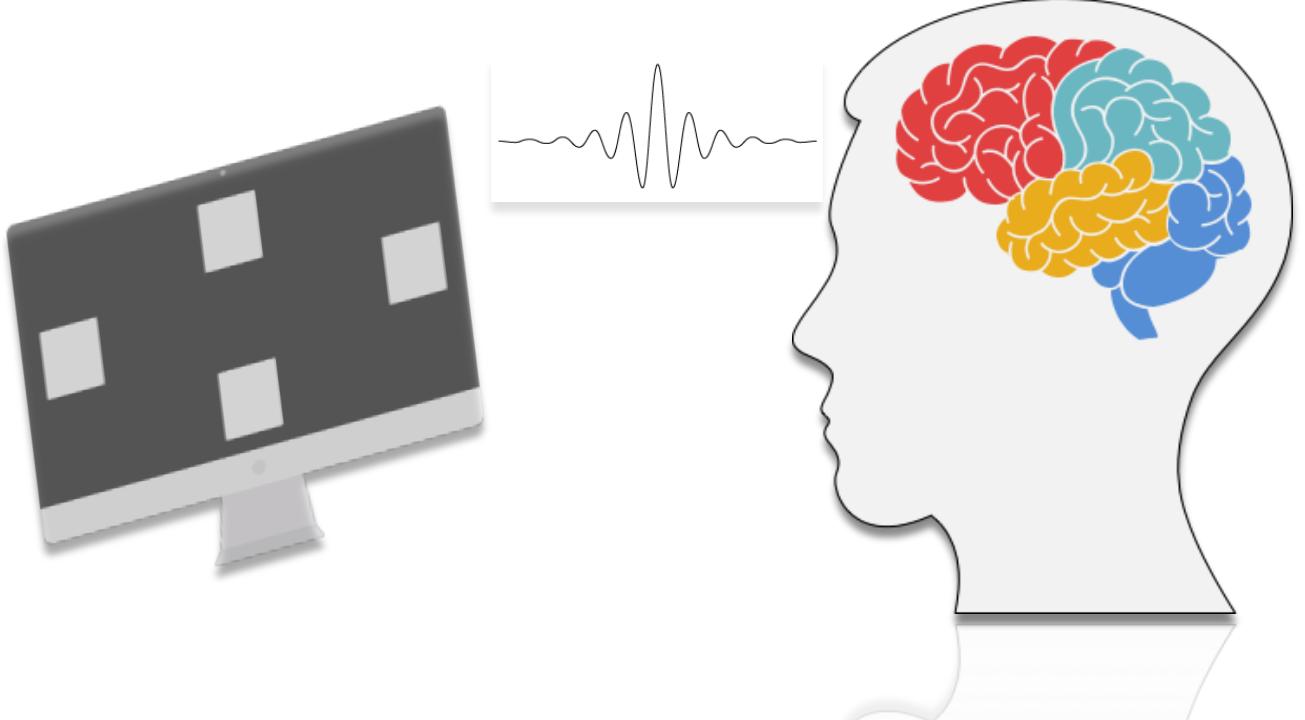
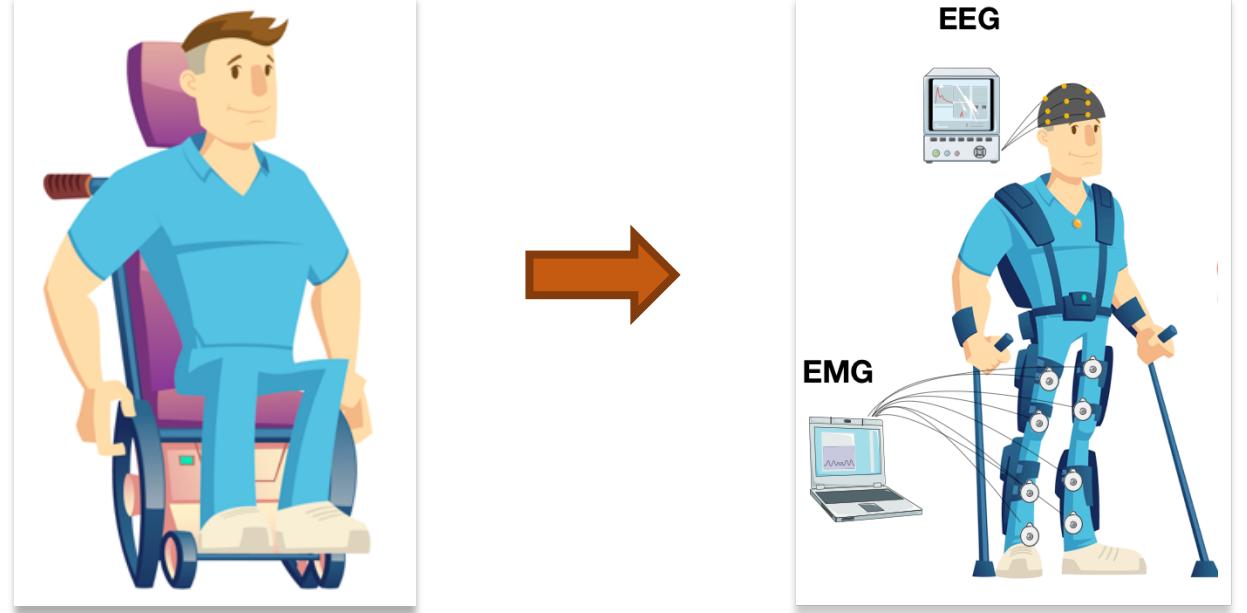
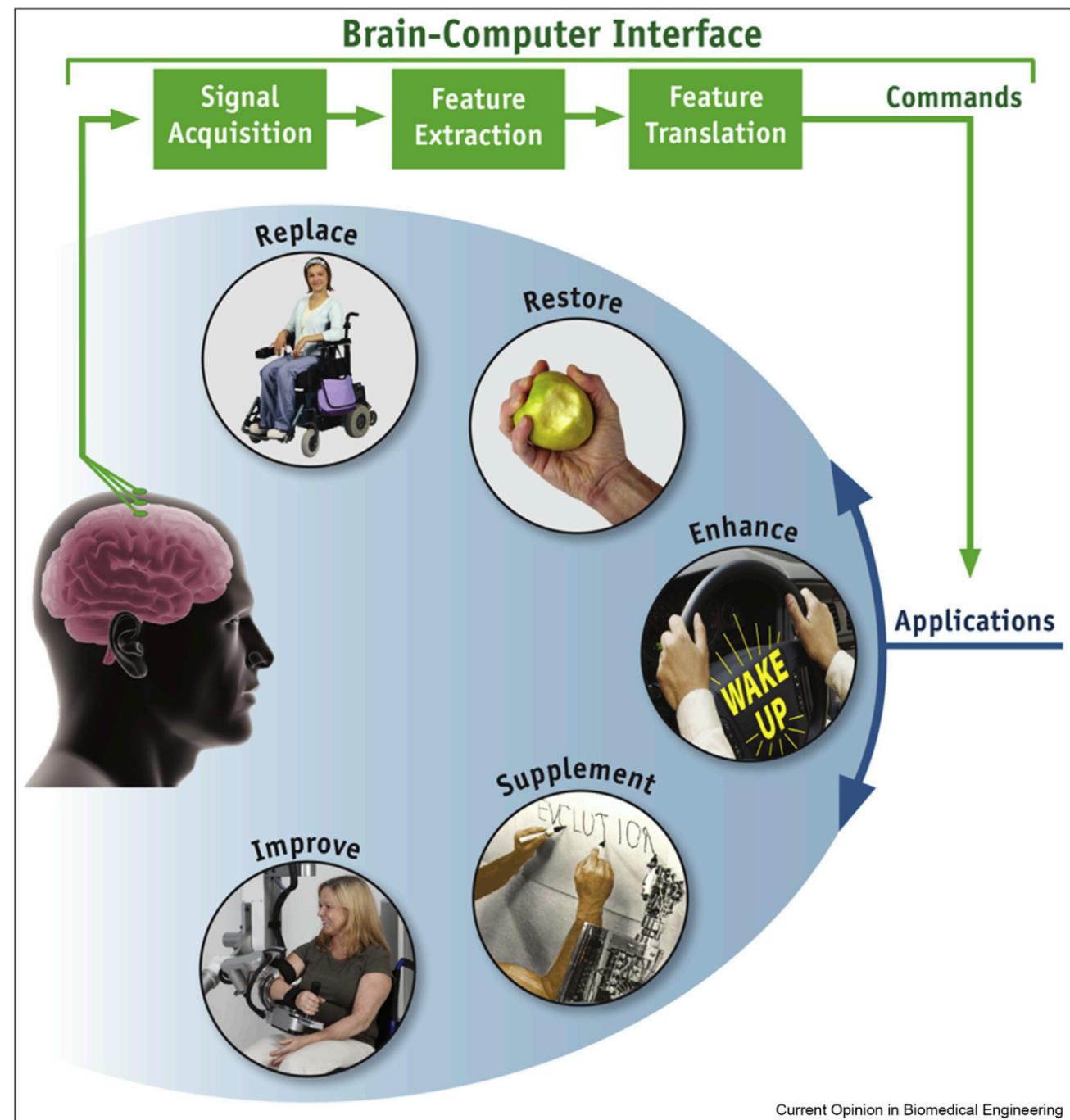


Brain Computer Interfaces

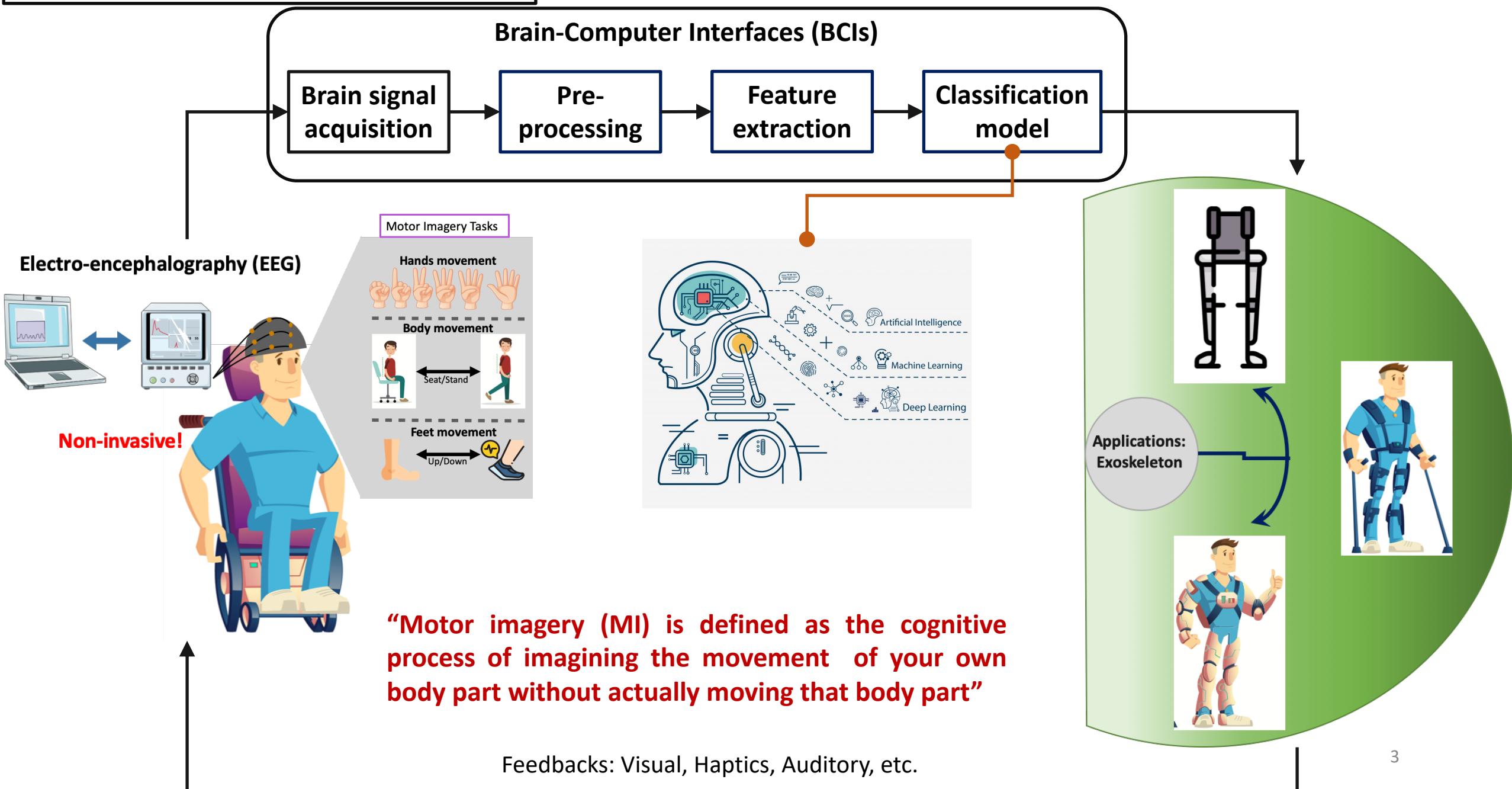


Electroencephalography (EEG)-based brain-computer interface (BCI)

- EEG is the non-invasive technique
- The continuous recording of electrical brain activity
- Electrical signals produced by brain activity are recorded from the scalp, from the cortical surface, or from within the brain
- They are analyzed to measure specific features (e.g., amplitudes of EEG rhythms or firing rates of single neurons) that reflect the BCI user's intent
- These features are translated into commands that operate applications



Motor imagery (MI) Based BCI



Event-Related Potential (ERP) Based BCI

Target notice

MACHINE LEARNING					
A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X
Y	Z	1	2	3	4
5	6	7	8	9	-

MACHINE LEARNING					
A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X
Y	Z	1	2	3	4
5	6	7	8	9	-

MACHINE LEARNING					
A	B	C	D	E	F
G	H	I	J	K	L
M	N	O	P	Q	R
S	T	U	V	W	X
Y	Z	1	2	3	4
5	6	7	8	9	-

MACHINE LEARNING					
A	B	C	D	E	F
G			J	K	L
M	N	O		Q	R
S	T	U	V	W	X
Y	Z	1	2	3	4
5	6	7	8	9	

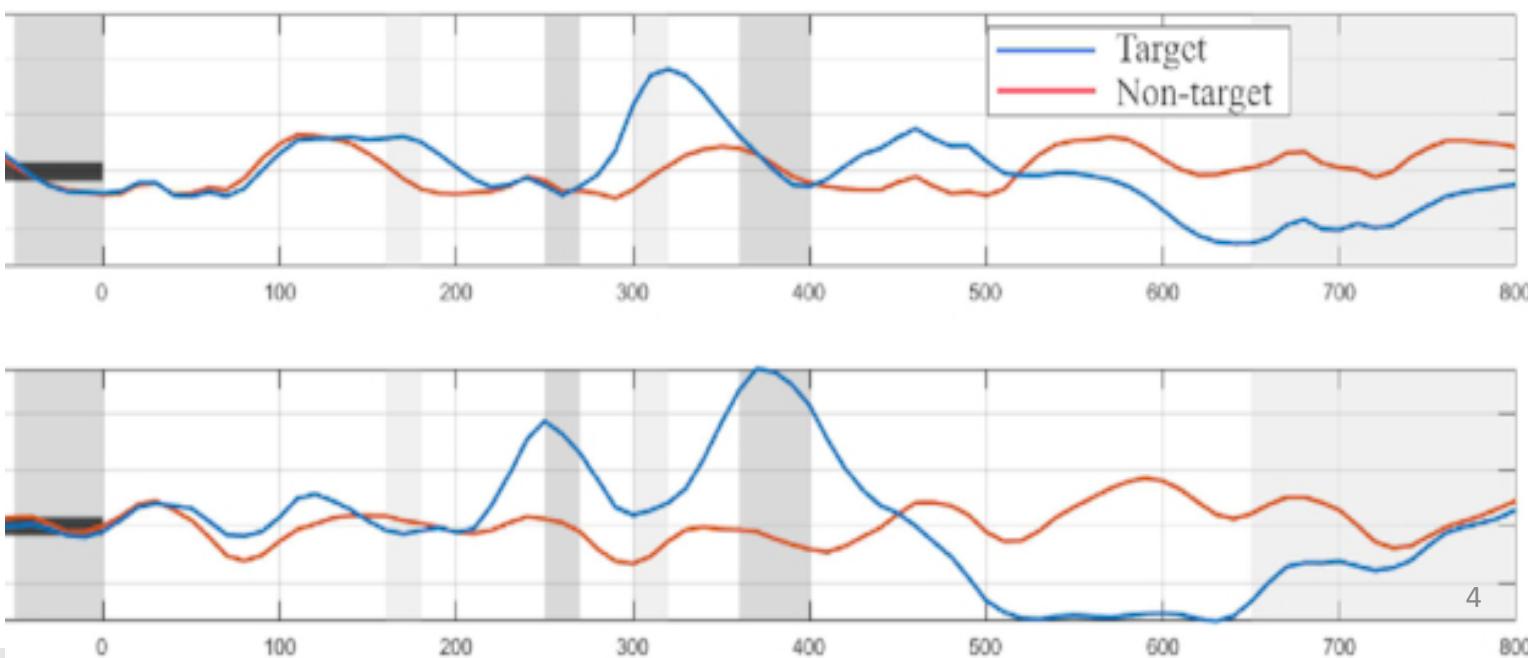
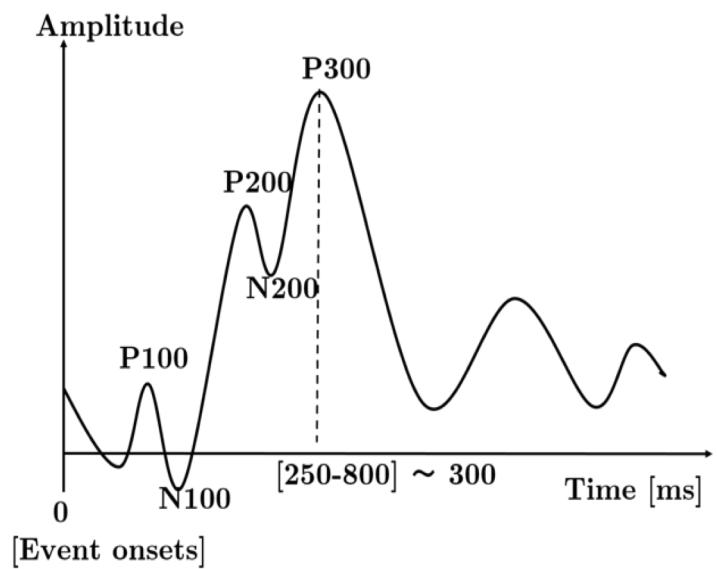
...

Rest
2 s

4.5 s

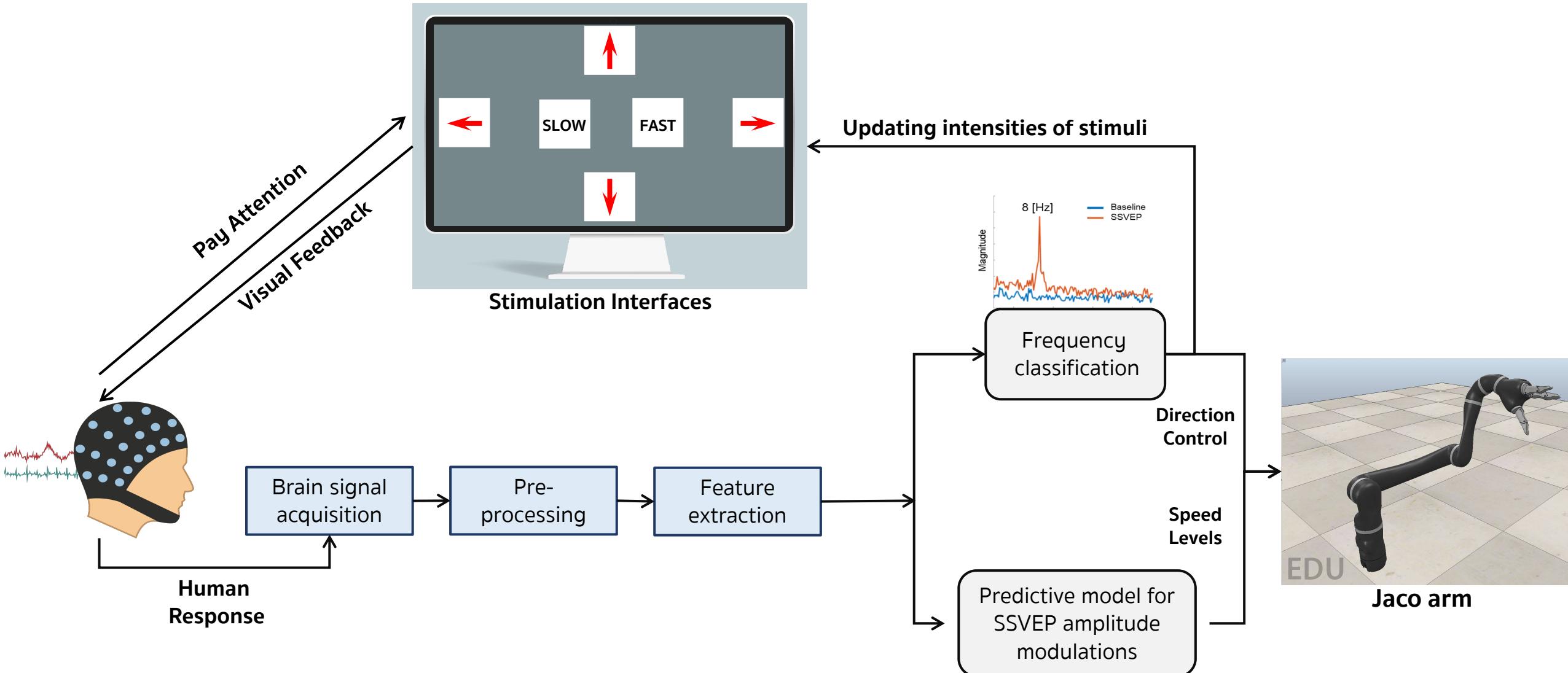
Trigger

The 6×6 ERP speller layout



SSVEP based BCI towards continuously control robotics

- Steady state visually evoked potential (SSVEP) has been generally high signal-to-noise ratio (SNR) and high information transfer rate (ITR).
- An electrical potential that is evoked from visual cortex within approximately 300 ms after the presentation of visual stimulus.



Let's get your hands dirty!

Let's go to our workshop...