EOG based virtual keyboard

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NANYANG TECHNOLOGICAL UNIVERSITY

URECA *Undergraduate Research Experience on CAmpus*

Category : 4
Project ID : SCE07104

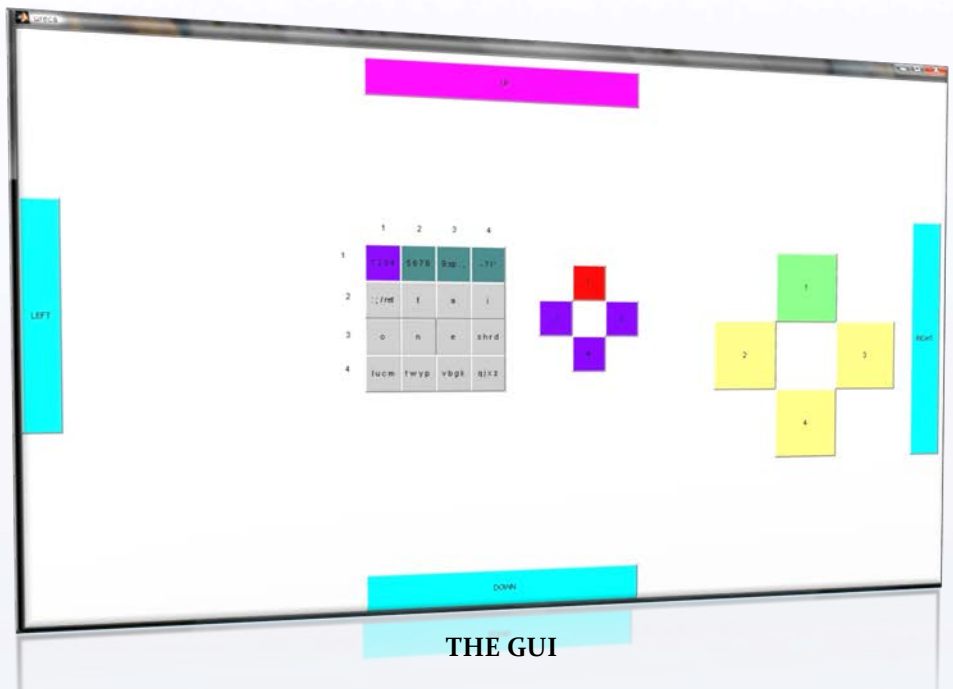
EOG Based Virtual Keyboard

OBJECTIVE : To develop an electrooculogram (EOG)-based computer keyboard system for paralyzed patients to communicate.

BACKGROUND : The signal resulting from measuring the resting potential of the retina is called the electrooculogram. This signal can be used to select keys on a virtual keyboard which can be used by paralyzed patients to do activities like operating computers.

SCOPE :

❖ To develop an EOG based virtual keyboard with fast, reliable and accurate functioning



THE GUI

- The Algorithm -

Setup

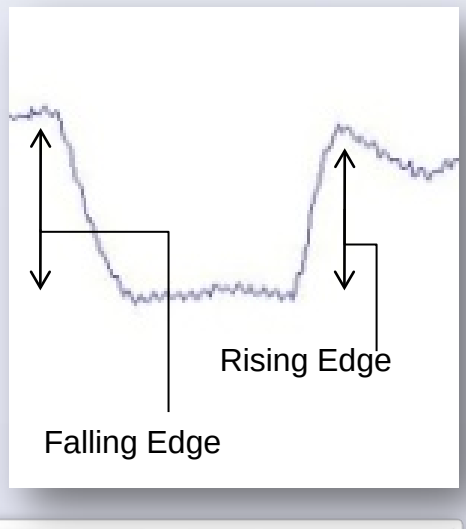
- Connect EOG equipment
- Obtain signal for reading

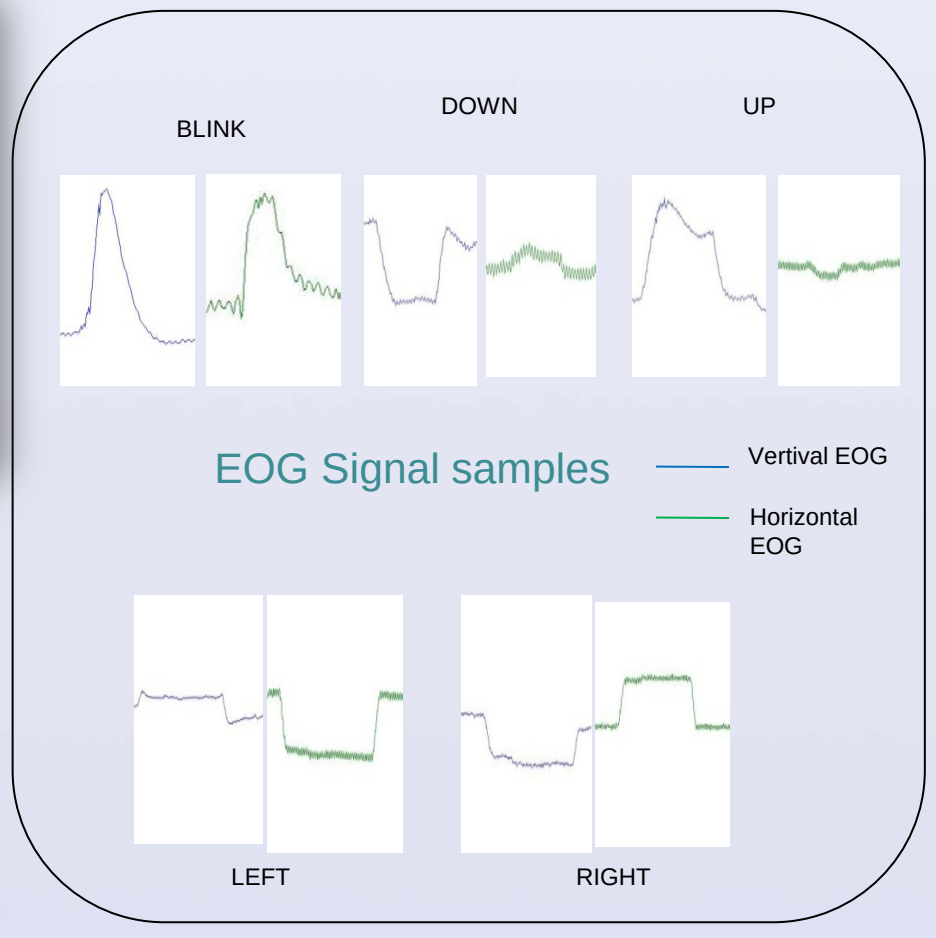
Pattern Recognition

- Vertical and Horizontal EOG(VOG and HOG) are calculated from the four individual electrodes
- Compare current VOG and HOG with an earlier reading
- If rising (or falling) edge detected then search for falling (or rising) edge
- If pattern not found try again for next reading

Action

- Direction of eye movement is found by matching pattern with standard patterns
- A row is selected
- Pattern recognition repeated to identify column
- If it is a group of characters the user chooses one of the four choices next.
- A character is obtained through two or three movements of the eye by selecting a position on the keyboard matrix





ADVANTAGES :

- ❖Fast GUI because letters are arranged in a way that most frequently used letters are typed with lesser movements.
- ❖Inexpensive equipment
- ❖User friendly and easy to understand

OTHER POTENTIAL APPLICATIONS :

- ❖Other communication devices like a virtual mouse
- ❖EOG based robotics

School of Computer Engineering
Project title: EOG-Based Virtual Keyboard for Paralyzed Patients
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