

Brain-Computer Interface

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After midterm . . .



or



Stay in bed?

See our TA?

THE FOLLOWING **PREVIEW** HAS BEEN APPROVED FOR
APPROPRIATE AUDIENCES
BY THE MOTION PICTURE ASSOCIATION OF AMERICA, INC.

www.filmratings.com

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In surrogate

- 📌 You can control your surrogate with your brain
- 📌 Live your life without limitation
- 📌 You see what they see
- 📌 You feel what they feel
- 📌 Become anyone your want to be
- 📌 That's how BCI so powerful!

What is BCI ?

- 📌 **Brain–computer interface**
- 📌 Often called a **mind-machine interface (MMI)**
- 📌 A direct communication pathway between the brain and an external device



Architecture

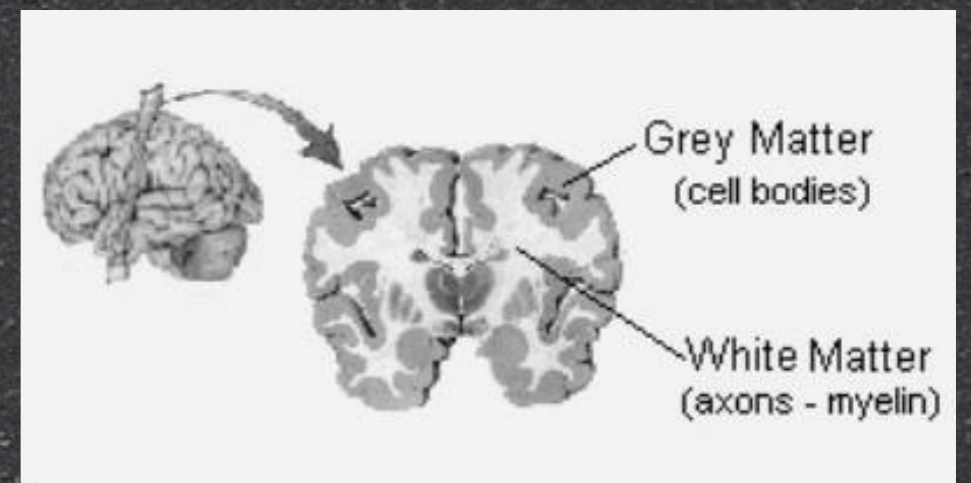
- 📌 Signal Acquisition
- 📌 Signal Processing
- 📌 Devices

Methods

- 📌 Invasive BCIs
- 📌 Partially invasive BCIs
- 📌 Non-invasive BCIs

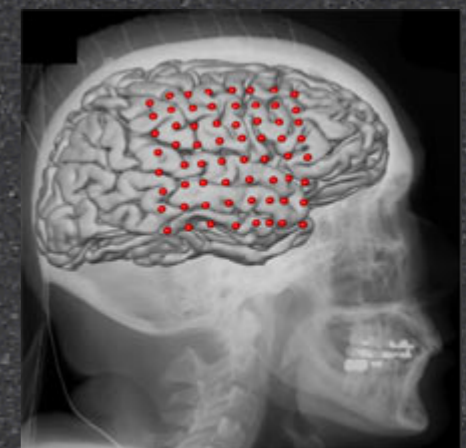
Invasive BCIs

- 📌 Invasive BCIs are implanted directly into the grey matter of the brain during neurosurgery
- 📌 Produce the highest quality signals of BCI devices but are prone to scar-tissue build-up



Partially Invasive BCIs

- Implanted inside the skull but rest outside the brain rather than within the grey matter
- Better resolution signals than non-invasive BCIs
- Lower risk of forming scar-tissue in the brain than fully invasive BCIs



Non-invasive BCIs

- 📌 lower resolution signals
- 📌 No scar-tissue problem
- 📌 Electroencephalography(EEG)
- 📌 Magnetoencephalography(MEG)
- 📌 Functional magnetic resonance imaging(fMRI)



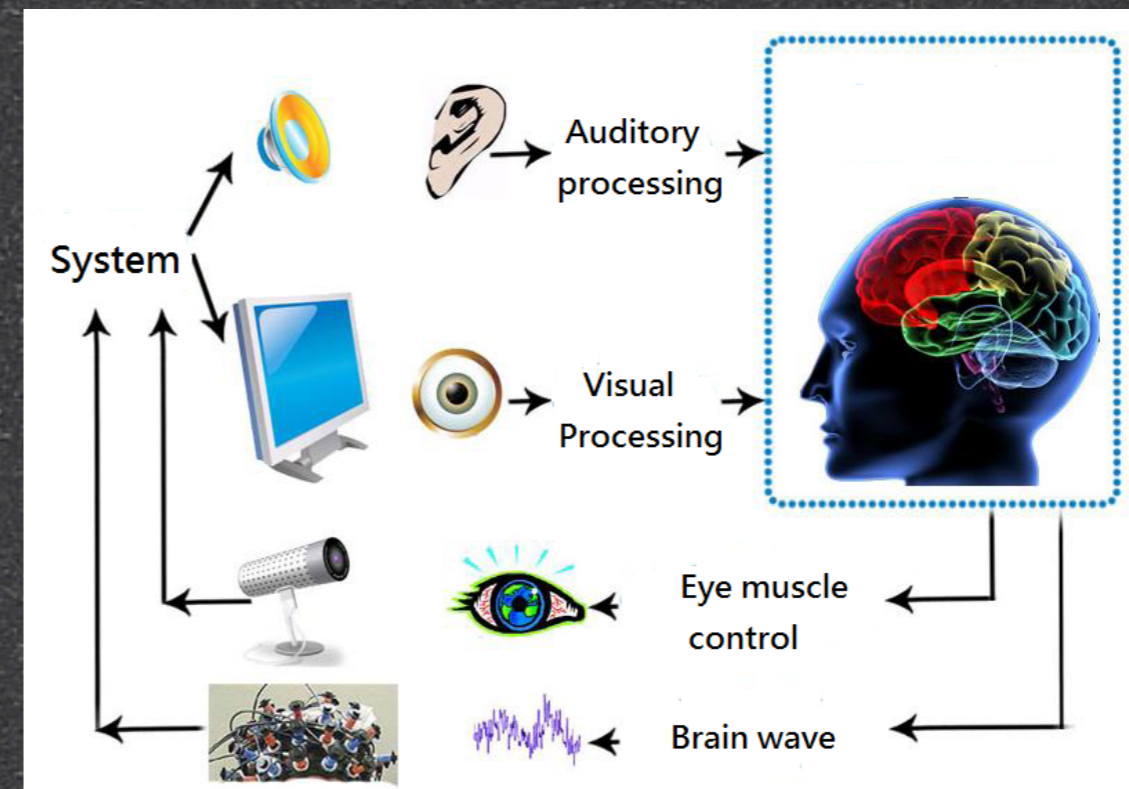
Research in BCI

Motion Control of Robot

- 📌 Feedback of mind control
- 📌 Position, Speed, acceleration
- 📌 Intelligent processing
- 📌 Environmental Information

Cognitive Research

- 📌 Soft platform
- 📌 Facial expressions
- 📌 Head motion



Intelligent Vehicle of Disability

- Information fusion technology
- BCI
- Blinking control
- GPS
- Laser radarSpeed



Mind Control

- 📌 Monkey operates a robotic arm with BCI
- 📌 Controlling a robotic dog with BCI
- 📌 A man operates the computer with his EEG
- 📌 Telephone

Monkey Eats Banana



Brain Loop



BCI On the Go!

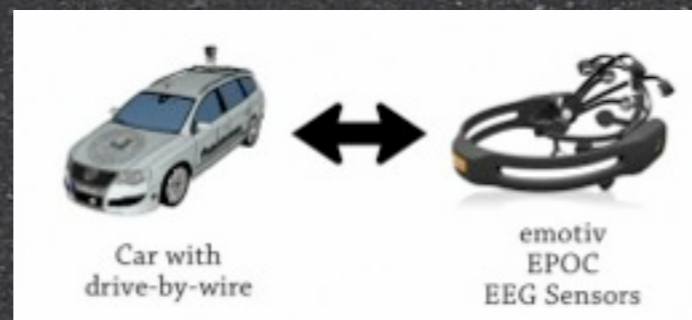
First Commercial Interface

- US\$300
- Wireless
- Detects conscious thoughts, expressions and non-conscious emotions based on electrical signals
- Can be controlled with our thoughts, expressions and emotions
- Use the unit's facial recognition sensors to mimic a game player's facial expressions in an animated avatar



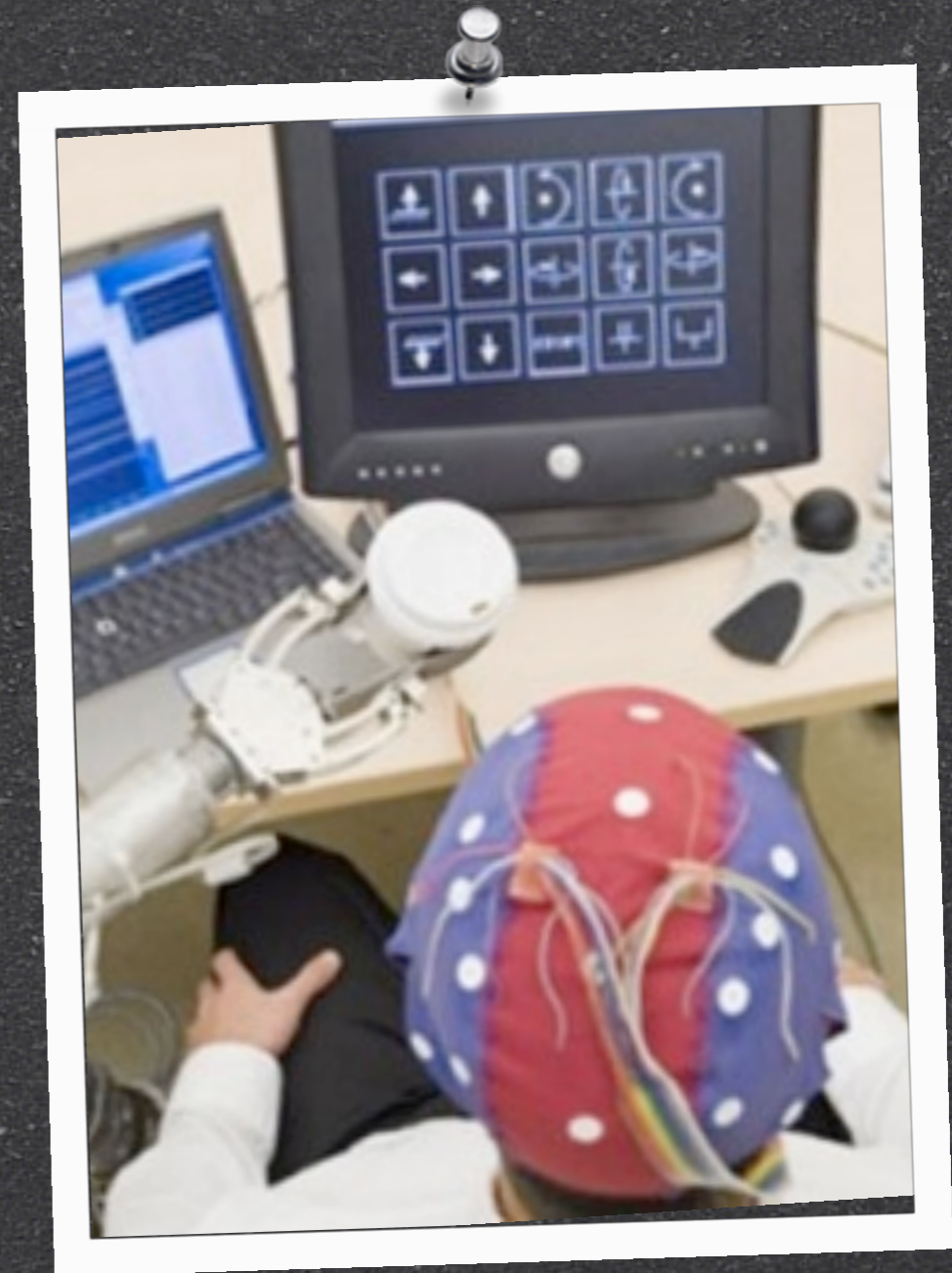
Thought-Controlled Car

- Acquires bioelectric signals from the driver via 16 EEG sensors on the EPOC neuroheadset
- Drivers first learn to move a cube back and forth on a computer screen by altering their thought patterns
- Allow passengers to assist autonomous cars when the vehicles are unsure of which road to take at an intersection



Wheelchair

- Display a matrix of several options that include actions or directions
- User concentrates on the option desired to trigger



Say Goodbye to Touchscreen

- Already released, US\$100
- XWave app that includes a number of exercises aimed at training your brain
- Levitating a ball on the iDevice's screen
- Changing a color based on the relaxation level of your brain

- Training your brain to maximize its attention span



Q & A

