How to aid and mediate the interaction between a user and a system in such a way to allow for more efficient accomplishment of a task
- that being retrieving the information, or alleviating states (e.g., stress) that can prevent them from accomplishing a task.
- early technological developments were focused on performance and production from an Engineering and Computer Science standpoint of usability and information retrieval.



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- With the advent of the informational age, HCI and Psychological theories came together to ground human-technology interactions in genuine human experience, emphasizing the stance of the user over the system.

- We can see these ideas and framework permeate into the UX and design space, leading to current trends of using immersive, interactive technologies for providing experiential accounts mediated through technologies that support positive human functioning and well-being.

Immersive technologies

- VR
- AR
- MR

Any Examples?

Smart and Ubiquitous technologies

- **“The most profound technologies are those that disappear. They weave themselves into the fabric of everyday life until they are indistinguishable from it.” - Mark Weiser, 1991**

- Mark Weiser, a Chief Scientist at Xerox, PARC (Palo Alto Research Centre) coined the term Ubiquitous Computing in 1988. It’s also called Ubicomp in short.
- Ubiquitous means everywhere and anywhere. It is the concept of proper imbedding of computers into the everyday world. Ubicomp can be considered as a subset of Internet of Things (IoT). It’s also called Pervasive Computing

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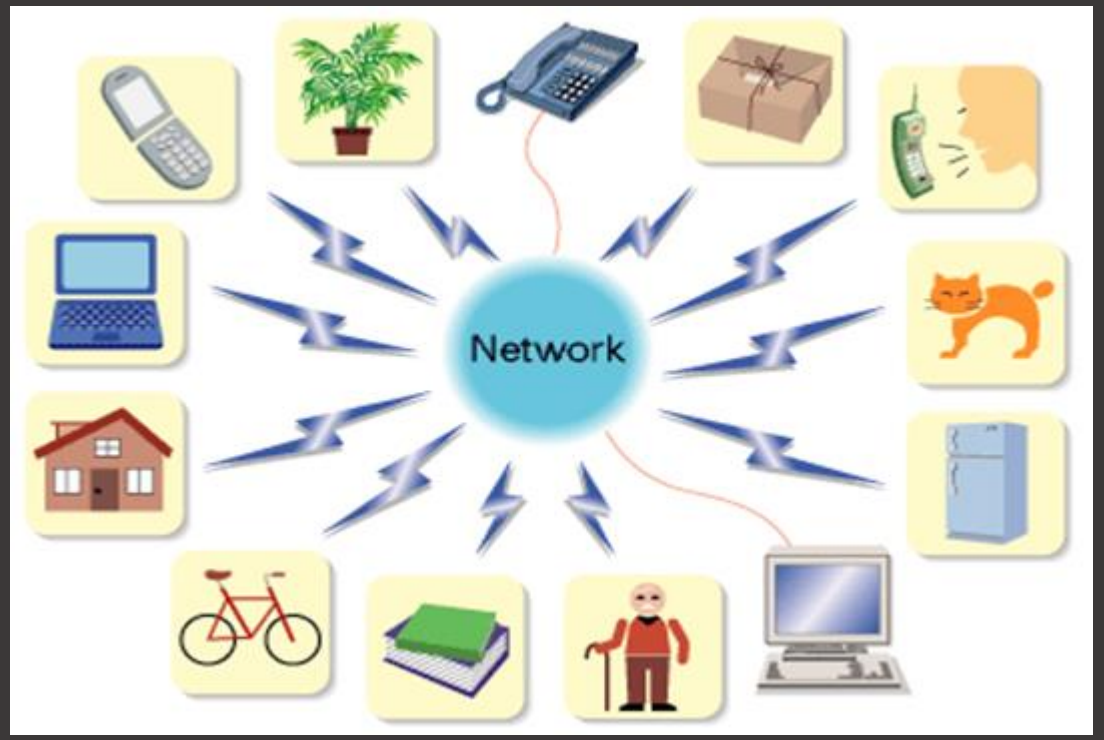
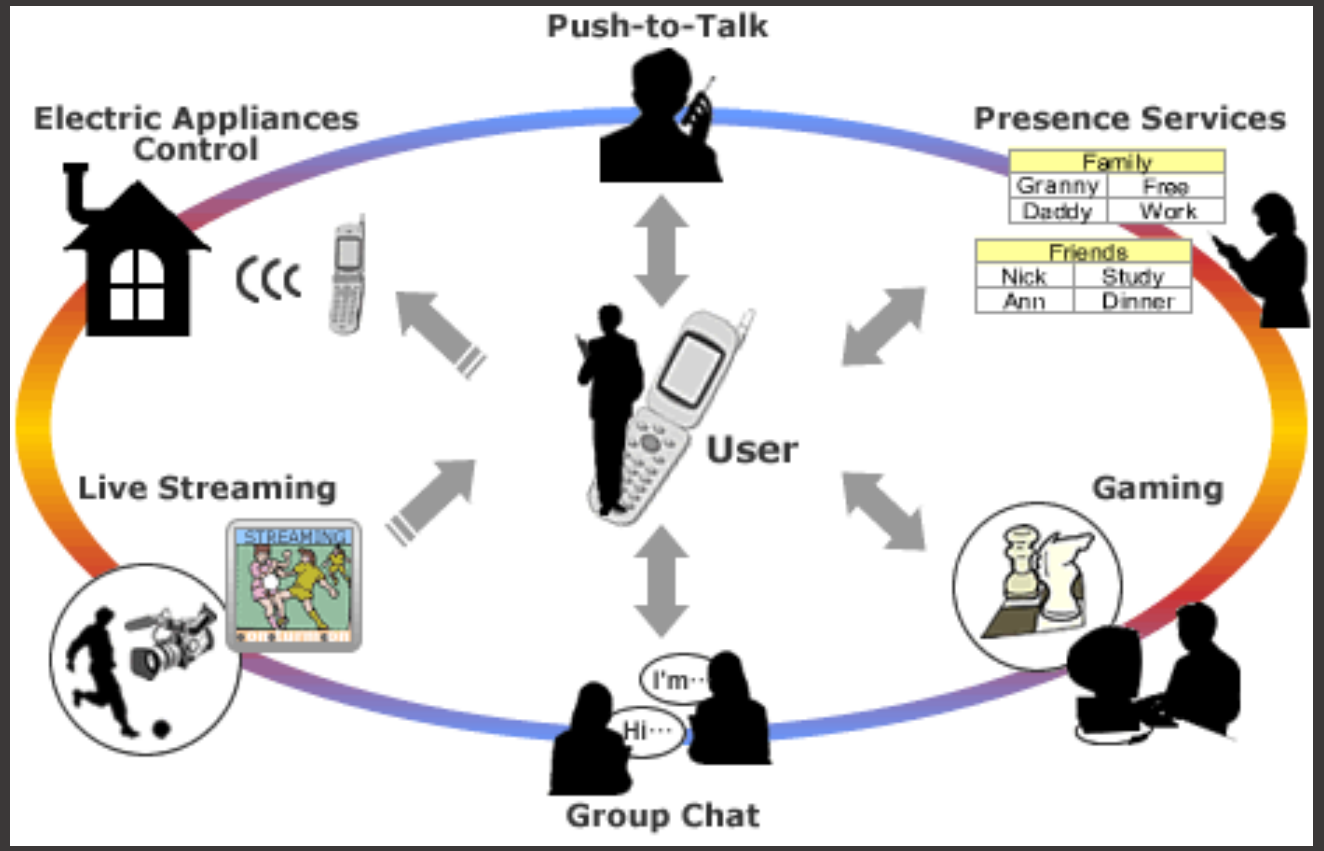
- Ubiquitous computing, or *Ubicom,* and also known as pervasive computing is the term given to the third era of modern computing.
- The first era was defined by the mainframe computer, a single large time-shared computer owned by an organization and used by many people at the same time.
- Second, came the era of the PC, a personal computer primarily owned and used by one person, and dedicated to them.
- The third era, ubiquitous computing, representative of the present time, is characterized by the explosion of small networked portable computer products in the form of *Smart phones*, personal digital assistants (PDAs), and embedded computers built into many of the devices we own—resulting in a world in which each person owns and uses many computers.



- Computers available anytime everywhere
- Embedding microprocessors in every day object
- GOAL: Smart, intelligent environment
- Vision: Small and expensive

Ubiquitous computing will enable divers wireless applications including monitoring of pets and houseplant, operation of appliances, keeping track of books and bicycles and much more.



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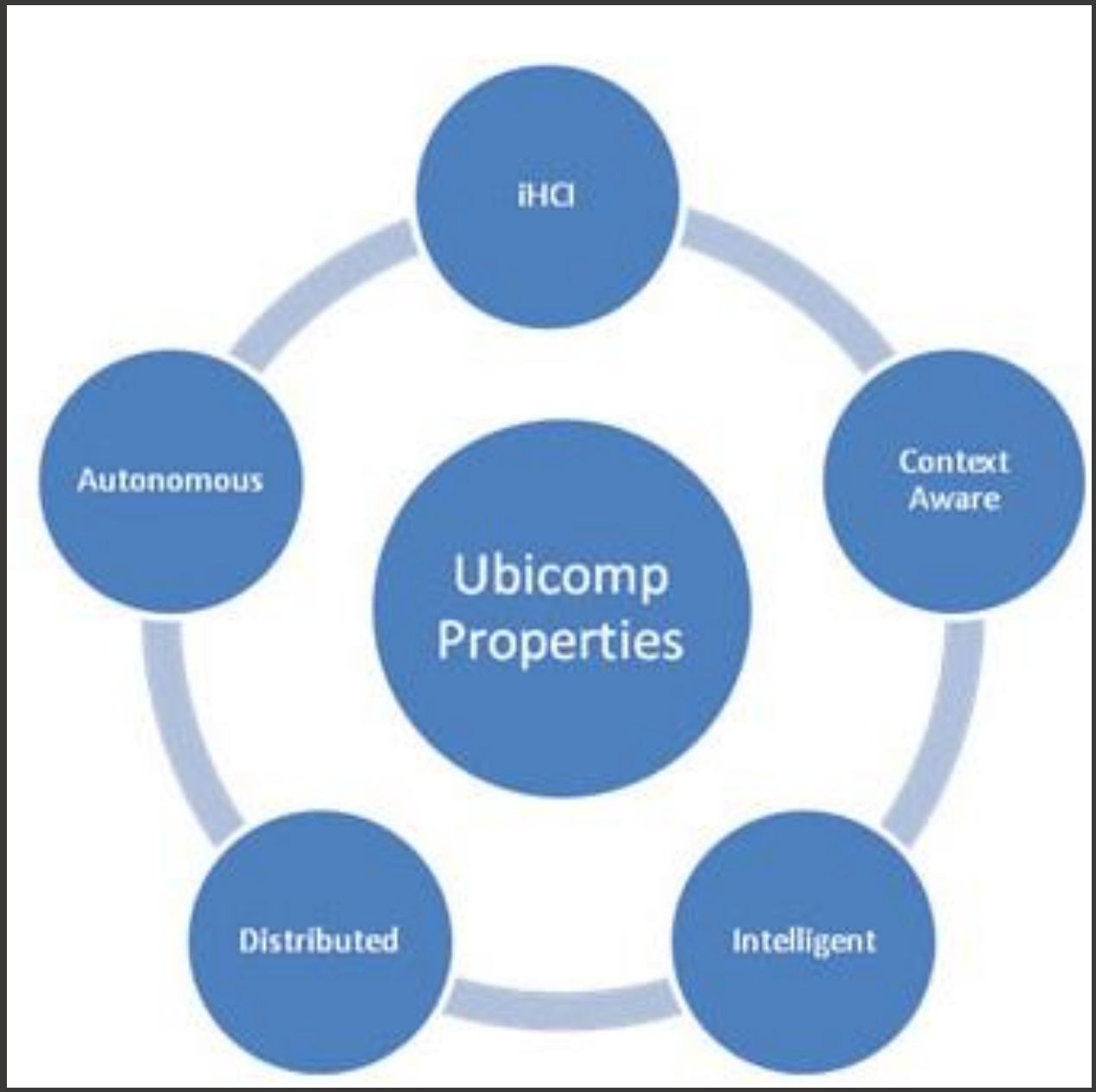
- With the introduction of Ubiquitous Computing, there is paradigm shift in terms of this interaction.
- Along with explicit Human Computer Interaction (eHCI), it will consider the Implicit Human Computer Interaction (iHCI) as well.
- Instead of Human To Computer (H2C) interaction, the machines will interact to other machines and humans which also known as Computer To Human (C2H) interaction.
- The C2H interaction is done through the sensors and sensor-nets based on context awareness.
- The Shift from eHCI design to also include iHCI design will be a key enabler for effective Ubicomp systems.



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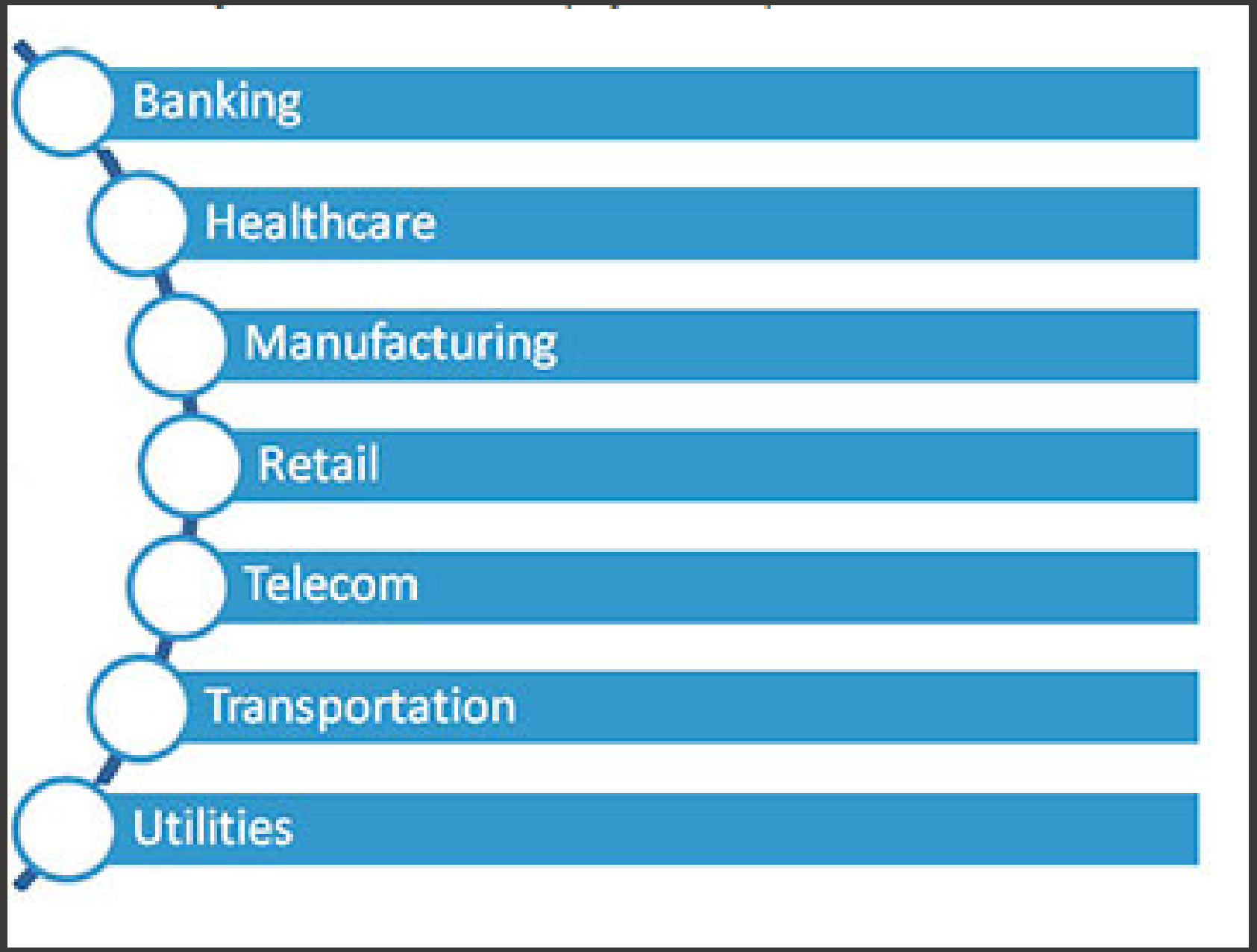

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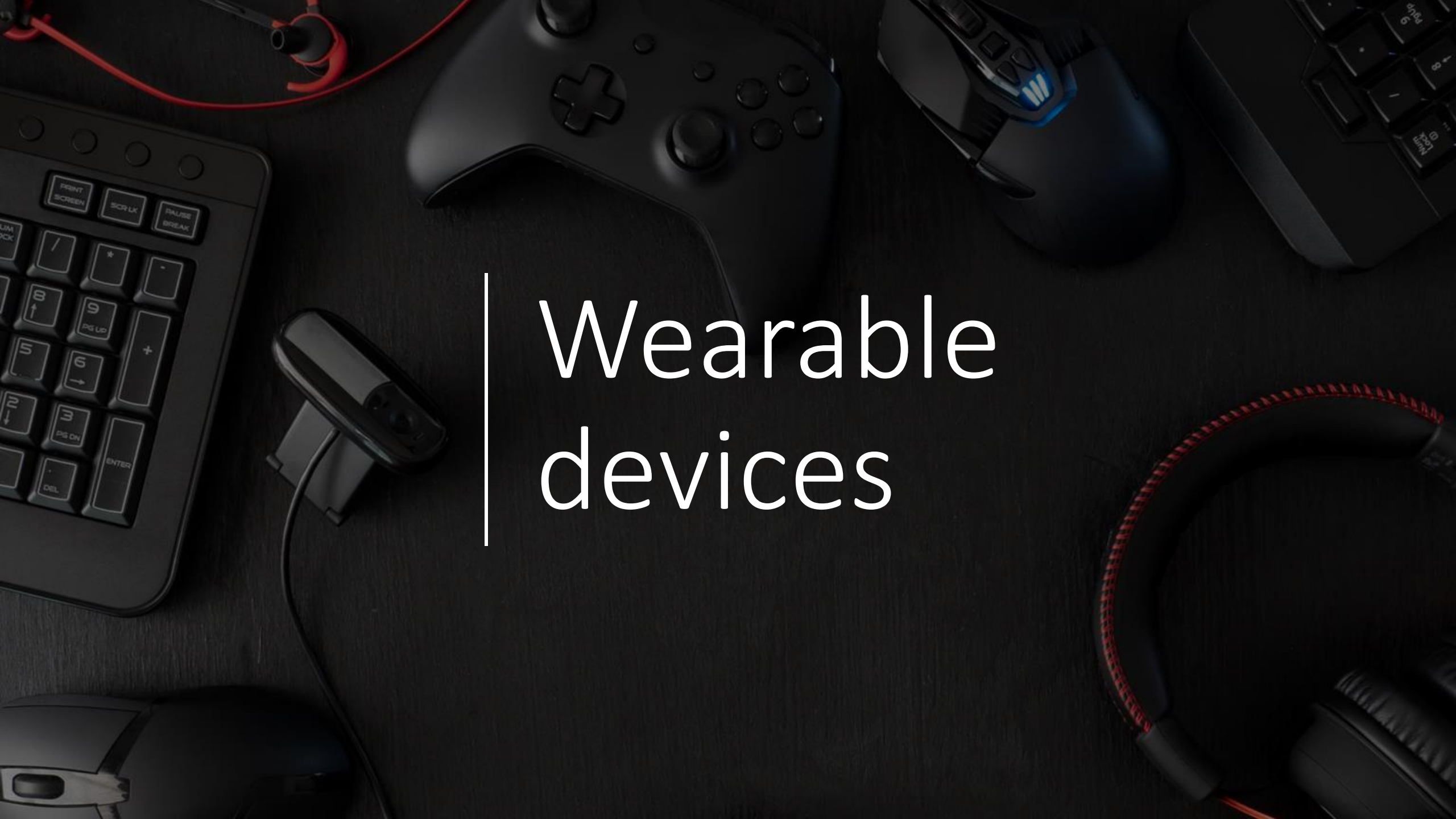
- “Similar to the way traditional phones were evolved as smartphones, there will be more consumer objects which will soon be evolved as smart objects like smart appliances, smart glasses, smart watches, smart cloths, smart cars, smart conferencing, smart homes, smart environment and a Smart World”
- … as we all witness in the current world.



Wearable devices

Wearable Computing

- **Wearable computers**, also known as **wearables** or **body-worn computers**, are small computing devices (nowadays usually electronic) that are worn under, with, or on top of clothing.
- The definition of "wearable computer" may be narrow or broad, extending to smartphones or even ordinary wristwatches.
- Good examples of wearable devices are Google glasses and iWatch.

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Smart Eyeglasses

Related Technologies

Location-based

Geo-fence technology

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Geo-fence technology,

- Geo-fence technology is placing a virtual boundary around a geographical area.
- It works when a user enters or leaves the area, which is identified by latitude and longitude of the area

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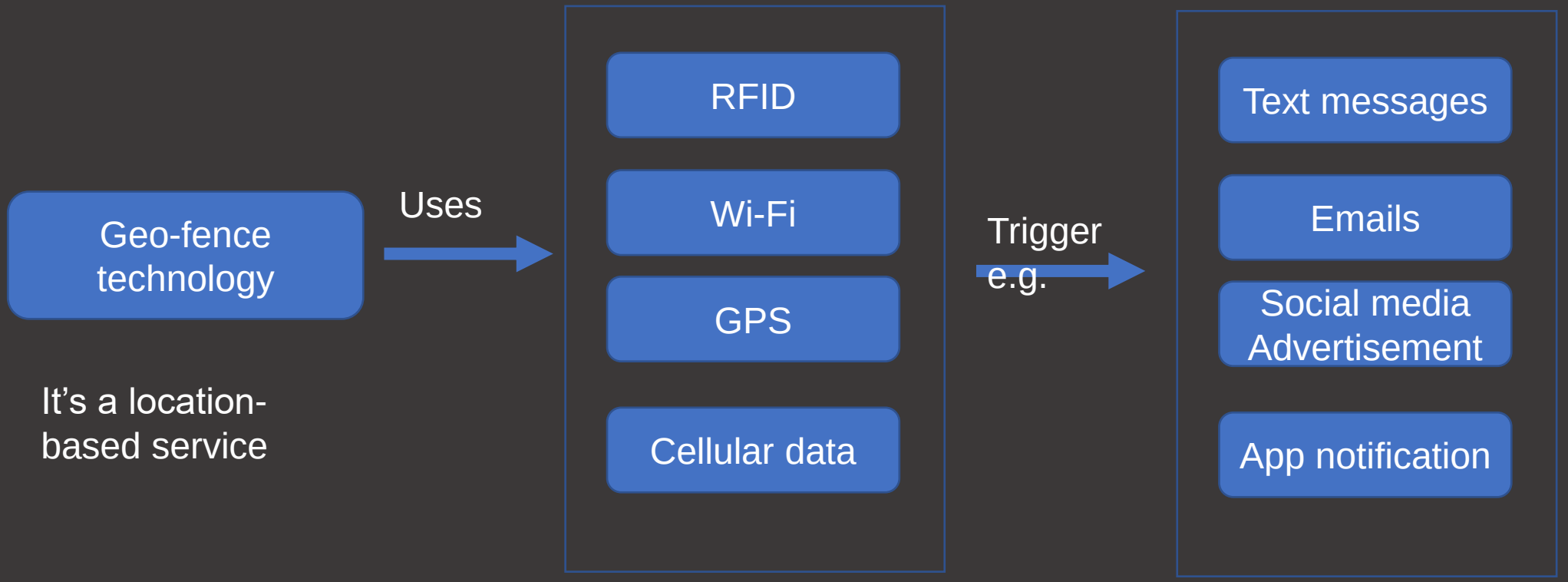
- Geofencing is a location-based service in which an app or other software program uses radio frequency identification (RFID), Wi-Fi, GPS, or cellular data to trigger a targeted marketing action (such as a text, email, social media advertisement, app notification) when a mobile device or RFID tag enters or exits a virtual geographic boundary, known as a geofence.



It's a location-based service

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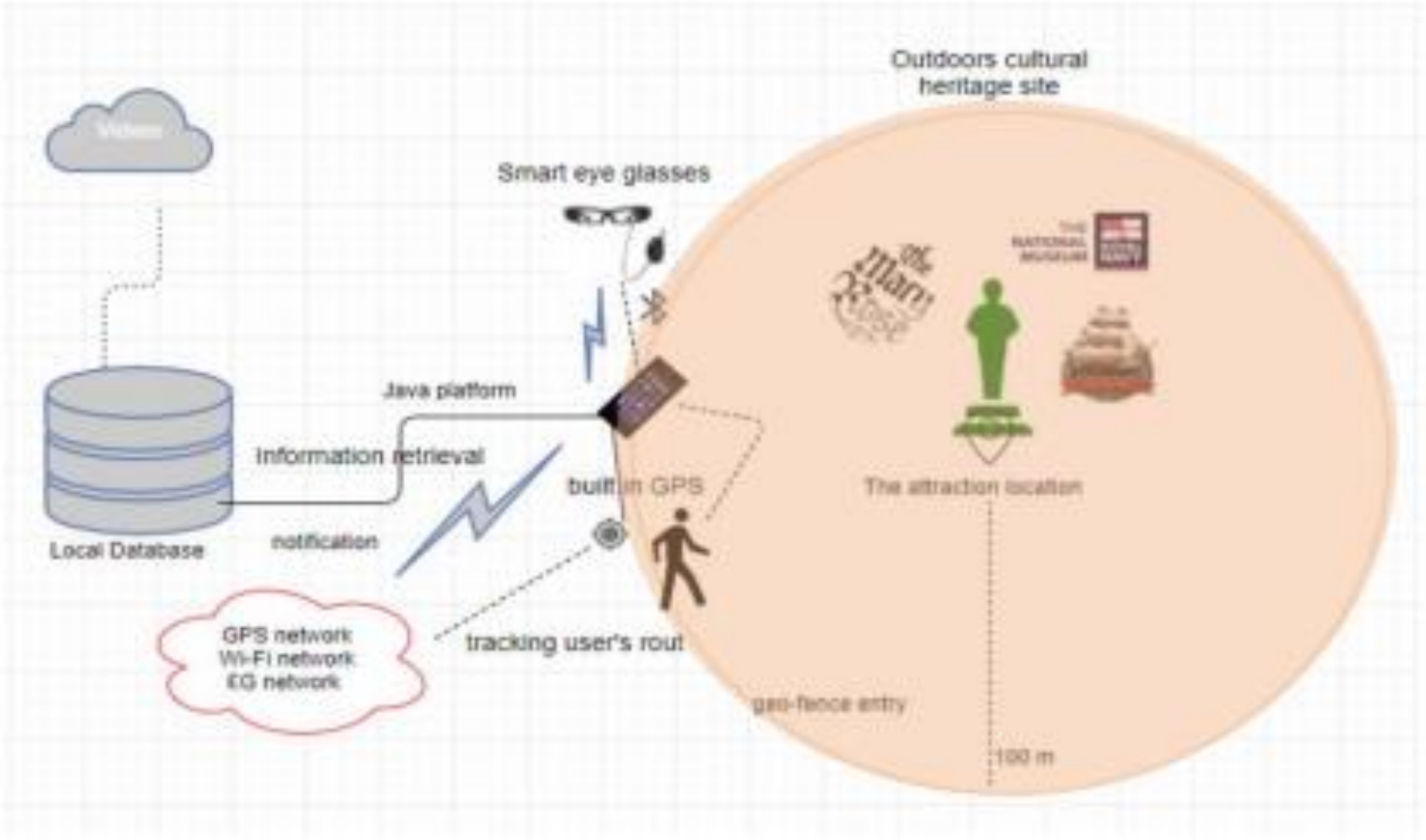

Example of a geo-fence technology for a cultural heritage context


12:11
ON
SET IT OFF


11:34
Attractions' Notification
Nelson
More details
Not interested


11:34
Nelson was a British naval commander and national hero, famous for his naval victories against the French during the Napoleonic Wars.
Audio
See the past
More


11:35
Let your device facing the attraction

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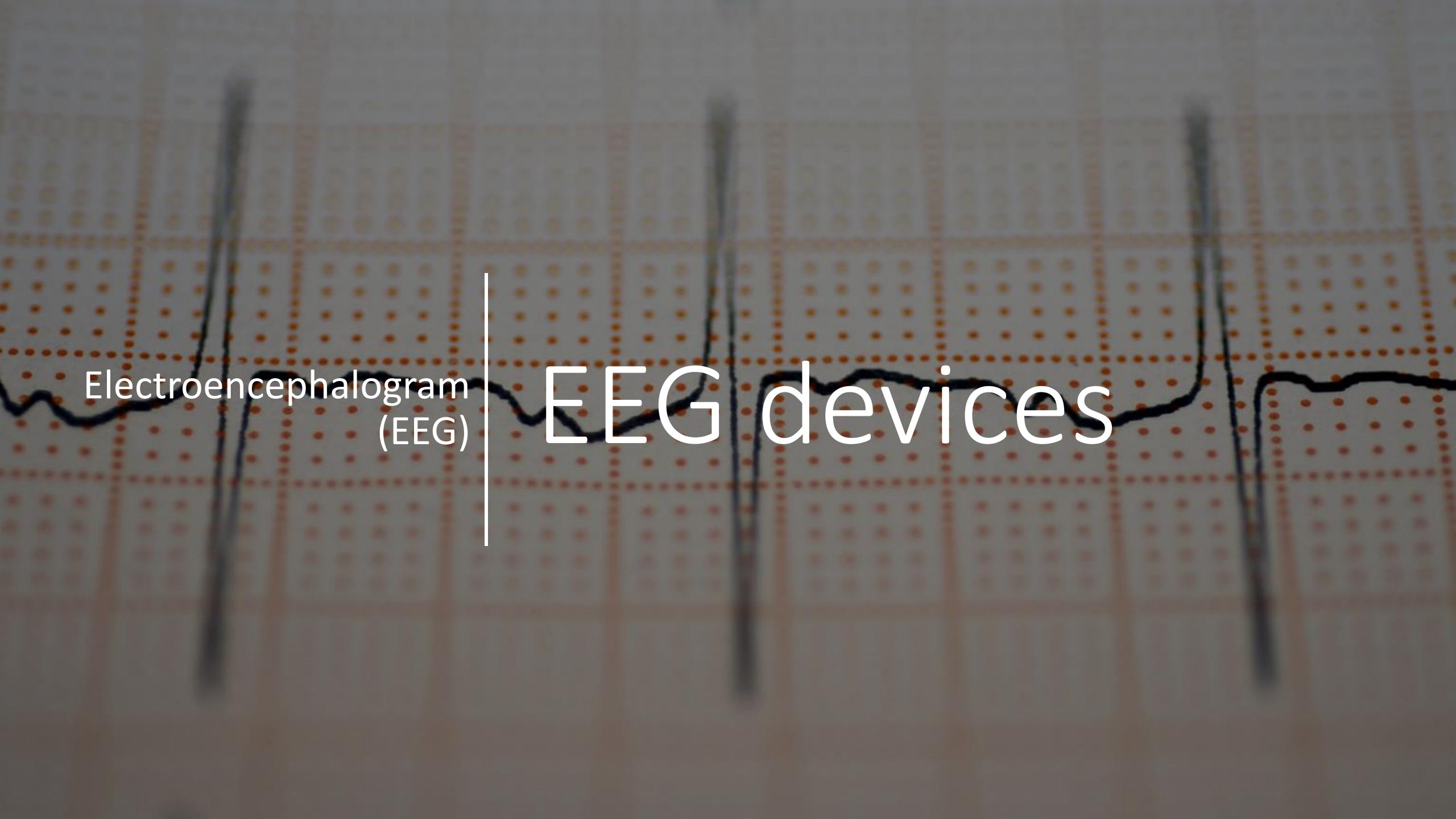
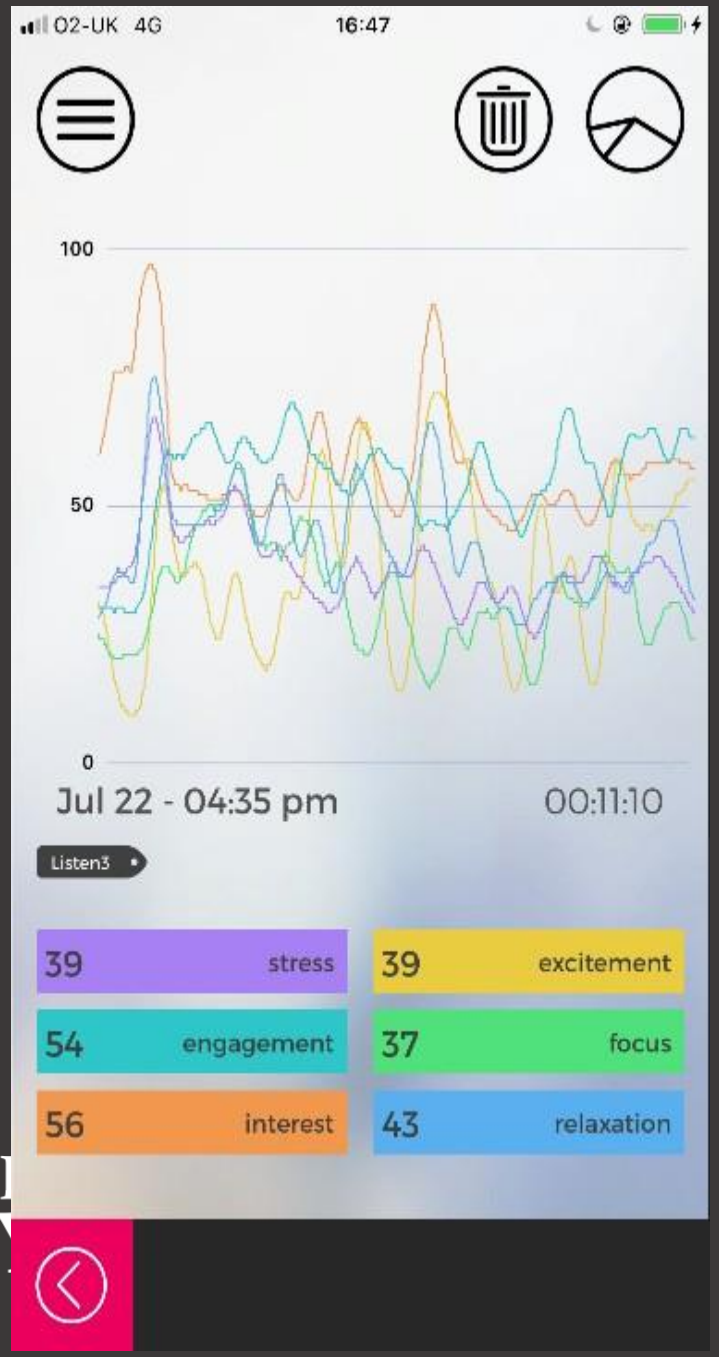


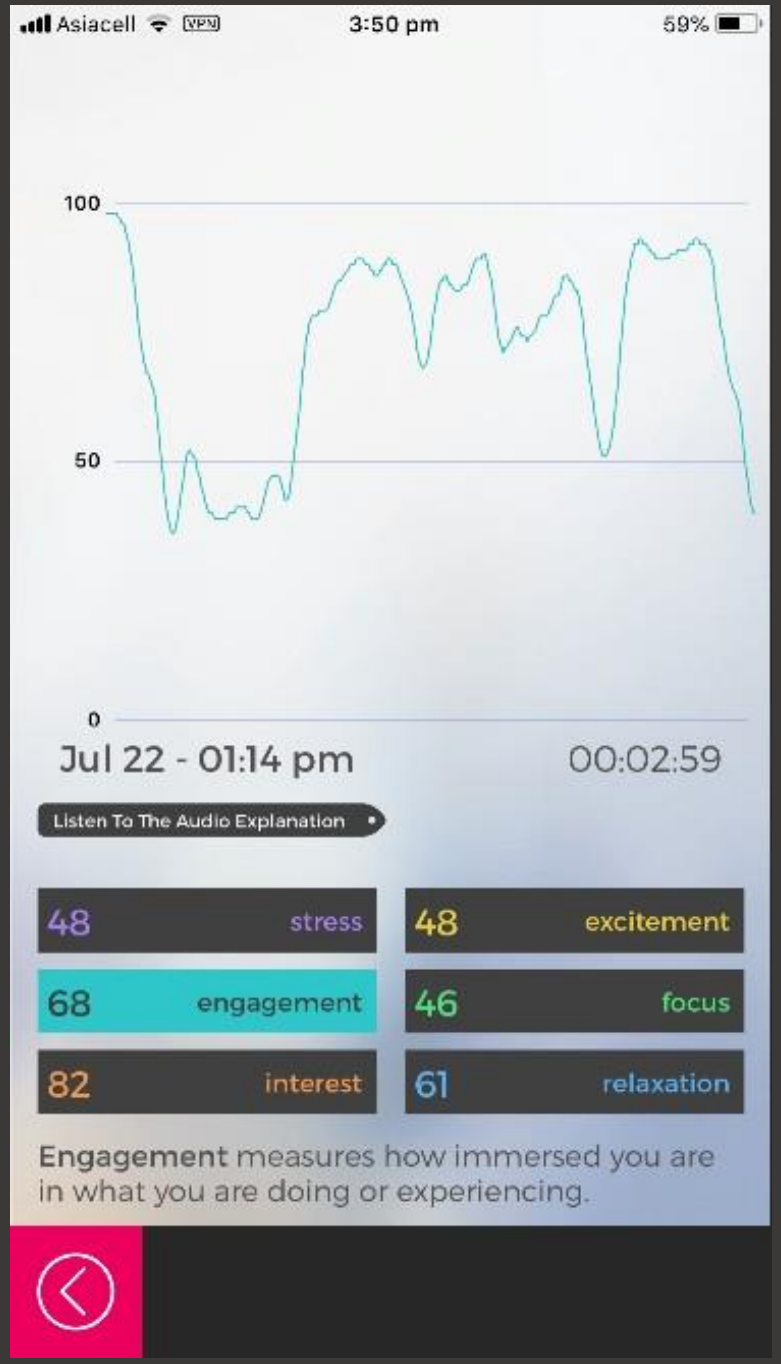
Electroencephalogram (EEG)

EEG devices


EMOTIV

- EEG is a device to be worn on the head that monitors brain activity translate it into meaningful data.
- EMOTIV is an example of the EEG, it collect biometric data to be used for different purposes such as users' experience. It measures six cognitive metrics which are: stress, engagement, interest, focus, excitement and relaxation.


O2-UK 4G
16:47
100
50
0
Jul 22 - 04:35 pm
00:11:10
Listen3
39 stress
39 excitement
54 engagement
37 focus
56 interest
43 relaxation


Asiacell
VPN
3:50 pm
59%
100
50
0
Jul 22 - 01:14 pm
00:02:59
Listen To The Audio Explanation
48 stress
48 excitement
68 engagement
46 focus
82 interest
61 relaxation
Engagement measures how immersed you are in what you are doing or experiencing.

- EMOTIV EPOC X is designed for scalable and contextual human brain research

UX Design

- UX design focuses on the interaction between real human users (like you and me) and everyday products and services, such as websites, apps, and even coffee machines.

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Refreshing your knowledge…

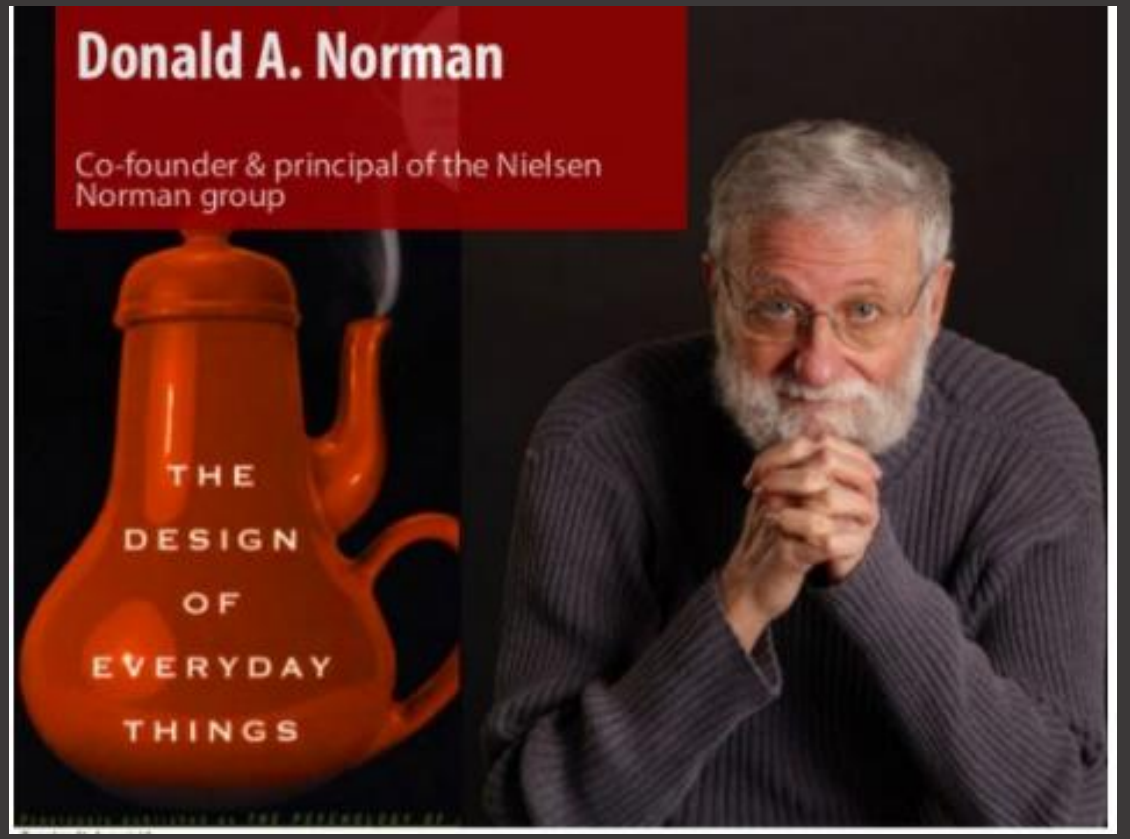
Why user experience is important?

- The user experience (UX) is central to interaction design. By this it is meant how a product behaves and is used by people in the real world. Nielsen and Norman (2014) define it as encompassing "all aspects of the end-user's interaction with the company, its services, and its products."
- As stressed by Garrett (2010, p. 10), "every product that is used by someone has a user experience: newspapers, ketchup bottles, reclining armchairs, cardigan sweaters."

Refreshing your knowledge…

Design principles

- Here we briefly describe the most common ones: visibility, feedback, constraints, mapping, consistency, and affordances.
- Each of these has been written about extensively by Don Norman (1988) in his bestseller The Design of Everyday Things.



https://www.nngroup.com/

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Further reading

- Sharp, Helen; Rogers, Yvonne and Preece, Jenny (2019). Interaction Design: Beyond Human-Computer Interaction.
- https://www.torryharris.com/uk/blog/ubiquitous-computing-living-in-a-smart-world
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- Alkhafaji, A., Fallahkhair, S., & Cocea, M. (2019, September). Design challenges for mobile and wearable systems to support learning on-the-move at outdoor cultural heritage sites. In IFIP Conference on Human-Computer Interaction (pp. 185-207). Springer, Cham.