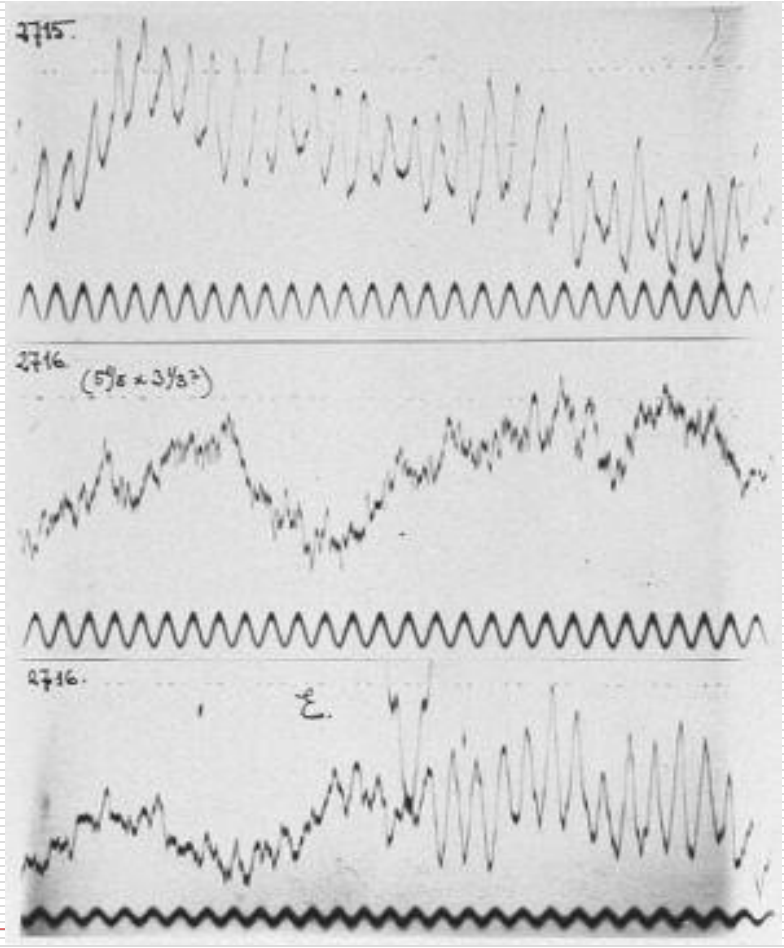
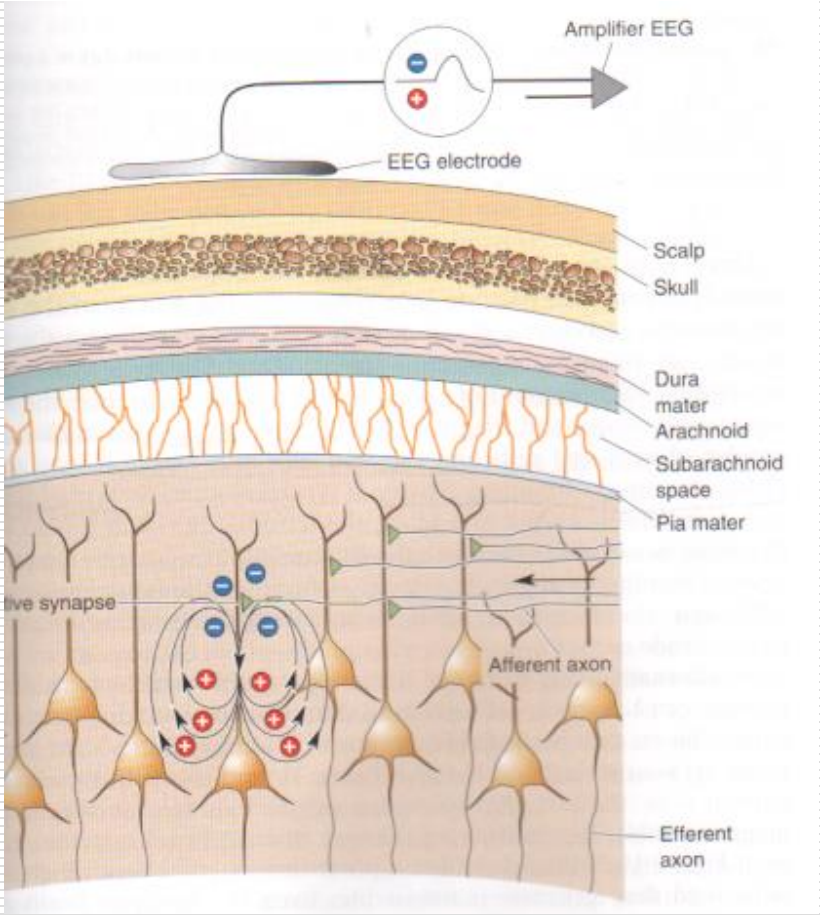
EEG

- The electroencephalogram (EEG) is a recording of the electrical activity of the brain from the scalp.
- The first recordings were made by Hans Berger in 1929

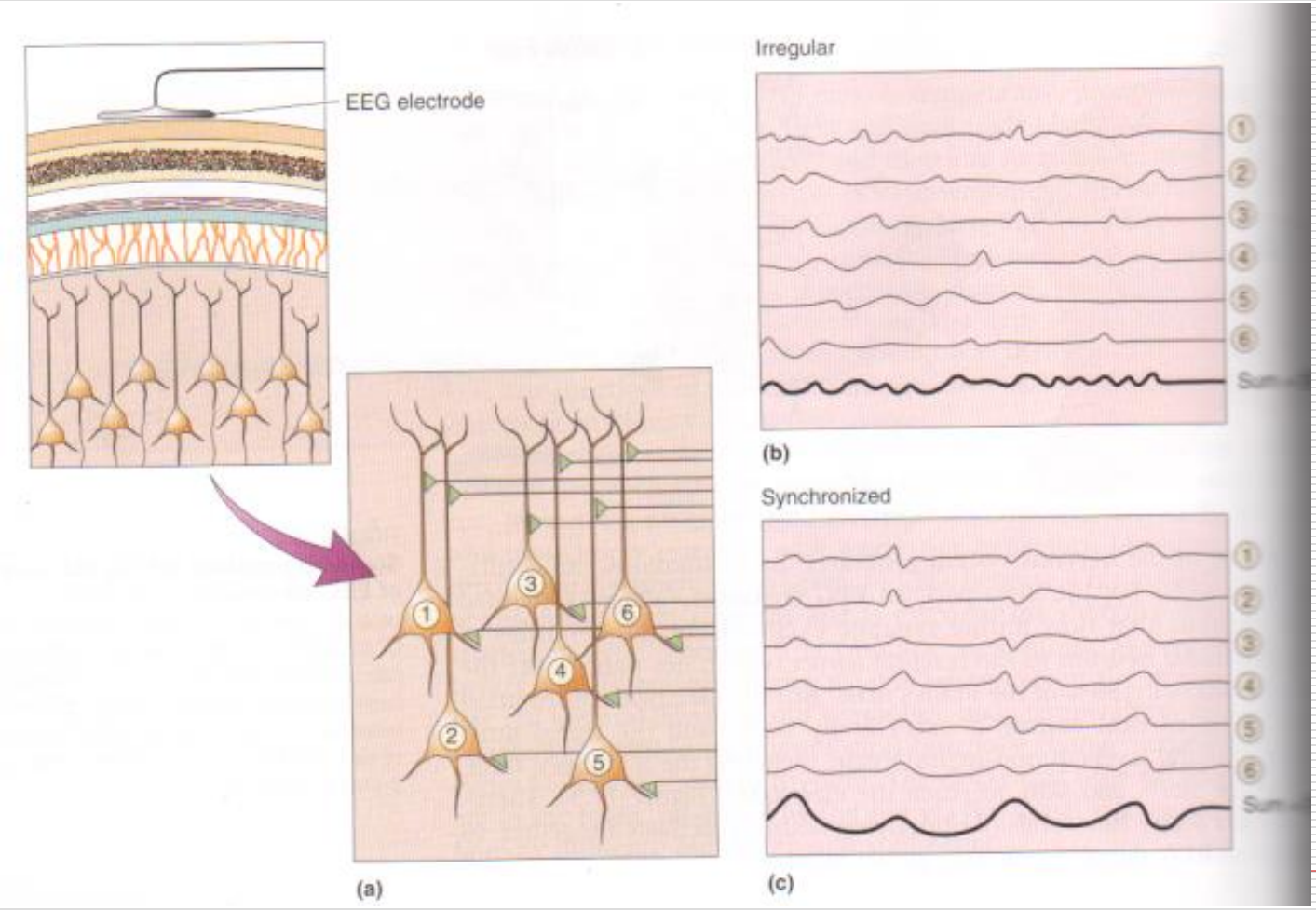
Origin of EEG waves



Origin of EEG waves



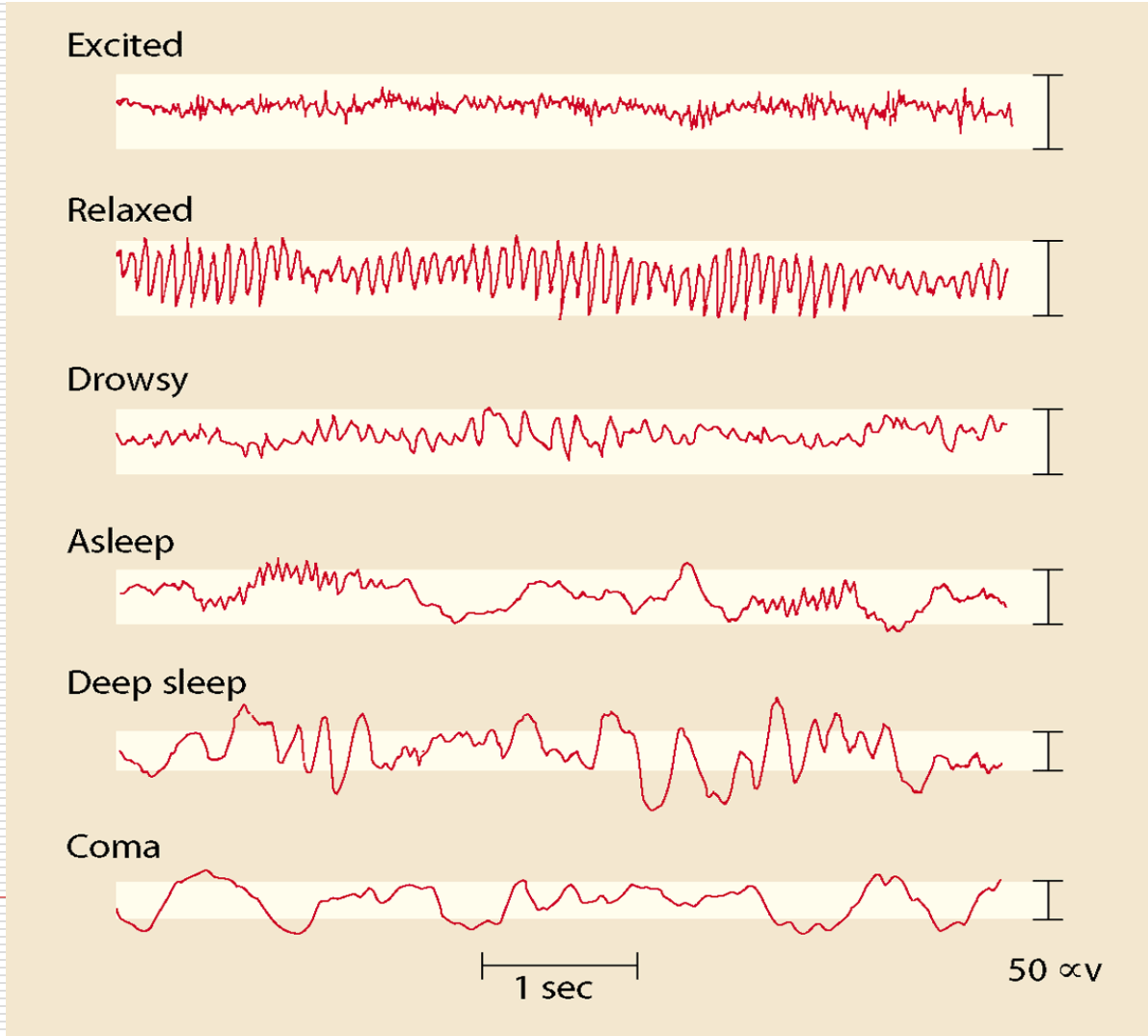
Generation of large EEG signals by synchronous activity



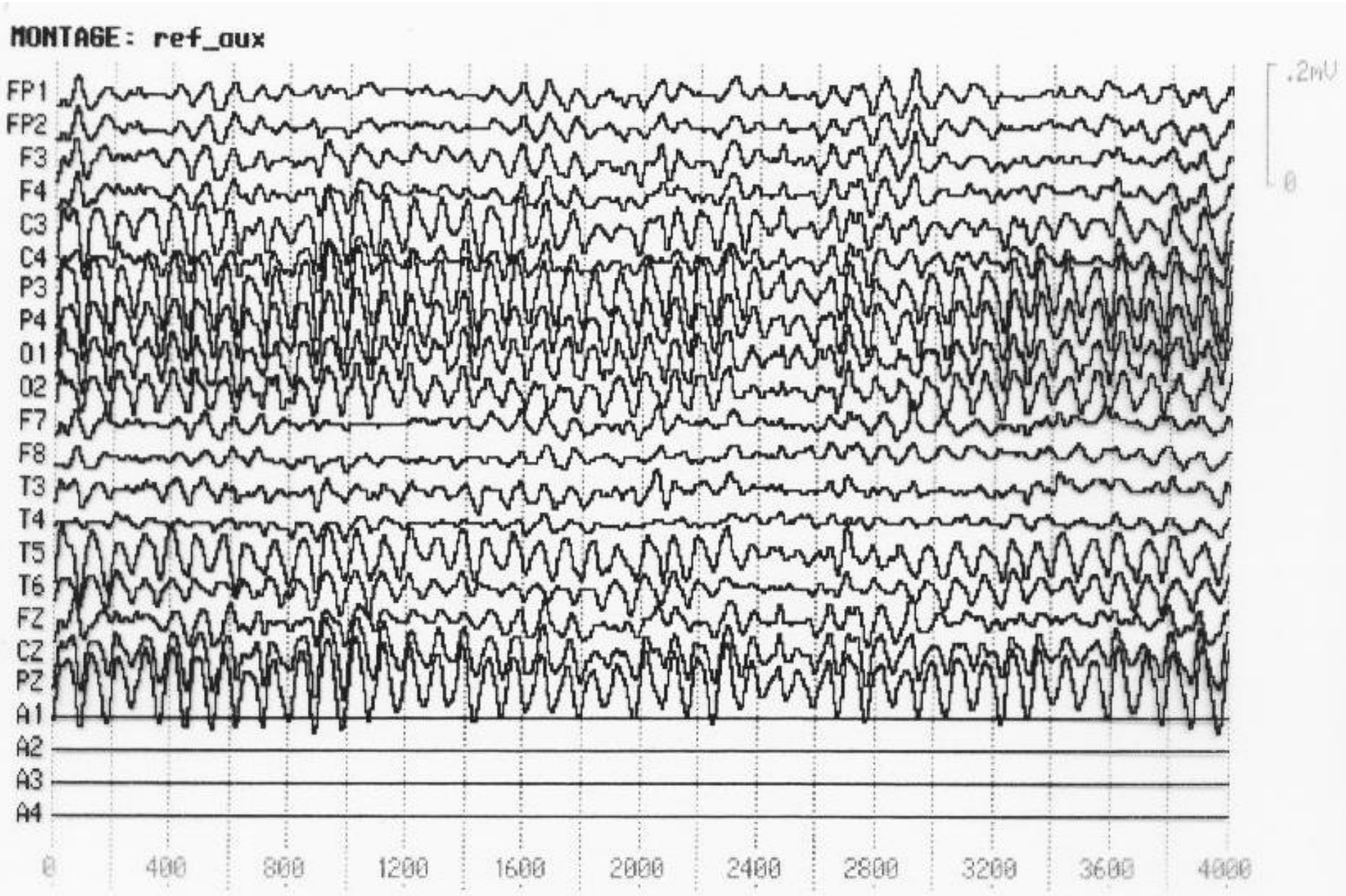
EEG Waves

- Alpha wave → 8 – 13 Hz.
- Beta wave → 13 Hz. (14 – 30 Hz.)
- Theta wave → 4 – 7.5 Hz.
- Delta waves → 1 – 3.5 Hz.

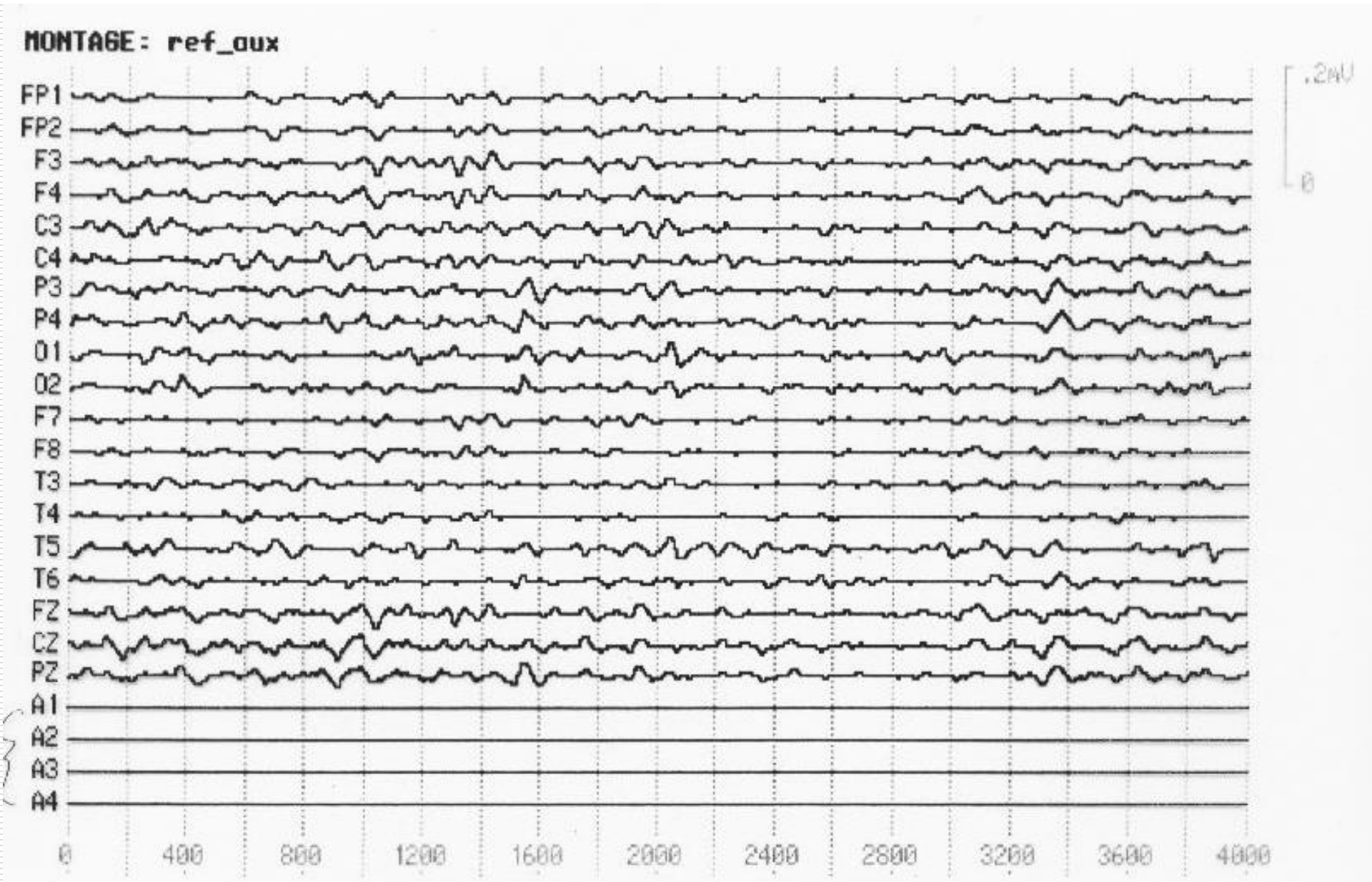
Different types of brain waves in normal EEG



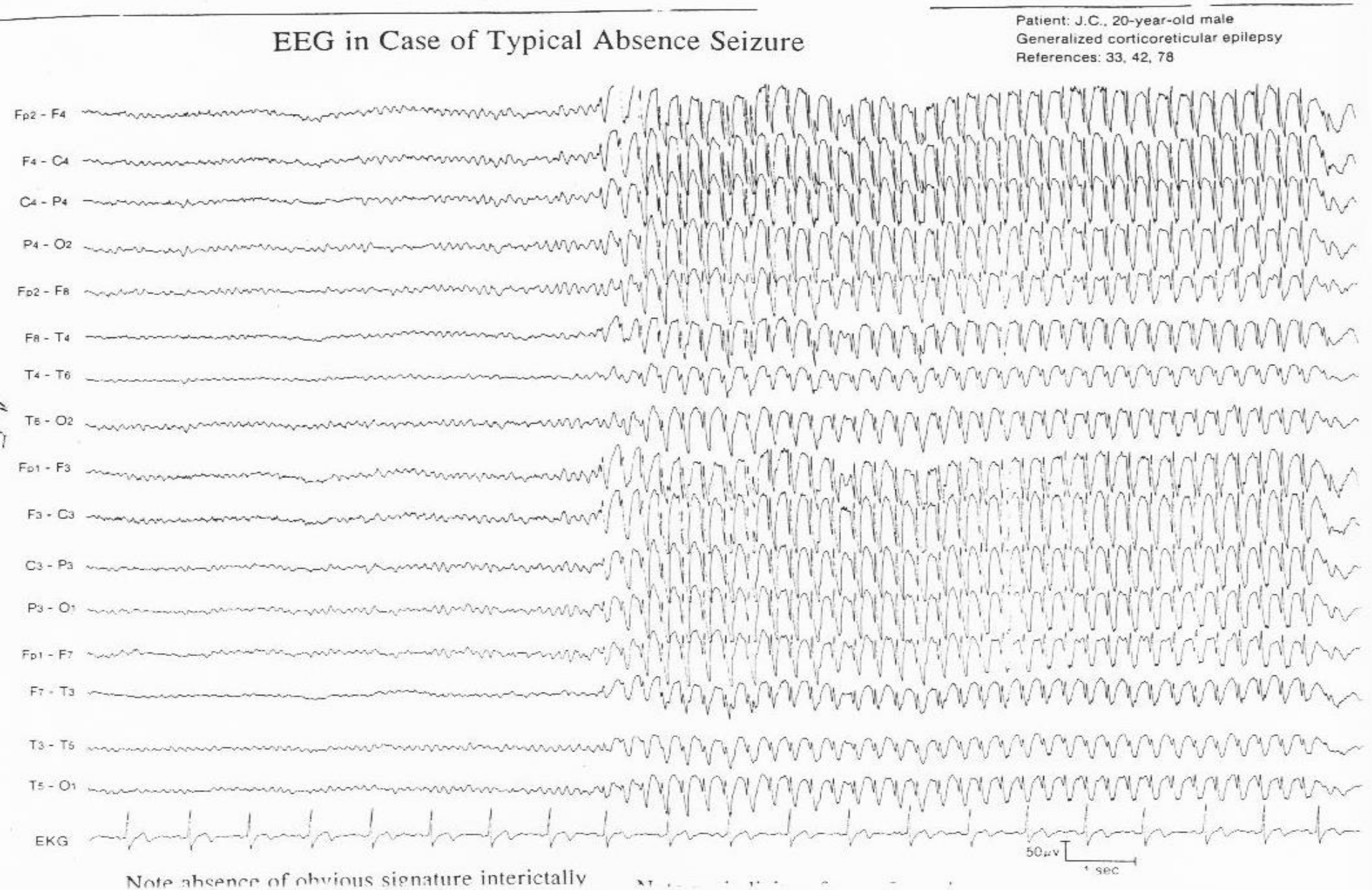
EEG – Eyes Closed



EEG – Eyes open



EEG – Epilepsy

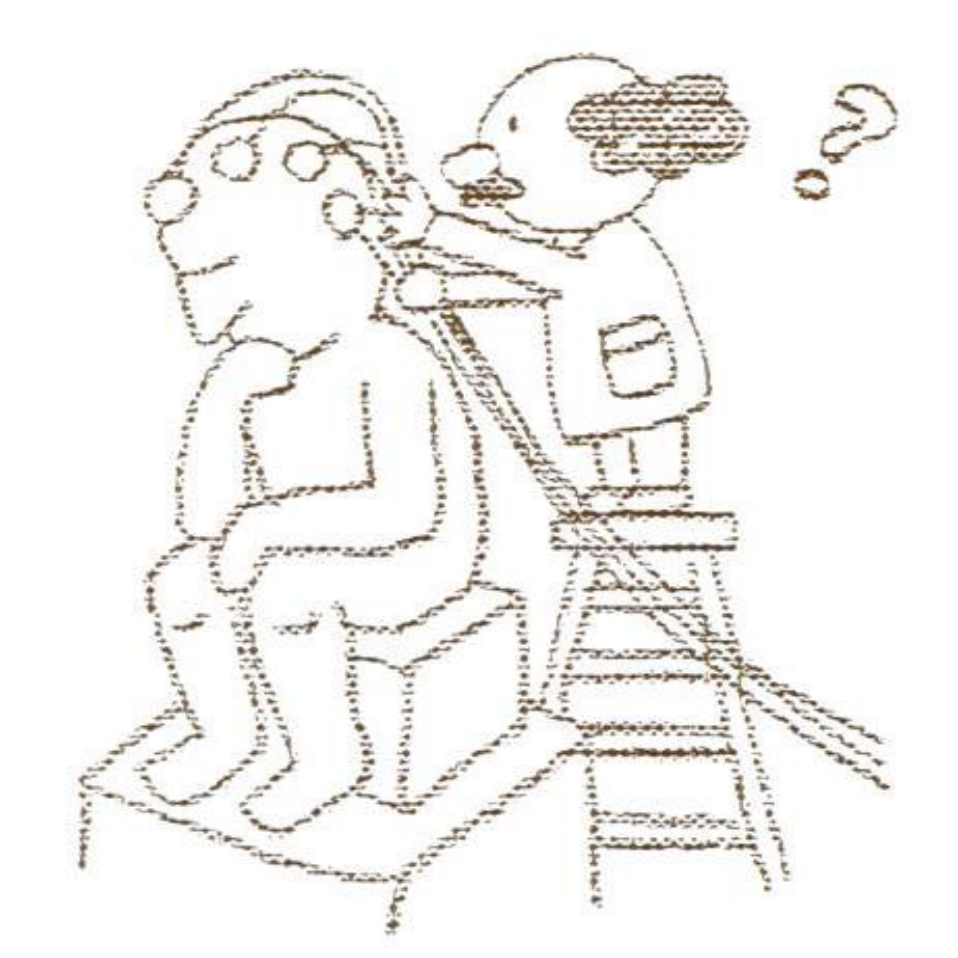


EEG Recording

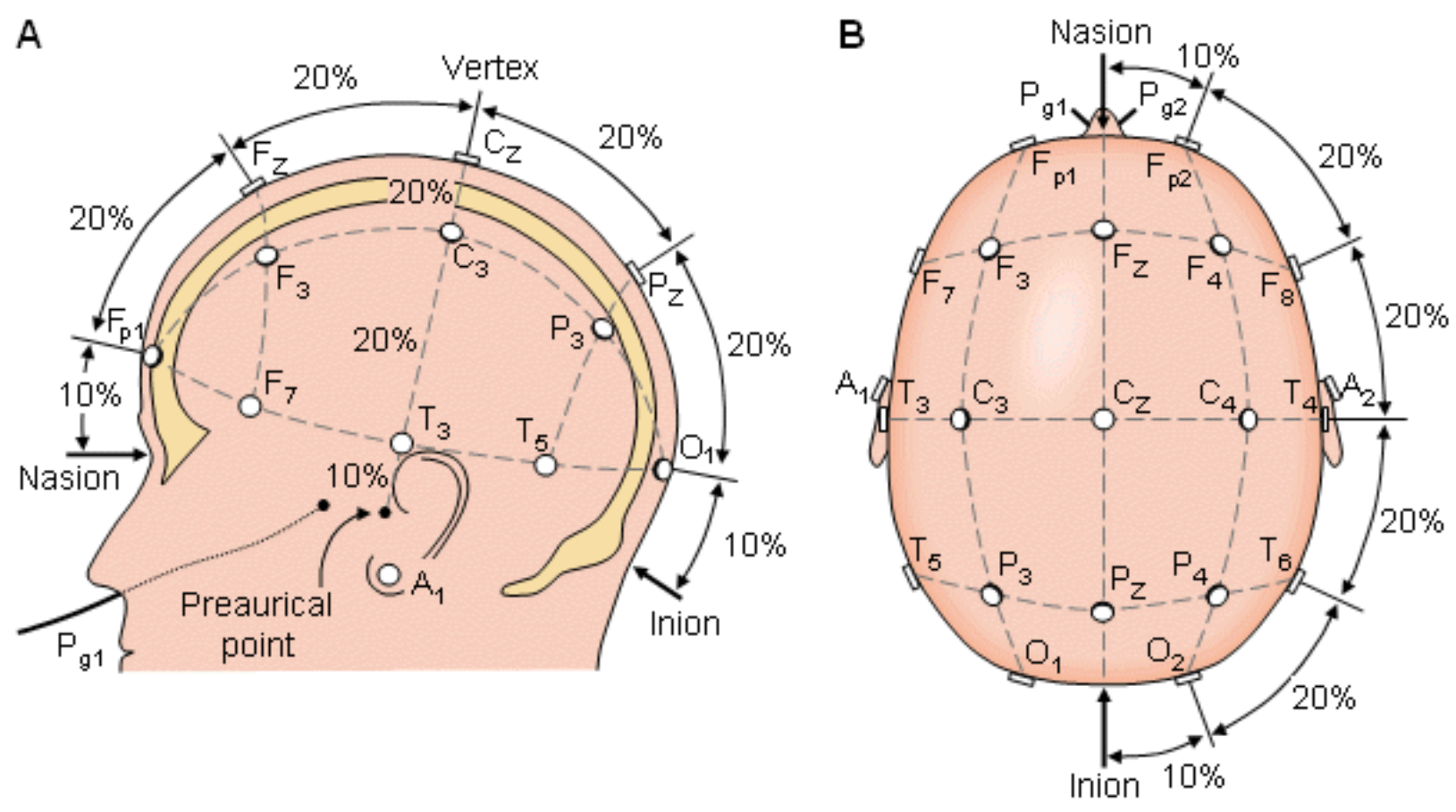
Healthcare systems

Wearable Devices

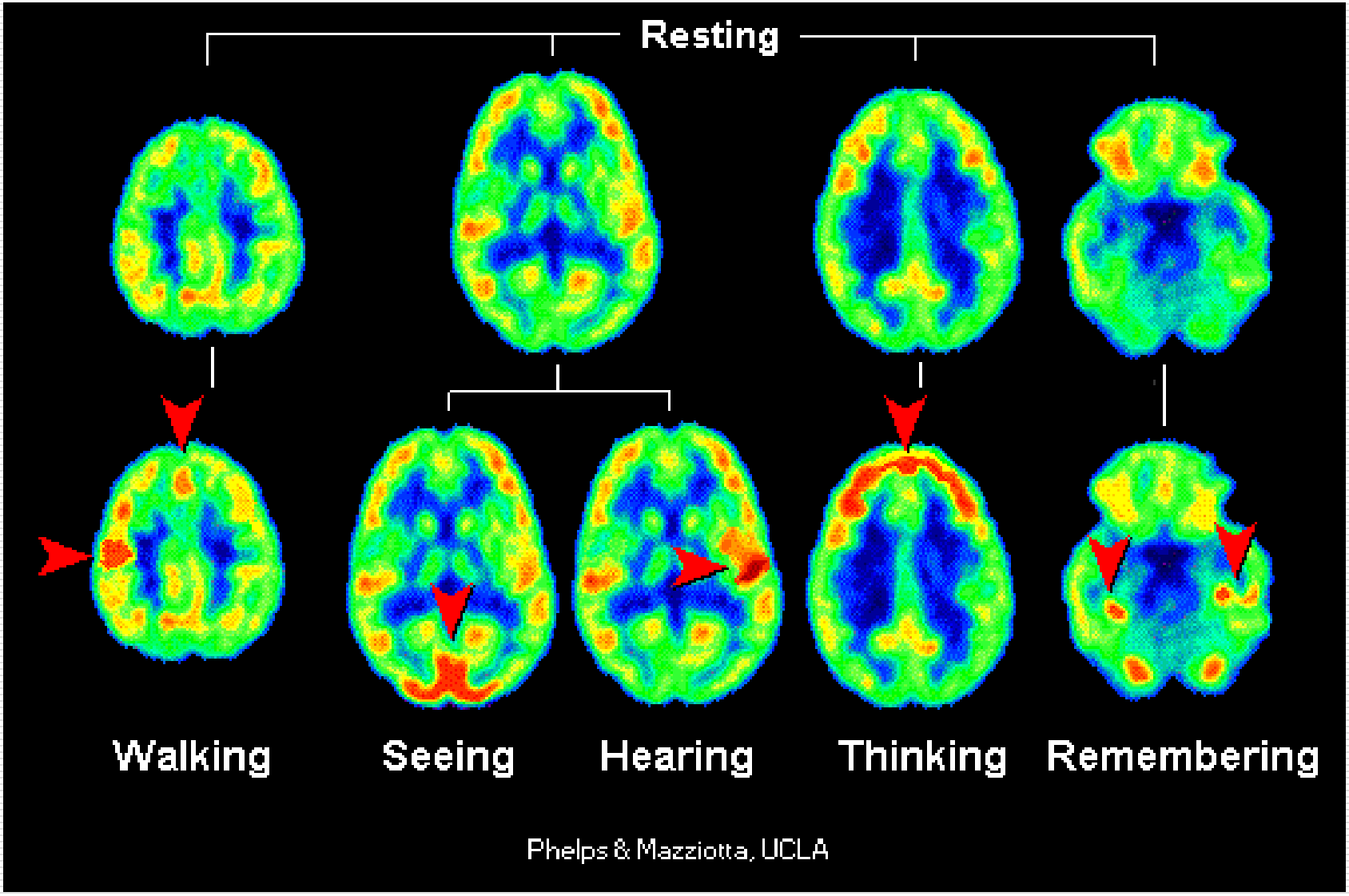
Electrode Positioning System



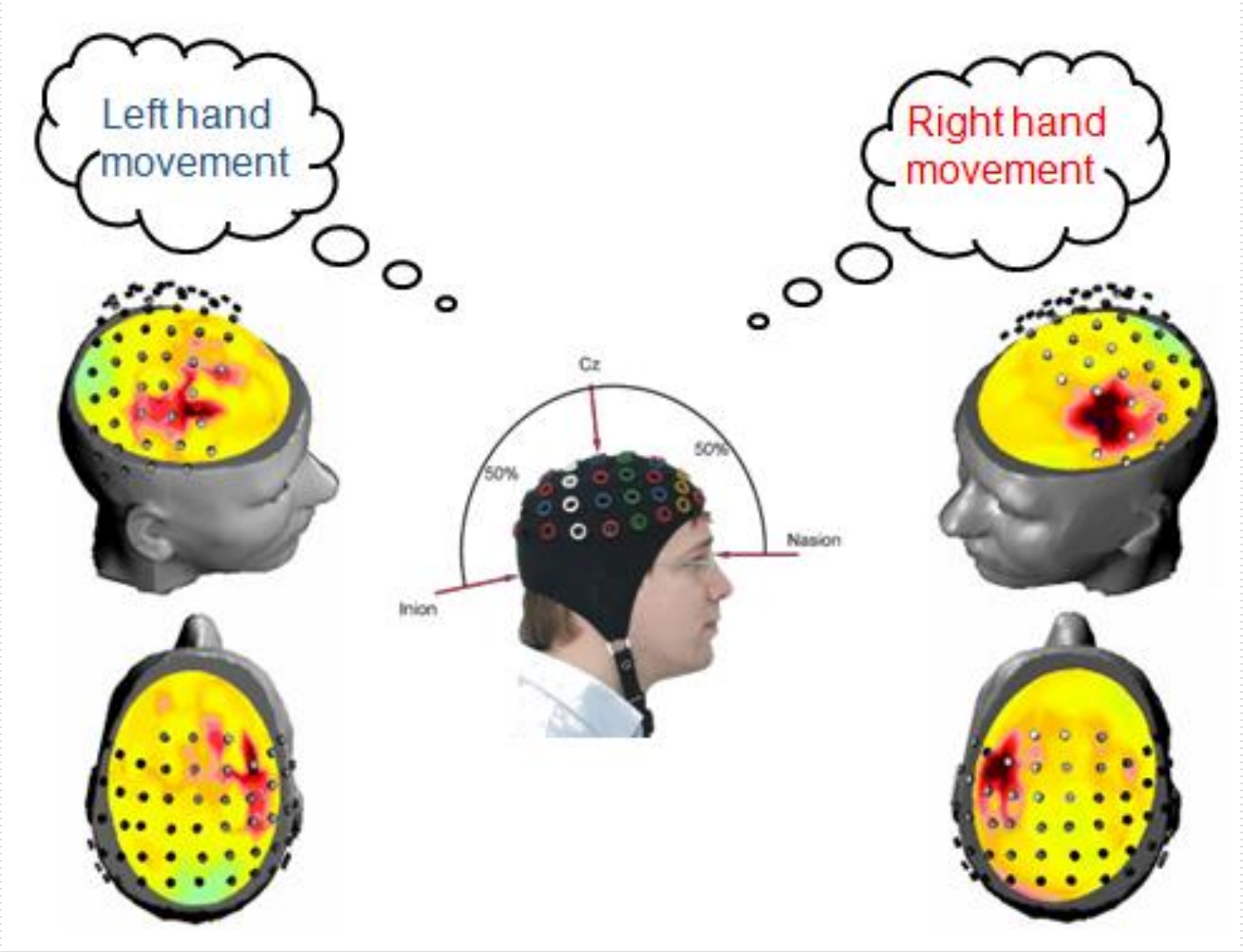
10/20 system of EEG electrode placement



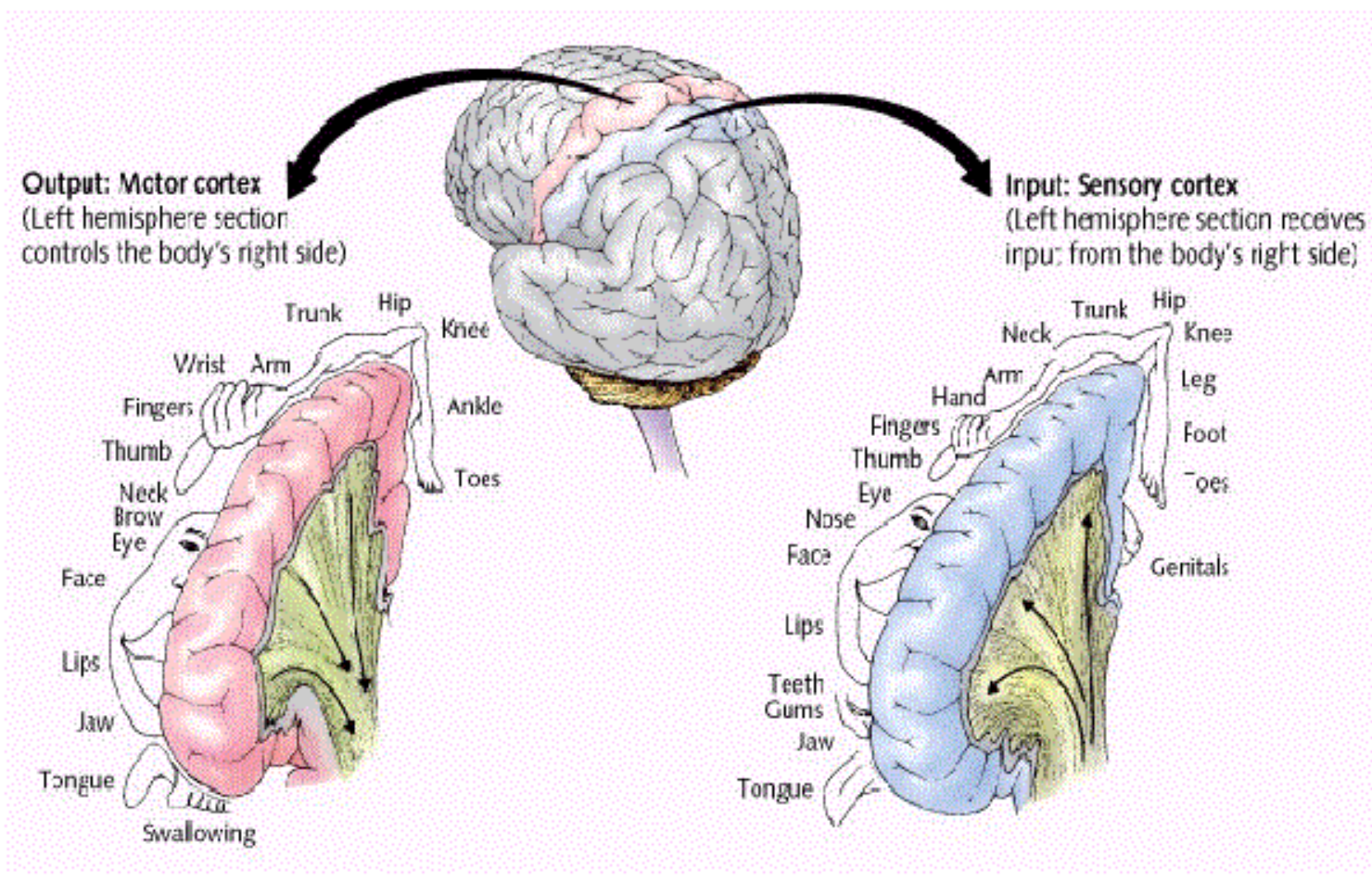
Brain activity by task



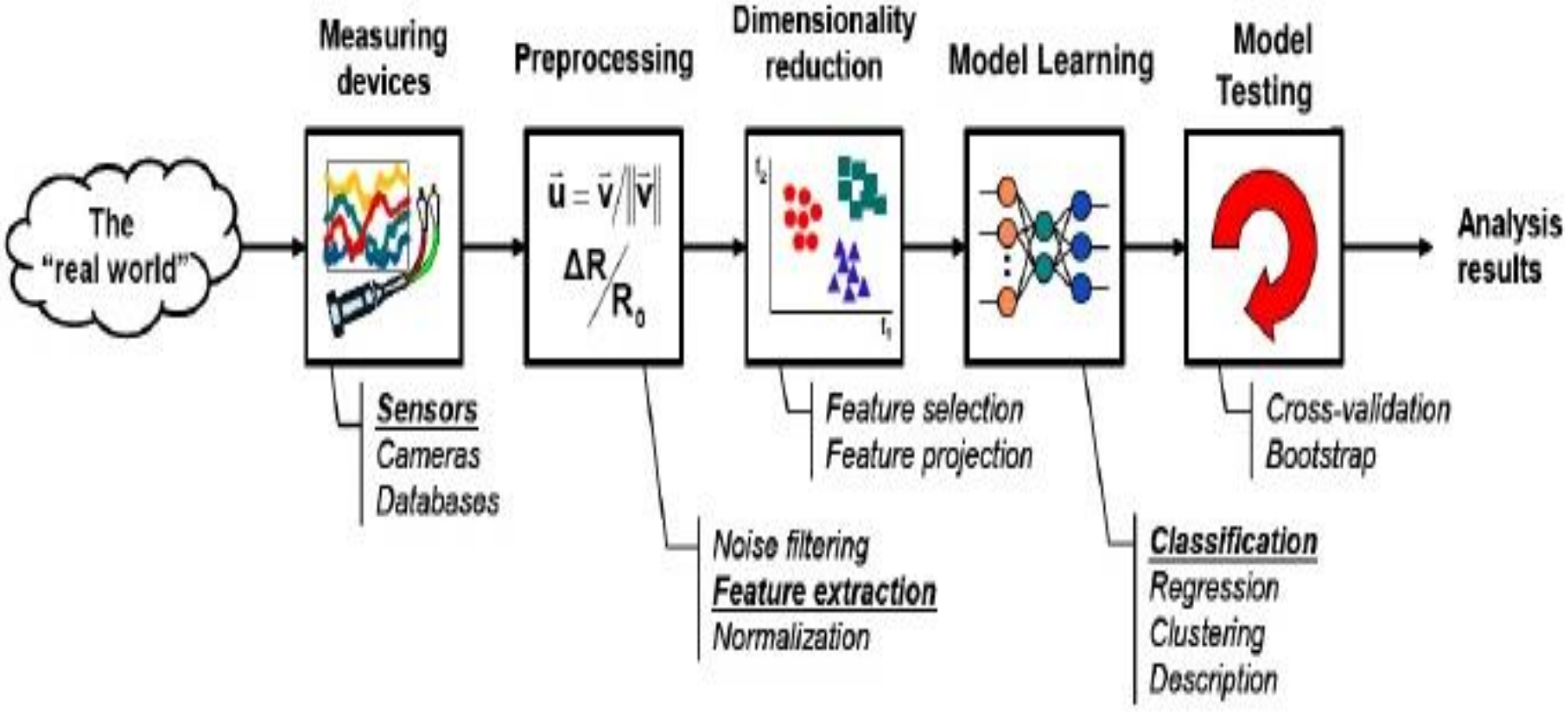
Motor EEG


Left hand movement
Right hand movement
Cz
50%
50%
Nasion
Inion

Motor EEG

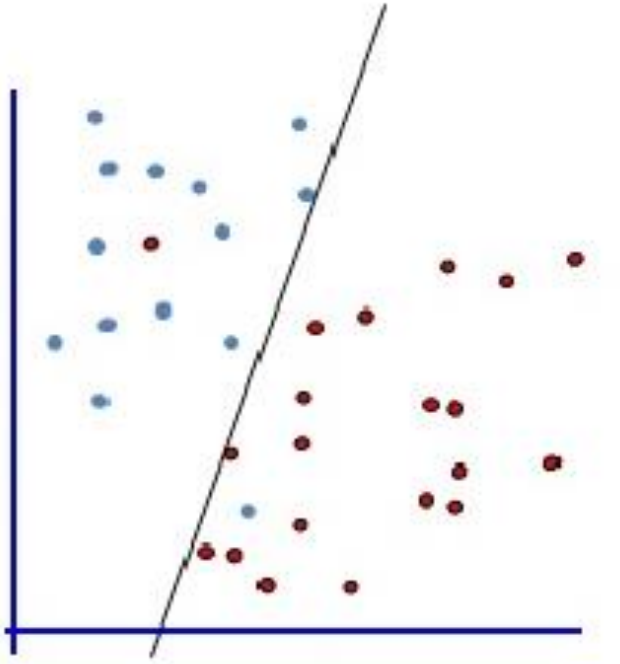

Output: Motor cortex
(Left hemisphere section controls the body's right side)
Trunk
Hip
Knee
Wrist
Arm
Fingers
Thumb
Ankle
Toes
Neck
Brow
Eye
Face
Lips
Jaw
Tongue
Swallowing
Input: Sensory cortex
(Left hemisphere section receives input from the body's right side)
Trunk
Hip
Neck
Knee
Arm
Leg
Hand
Fingers
Foot
Thumb
Toes
Eye
Nose
Face
Genitals
Lips
Teeth
Gums
Jaw
Tongue

Machine Learning

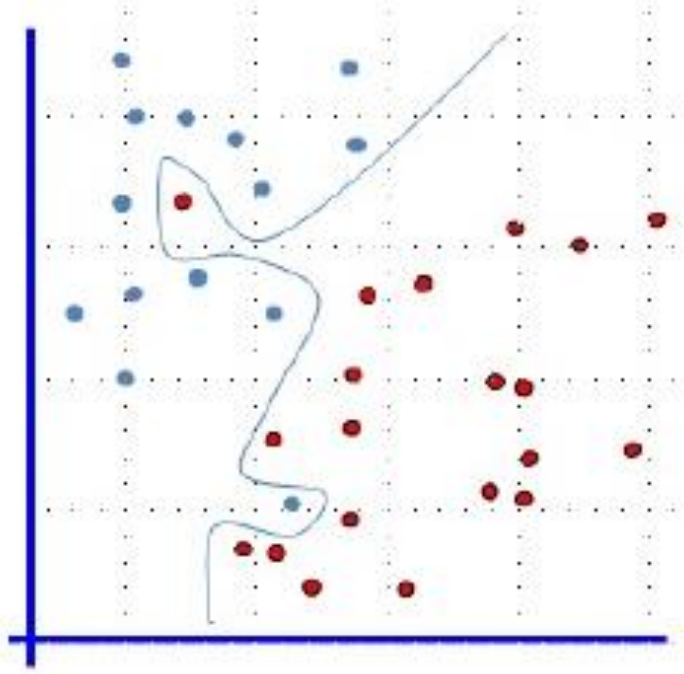


Machine Learning

Classification Models



2 Errors
Simple model



0 Errors
Complicated model