Analysis of Electroencephalography (EEG) Signals and Its Categorization

1. EEG – Nondestructive, pain less, side effect less and accurate interpretations for some brain diseases.  
Different signal frequencies for states/stimuli.

2. Description human brain

4. Electrodes placement and labels

5. Signal analysis

First phase: Acquisition  
Second phase: Artifact removal and data filtering  
Third phase: Feature extraction  
Fourth phase: Classification

Feature extraction techniques:

* Fourier Transform
* Wavelet
* Principal Component Analysis

6. Signals category: Delta (< 4 Hz), Theta (4-8 Hz), Alpha (8-13Hz), Beta (13-30 Hz).

Left side of brain is responsible for controlling right side of the human body and right side of the brain controls left side of human body.

A significant characteristic of EEG includes, non-destructive, pain less, side effect less and accurate interpretations for some brain diseases such as, epilepsy, memory loss, Alzheimer and autism.

Brain = 2 hemispheres, each hemisphere is further divided into four lobes: Frontal, Temporal, Parietal and Occipital.

Frontal lobe = Largest, behind the forehead.  
Temporal lobe = Sides of the brain under parietal and behind frontal.  
Occipital lobe = Lower back of the head 🡪 Relates to perception and process visual information.  
Parietal lobe = Behind frontal lobe.

10-20 standards for EEG placement.  
Letter for lobes, midline region referred by a label with “z”, odd numbers = left hemisphere, even numbers = right hemisphere.

Pz, P3, P4 = Related to cognitive processing.  
**Oz, O1, O2** = Deals with visual processing stimuli.