Types Of Interfaces

Class Activity 3

A short presentation on "User Interfaces" is presented to –

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What is Interface ?

A boundary across which two independent systems meet and act on or communicate with each other. In computer technology, there are several types of interfaces.

User interface - the keyboard, mouse, menus of a computer system. The user interface allows the user to communicate with the operating system.

Software interface - the languages and codes that the applications use to communicate with each other and with the hardware.

Hardware interface - the wires, plugs and sockets that hardware devices use to communicate with each other.

To connect with or interact with by means of an interface.

Mobile Interface

What is Mobile User Interface

A mobile user interface (mobile UI) is the graphical and usually touch-sensitive display on a mobile device, such as a smartphone or tablet, that allows the user to interact with the device's apps, features, content and functions.

User Input

To make it easier for the users, there are keyboards variations for specific uses.

Communications

▶ **Provide feedback**

Provide instant feedback for every interaction. Instant feedbacks assure to the user that the request is being processed. (e.g. display a spinner or progress bar)

▶ **Modal alerts**

Modal alerts can be intrusive to any user, therefore they are used for serious requests.

▶ **Confirmations**

Confirmations are less intrusive than alerts because they are in response to a user action and therefore in context and perhaps even expected. (e.g. "Are you sure you want to delete this application?" or "Save changes to this file?")

Wireless Charging

Wireless charging is relatively a new and handy feature in mobiles. This feature allow the users to charge their mobile using wireless signals instead of having to charge it through wires.

Storage Space

Storage space is a place where one keeps their data. Nowadays most of the mobile are relying on the internal storage and trying to get rid of the external storage management . Storage space is usually 32 gigabytes to 512 gigabytes in smartphones. The bigger the storage space, the better for the user.
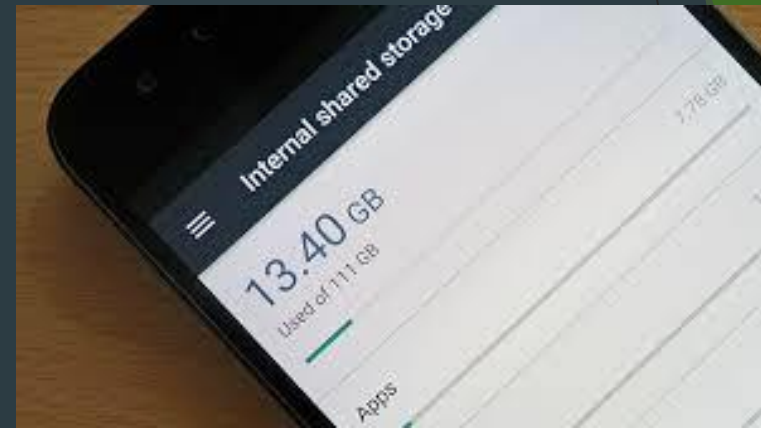
Multiple Windows

As any user can see multiple applications on one computer screen, "multiple windows" or "split screen" feature in mobiles is similar to the feature on computers, it allows the user to view more than one application on the mobile screen.
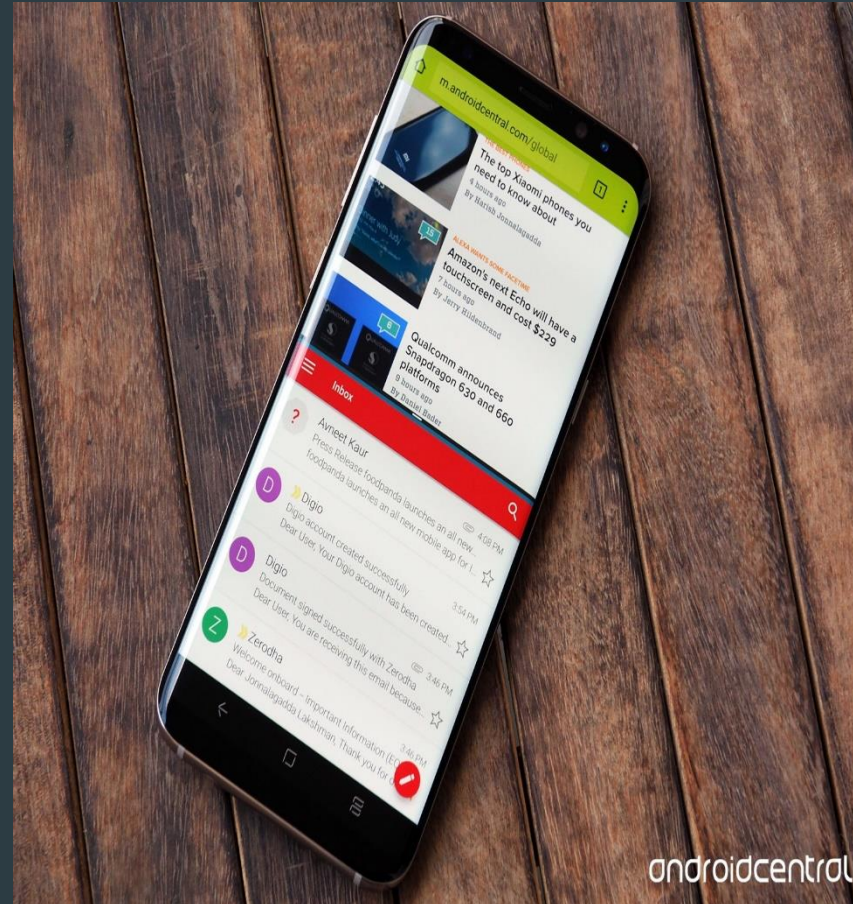
NFC -Near Field Communication-

Similar to Wireless connections, Near Field Communications are communication protocols that allow two electronic devices to send data to each other. The difference between Wi-Fi and NFC, NFC can transmit data only through small areas (roughly around 4cm) between electronic devices.

Long Lasting Battery

For users to accomplish their tasks, definitely they need a long lasting battery for their mobiles to function. Usually mobiles' batteries last around a day. Nowadays battery is getting bigger and bigger for instance latest Huawei Mate 20 pro has a gigantic battery of 4200 mAh.
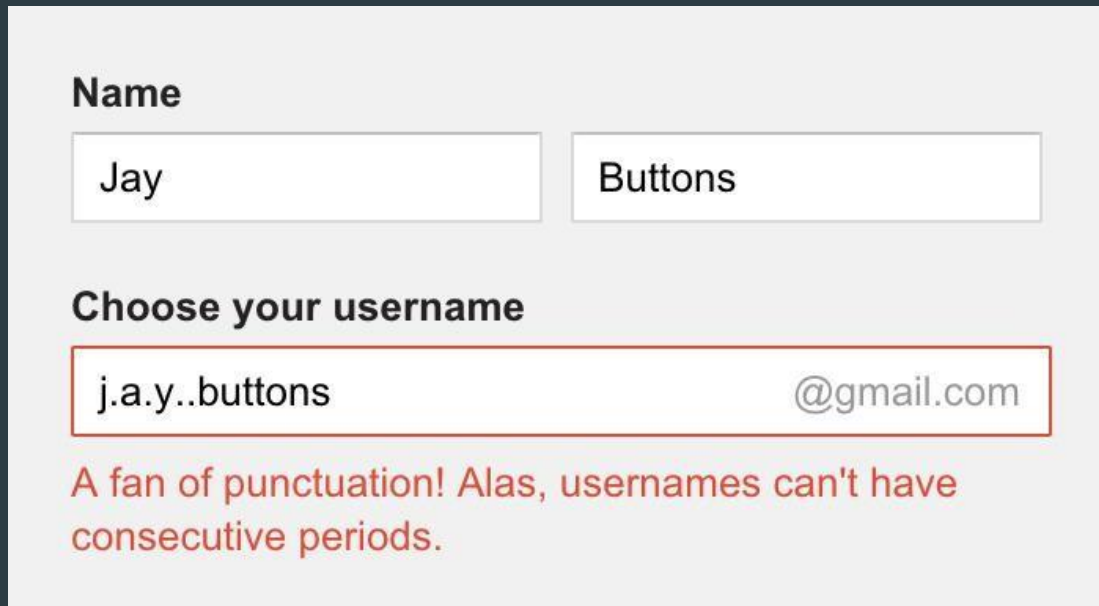
The Issues

Questionable in-app permissions

Having questionable in-app permissions is one of the most common and detrimental UX mistakes that app owners make. In-app permissions are an invaluable tool, but they also immediately raise the suspicions of today's mobile app users

Weak microinteractions

Micro interactions are any single action that a user can take inside of your product. This could be tapping a button, tweaking a setting, interacting with an advertisement, or thousands of other "micro" possibilities. What makes many of these micro interactions weak is the fact that most teams don't fully consider creative design, copywriting and A/B testing when they're working out the fine details of their product.

Name

| Jay | Buttons |

Choose your username

j.a.y..buttons   @gmail.com

A fan of punctuation! Alas, usernames can't have consecutive periods.

Mismatched onboarding

Onboarding is one of the most impactful experiences that a user will have with your app. Yet it done wrong so often. Be aware of the different styles of user onboarding, and understand what work best for your unique audience. For example, value-oriented onboarding introduces users to the fun, useful or beneficial aspects of your app. Meanwhile, function-oriented onboarding tends to works best for describing unique or technical features within your app. And, progressive onboarding is kind of like presenting your app's value and functionality while users interact with your app as they normally would.

Overlooking qualitative data

Having access to quantitative data is, of course, important. But it doesn't tell the full story of an app's user experience. Basically, quantitative data can help you pinpoint numerical-based concerns such as quit rate on a certain screen, but cannot really go beyond that in terms of analysis. *Qualitative* data can. Tools like user session recordings and touch heatmaps give you the "why" behind your users' behavior and help you pinpoint mistakes and fix them, fast

Brain Computing

What is brain Computing?

Brain Computer Interface (BCI) technology is a powerful communication tool between users and systems. It does not require any external devices or muscle intervention to issue commands and complete the interaction. The research community has initially developed BCIs with biomedical applications in mind, leading to the generation of assistive devices. They have facilitated restoring the movement ability for physically challenged or locked-in users and replacing lost motor functionality. The promising future predicted for BCI has encouraged research community to study the involvement of BCI in the life of non-paralyzed humans through medical applications.

A short video on the Brain Computing
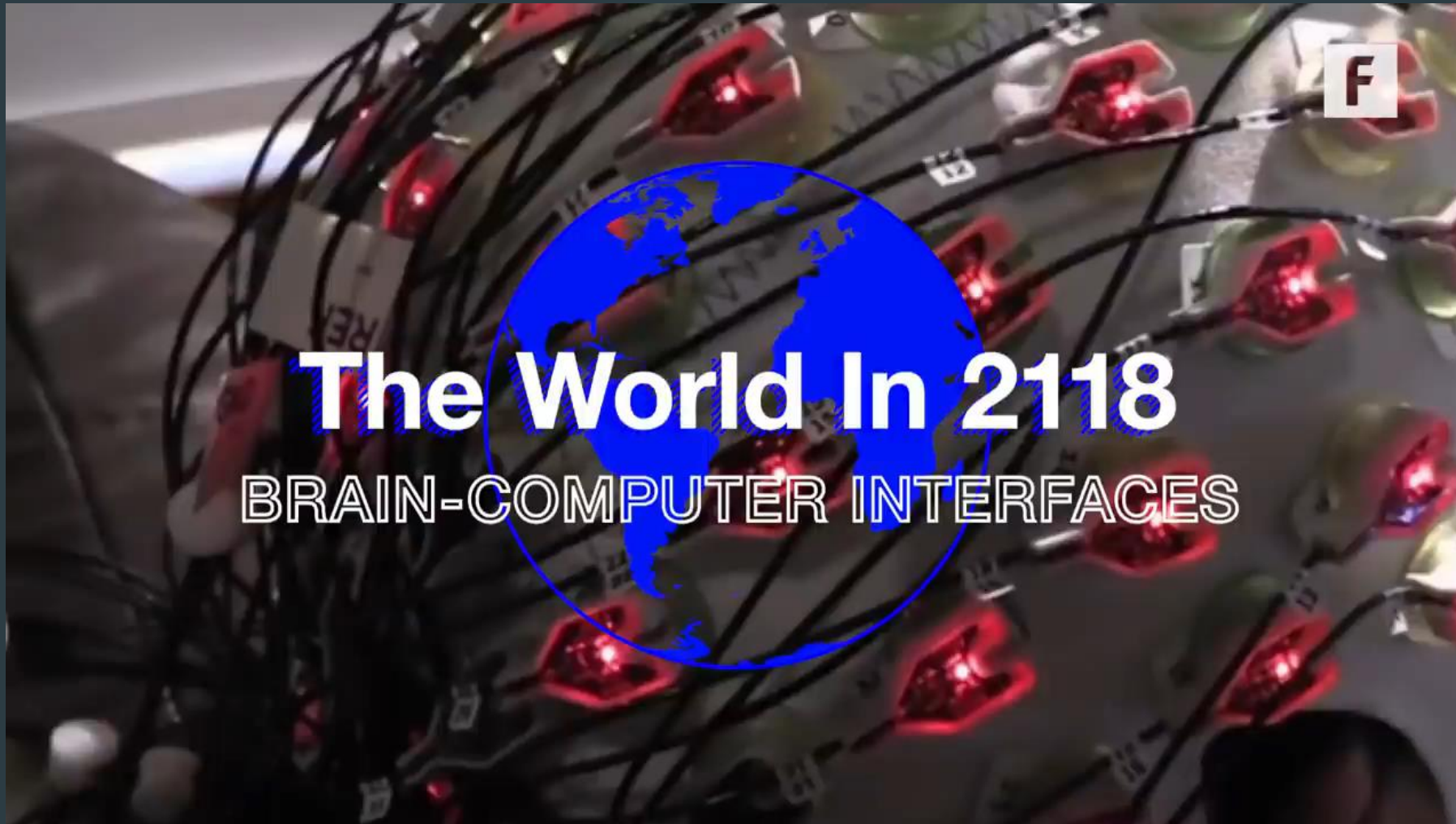
BCI Functionality

Applications of Brain Computer Interface base its functionality on either observing the user state or allowing the user to deliver his\her ideas. BCI system records the brain waves and sends them to the computer system to complete the intended task. The transmitted waves are therefor used to express an idea or control an object.

Comunication and Control

Brain computer interface (BCI) systems build a communication bridge between human brain and the external world eliminating the need for typical information delivery methods. They manage the sending of messages from human brains and decoding their silent thoughts. Thus they can help handicapped people to tell and write down their opinions and ideas via variety of methods such as in spelling applications, semantic categorization, or silent speech communication.

User State Monitoring

Early BCI applications have targeted disabled users who have mobility or speaking issues. Their aim was to provide an alternative communication channel for those users. But later on, BCI enters the world of healthy people as well. It works as a physiological measuring tool that retrieves and uses information about an individual's emotional, cognitive or affectiveness state. The target of brain signals utilization has been extended beyond controlling some object or offering a substitution for specific functions, in what is called passive BCI. According to Garcia-Molina et al, the precise awareness of the current emotional or cognitive state can affect the recognition of the mental task associated with the recorded brain waves.
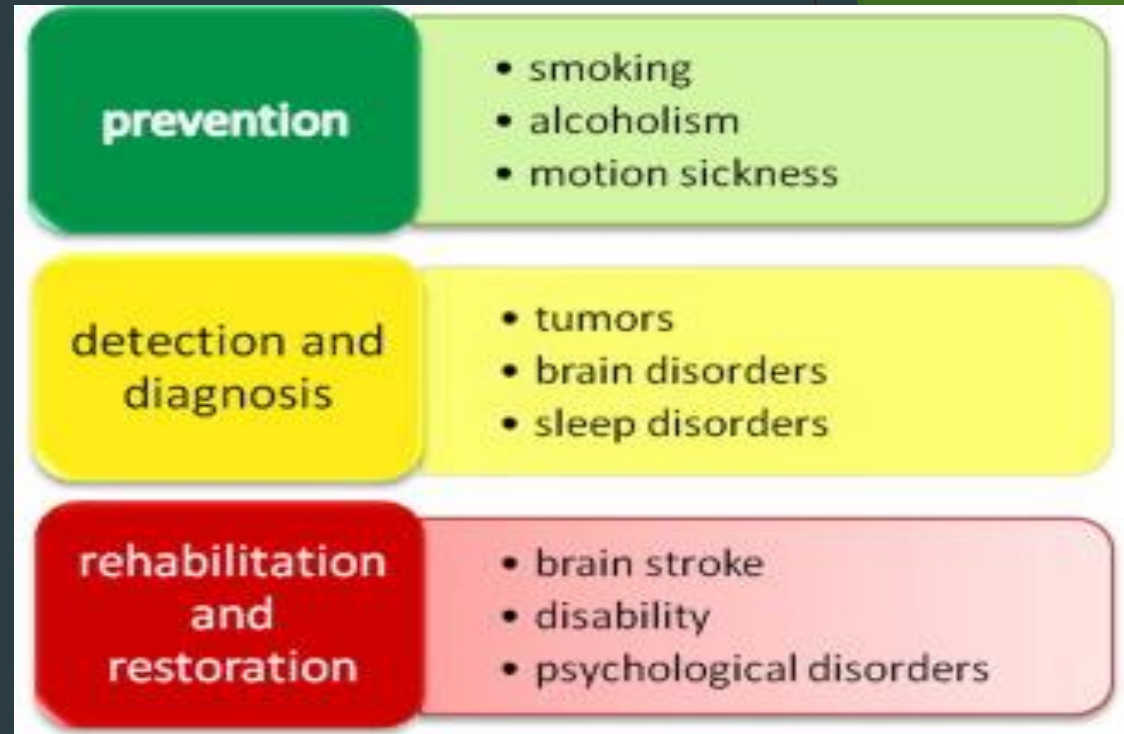
BCI Application

Brain computer interfaces have contributed in various fields of research. As briefed in Fig. 1, they are involved in medical, neuroergonomics and smart environment, neuromarketing and advertisement, educational and self-regulation, games and entertainment, and Security and authentication fields.

Medical Application

Healthcare field has a variety of applications that could take advantage of brain signals in all associated phases including prevention, detection, diagnosis, rehabilitation and restoration as shown in Fig. 2.

prevention	• smoking • alcoholism • motion sickness
detection and diagnosis	• tumors • brain disorders • sleep disorders
rehabilitation and restoration	• brain stroke • disability • psychological disorders

Neuromarketing and Advertisement

Marketing field has also been an interest for BCI researches. The research in has explained the benefits of using EEG evaluation for TV advertisements related to both commercial and political fields. BCI based assessment measures the generated attention accompanying watching activity. On the other hand, the researchers of have considered the impact of another cognitive function in neuromarketing field. They have been interested in estimating the memorization of TV advertisements thus providing another method for advertising evaluation.

Education and Self Regulation

Neurofeedback is a promising approach for enhancing brain performance via targeting human brain activity modulation. It invades the educational systems, which utilizes brain electrical signals to determine the degree of clearness of studied information. Personalized interaction to each learner is established according to the resultant response experienced

Games and Entertainment

Entertainment and gaming applications have opened the market for nonmedical brain computer interfaces. Various games are presented like in where helicopters are made to fly to any point in either a 2D or 3D virtual world.

Combining the features of existing games with brain controlling capabilities has been subject to many researches such as which tend to provide a multi-brain entertainment experience. The video game is called BrainArena. The players can join a collaborative or competitive football game by means of two BCIs. They can score goals by imagining left or right hand movements.

Security and Authentication

Security systems involve knowledge based, object based or biometrics based authentication. They have shown to be vulnerable to several drawbacks such as simple insecure password, shoulder surfing, theft crime, and cancelable biometrics. Cognitive Biometrics or electrophysiology, where only modalities using biosignals (such as brain signals) are used as sources of identity information, gives a solution for those vulnerabilities. The motivation behind exploring the feasibility of electrophysiology is that biosignals cannot be casually acquired by external observers. They also can be of great value for disabled patients or users missing the associated physical trait. This makes such signals difficult to synthesize and therefore improves the resistance of biometric systems to spoofing attacks. Besides electroencephalogram (EEG), as a biometric modality, could be used to send covert warning when the authorized user is under external forcing conditions.

BCI system components

BCI system consists of four basic components. They include signal acquisition, signal preprocessing, feature extraction, and classification. Signal acquisition component, described in details in the following section, is responsible for recording the brain waves and sending them to the preprocessing component for signal enhancement and noise reduction. Feature extraction component generates the discriminative characteristics for the improved signal, decreasing the size of the data applied to the classification component. Classifiers are translating the produced features into device commands.
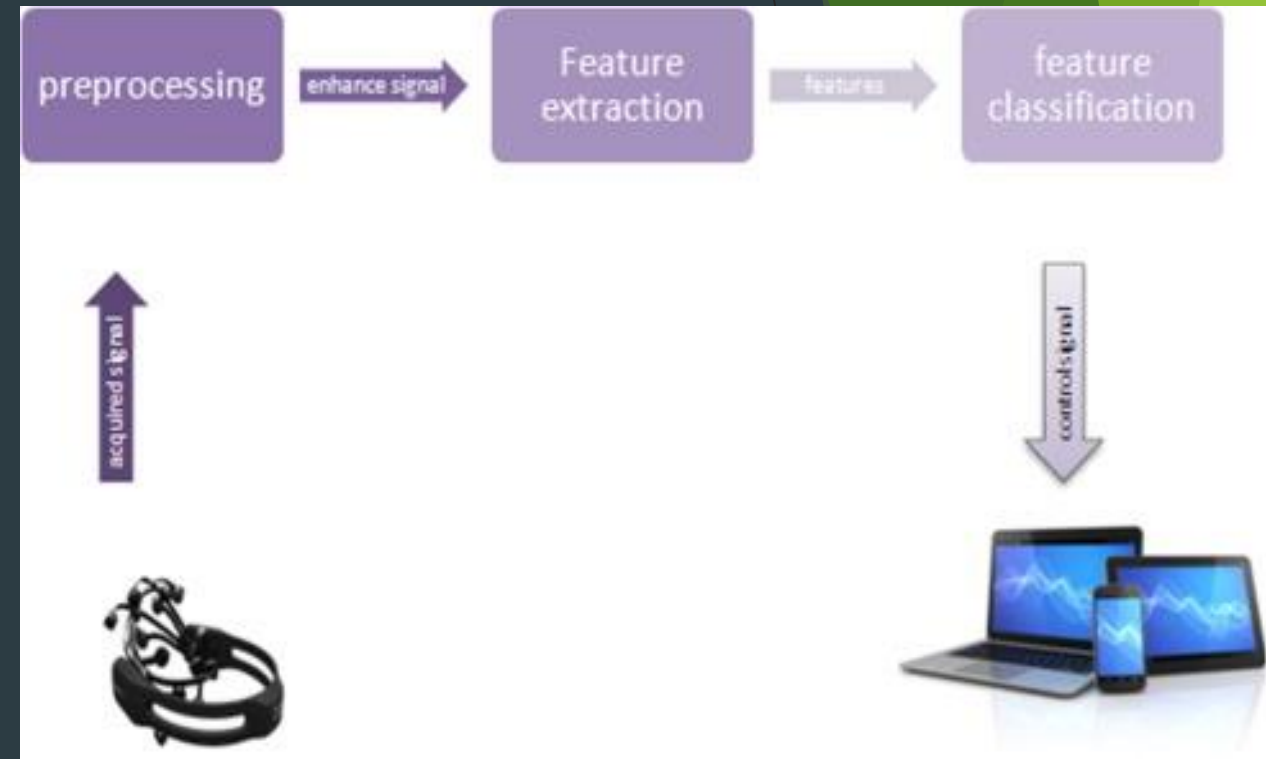
Signal Acquisition

Measuring brain generated oscillations is one of the main components in any BCI based system. It reflects the voluntary neural actions generated by user's current activity. Various methods for signal acquisition have been studied. It is the BCI application and the category of its intended users that decides the proper signal acquisition method and its measured phenomena.
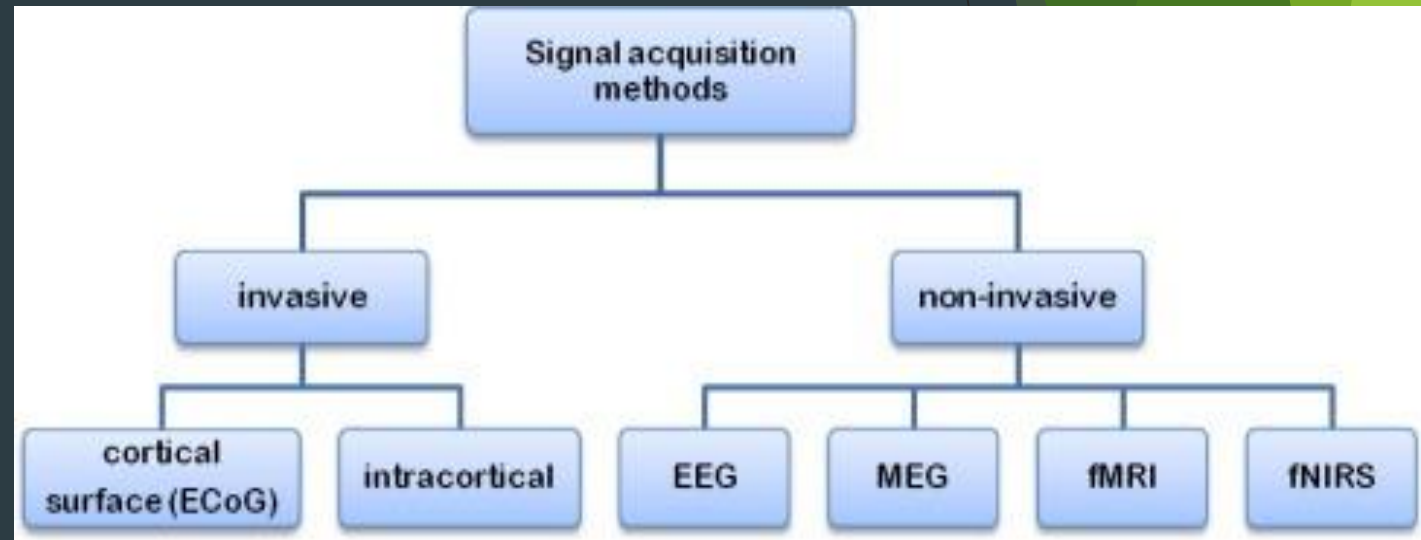
Challenges of BCI

Establishing the communication interface using brain signals has faced a lot of challenges. They can be categorized as technical and usability. Technical challenges are concerned with the system obstacles specially those regarding EEG features characteristics. Usability challenges describe the limitations affecting the level of human acceptance

- ▶ Usability challenges
- ▶ Training process
- ▶ Information Transfer Rate
- ▶ Non-linearity
- ▶ Non-stationarity and Noise
- ▶ High Dimentionilty Curse

Proposed Solutions

Several solutions have been investigated to confront and limit the influence of the previously mentioned technical issues. They are spread over various BCI system components. The following sections explain some employed methods for improving the performance of BCI based systems.

- ▶ Noise Removal
- ▶ Separability of multiple Classes
- ▶ Linear Discriminant Analysis
- ▶ Support Vector Machine

References

- https://www.creativebloq.com/mobile/10-principles-mobile-interface-design-4122910

- https://www.usatoday.com/story/tech/columnist/komando/2013/12/13/smartphone-battery-processing-display-camera/3921399/

- https://www.huffingtonpost.com/entry/the-7-problems-with-our-phones_us_59c13102e4b0f96732cbc938

- https://www.youtube.com/watch?v=LDcm6twPEJA

- https://ac.els-cdn.com/S1110866515000237/1-s2.0-S1110866515000237-main.pdf?_tid=702f36b1-be19-431e-a1a5-38017993db1e&acdnat=1540214506_291b554f406e7e6cd77828756f944ae5

- https://www.youtube.com/watch?v=CgFzmE2fGXA

- https://www.youtube.com/watch?v=tIuvUFRN59o

- https://www.quora.com/What-are-some-currently-practical-uses-of-brain-computer-interfaces

- https://computer.howstuffworks.com/brain-computer-interface2.htm