

Glyn Kendall

Contributions between 1-1-2018 and 1-7-2018

Number of characters added: 84109

Number of characters deleted: 4897

Format of edits

<i>Date and time</i>	<i>File name</i>	<i>Addition/Deletion</i>
<i>Content of edit</i>		

Edit history

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Brain-computer-interfaces		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Electroencephalography		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
https://www-sciencedirect-com.ezproxy.lib.monash.edu.au/science/article/pii/S105381191731042X		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Brain-computer-interfaces		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Real-time decoding of covert		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
https://www.sciencedirect.com/science/article/pii/S0957417418301507		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
This paper investigates the		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Sentiment analysis using EEG		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
https://www-sciencedirect-com.ezproxy.lib.monash.edu.au/science/article/pii/S1389041717302334		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
The appearance of unknown words		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
EEG based word familiarity using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
http://iopscience.iop.org.ezproxy.lib.monash.edu.au/article/10.1088/1741-2560/13/2/021002/meta		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
for research subjects and patients, the probable benefit of research into and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Neuroprosthetics are artificial		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Ethical issues in neuroprosthetics		

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https://search-proquest-com.ezproxy.lib.monash.edu.au/docview/1999856284?OpenUrlRefId=info:		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
paradigm showed 93% and 91% accuracy in healthy volunteers and LIS patients		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Electroencephalography (EEG)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Toward an Attention-Based Diagnostic Tool for Patients With		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf, N. and Rees, G. (2018).		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment analysis using EEG activities for		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Laureys, Steven		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Soddu, Andrea		

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Chatelle Camille		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Habbal Dina		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
References		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Brain-computer-interfaces		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Real-time decoding of covert		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Deletion
Advances in neural interfaces have demonstrated remarkable results in the direction of replacing		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
are unable to speak or move due to brain injury.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
information, potentially providing a platform for communication in patients who		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
processes, cognitive BCIs access varied and therefore more versatile		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
decoding accuracies reaching upto 70%. By utilising higher order mental		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
in three target regions were significantly above chance, with individual		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
of attention to real-world images presented at 4-quadrant locations. Accuracies		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
classification of brain activations. These were linked to the covert allocation		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
approach with quadrant-specific parameter estimates, to achieve single-block		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
attention. Using realtime fMRI, we implemented an online winner-takes-all		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
higher-order brain regions involved in complex cognitive processes such as		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
neuroimaging techniques. Here, we provide proof-of-principle for the use of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
motor and sensory brain regions, using surgical implants or non-invasive		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
devices for communication. Until now this has only been demonstrated in primary		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
(BCI) provide a means of using human brain activations to control		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
visual areas		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Real-time decoding of covert attention in higher-order		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
neurophysiological study, including implementation of connectivity features as BCI modality.		

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strengths and limitations of our design and propose further steps on development and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
investigation on spinal cord injured patients' BCI control and brain connectivity. We discuss		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
arms, a study of motor imagery modalities on healthy individuals' BCI performance, and a pilot		

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system. Furthermore, we present two illustrative experimental applications of the BCI-controlled		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
development, BCI implementation, and qualitative assessment of HRI characteristics of the		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
arms for assistive technologies and rehabilitation applications. We account for robotics		

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our progress and goals towards developing off-the-shelf BCI-controlled anthropomorphic robotic		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
(HRI) is increasingly important in rehabilitation robotics development. In this paper, we present		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
and can be implemented in neurorobotic applications. Moreover, social Human-Robot Interaction		

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importance. Off-the-shelf BCI systems are based on fast, reproducible detection of mental activity		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
investigating brain connectivity features for implementation of BCI control holds special		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
limitations. Taking into account the neurophysiological alterations of disabled individuals,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
cost, while recent advances aim at improving past technological and neurophysiological		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
interfaces (BCIs) are popular due to considerable advantages including simplicity, safety, and low		

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and restoring lost sensorimotor function in human patients. Noninvasive brain-computer		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Advances in neural interfaces have demonstrated remarkable results in the direction of replacing		

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Arms.		

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Rehabilitation Robotics: Off-the-Shelf BCI Control of Anthropomorphic Robotic		

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Towards		

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comparative study with other popular classification technique is also discussed.		

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recorded using the proposed classifier combination approach. Finally, a		

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word for which the user has confusion in his mind. An accuracy of 82% has been		

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Similarly, the pattern of brain waves has been found to be different for the		

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be totally different from the pattern when he is familiar with the word.		

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comes across an unknown word then the pattern of his brain waves comes out to		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
at the time of unknown word perception can be detected, i.e., when the user		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
are reading 25 words. The results show that the characteristics of brain waves		

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unfamiliar with the text. EEG dataset of 12 users has been developed while they		

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been developed to provide the meaning of the word when a user is found to be		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
used to boost the prediction performance. A dictionary based pop-up window has		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Random Forest (RF) classifier. Next, a decision fusion approach has also been		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
frequency bands. The prediction of word-familiarity has been performed using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Root Mean Square (RMS) and power have been computed from beta and gamma		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
decomposition technique and four features, namely mean, standard deviation,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
reading the text. The recorded signals have been processed using Wavelet		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Word-familiarity refers whether a user is familiar with the word or not while		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
based on EEG signals from the users brain waves has been developed.		

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particular, a word-familiarity prediction approach		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
(EEG). In		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
words which are unfamiliar to the users while reading using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
often disturbs communication and reading. This paper focuses on detecting those		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
The appearance of unknown words		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
features and frequency bands combination		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
EEG based word familiarity using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
techniques to better understand and treat brain disorders.		

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brains. These questions should shape the evolution and application of novel		

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will generate new ethical and philosophical questions about people and their		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
may be an ethical obligation to conduct this research. Advances in neuroscience		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
can be ethically justified. Depending on their neurogenerative potential, there		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
therapeutic applications of neuroprosthetics outweighs the risk and therefore		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
for research subjects and patients, the probable benefit of research into and		

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. Provided that adequate protections are in place		

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Significance		

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their lives.		

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people affected by damaged or dysfunctional brains and improve the quality of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
their identity. Neuroprosthetics can maximize benefit and minimize harm for		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
properties they had before injury or disease onset and thereby re-establish		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
also re-establish the connectedness and continuity of the psychological		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
agency for people affected by neurological and psychiatric disorders. They can		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
with these circuits, neuroprosthetics can restore varying degrees of autonomous		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
modulating dysregulation in neural circuits. As enabling devices that integrate		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
or improve motor and mental functions in bypassing areas of injury or		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
. Neuroprosthetics can restore		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
results		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Main		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
patients' best interests.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
to neuroprosthetic research and balancing technological innovation with		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
as how to establish and implement fair selection criteria in providing access		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
these questions. It also includes consideration of social justice issues such		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
. This review is an analysis and discussion of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Approach		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
identity.		

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indicated. These include informed consent, agency, autonomy (free will) and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
goals of particular neuroprosthetics and the conditions for which they are		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
psychological sequelae. Other ethical questions are more specific to the therapeutic		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
altering neural circuits against the potential harm from neurophysiological and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
raise general ethical questions about weighing the potential benefit of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
thought and behavior. These direct and indirect interventions in the brain		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
people with these conditions to gain or regain varying degrees of control of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
dysfunctional neural circuits, brain injury and limb loss. They can enable		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
interfaces and hippocampal prosthetics can bypass, replace or compensate for		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
prosthetics, deep brain stimulation, brain-computer interfaces, brain-to-brain		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
neurodevelopmental and neurodegenerative disorders. Cochlear implants, visual		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
congenital anomalies, traumatic brain injury, infection, amputation or		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
cognitive affective and volitional functions that have been impaired or lost from		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
neurally mediated functions. These include sensorimotor, visual, auditory,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
devices or systems designed to generate, restore or modulate a range of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Neuroprosthetics are artificial		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Ethical issues in neuroprosthetics		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
using this system.		

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LIS patients, while none of the VS/UWS patients showed a response to command		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
entropy system could detect a response to command in all healthy subjects and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
detect command-following in patients with severe motor disabilities. The		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
present study provides evidence that an EEG-based measure of attention could		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
entropy could not distinguish individual VS/UWS patients from LIS patients. The		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
reached a lower accuracy than spectral entropy. Resting-state EEG spectral		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
respectively. VS/UWS patients were at chance level. EEG rhythms classification		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
paradigm showed 93% and 91% accuracy in healthy volunteers and LIS patients		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
classification. Spectral entropy classification during the attention-rest		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
paradigm, and compared with EEG rhythms (delta, theta, alpha, and beta)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
entropy was computed during a gaze-independent 2-class (attention vs rest)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
state/unresponsive wakefulness syndrome (VS/UWS) were included. Spectral		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
volunteers, 6 LIS patients, and 10 patients with a vegetative		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
the issues of accuracy and training requirement. Data from 20 healthy		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
objective diagnostic tool for patients with locked-in syndrome (LIS), answering		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
focal attention in order to develop a motor-independent, portable, and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
unconscious patients. We studied the use of spectral entropy as a measure of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
severely brain-injured populations helping to distinguish conscious from		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
has been proposed as a supplemental tool for reducing clinical misdiagnosis in		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Electroencephalography (EEG)		

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Locked-in Syndrome		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Toward an Attention-Based Diagnostic Tool for Patients With		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Abstracts:		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
169, pp.462-472.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
decoding of covert attention in higher-order visual areas. Neurolmage,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Real-time		

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F., Weiskopf, N. and Rees, G. (2018).		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
pp.1-17.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
International, 2017,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Control of Anthropomorphic Robotic Arms. BioMed Research		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Shelf BCI		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Astaras, A. and Bamidis, P. (2017). Towards Rehabilitation Robotics: Off-the-		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
N.,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Athanasίου, A., Xygonakis, I., Pandria, N., Kartsidis, P., Arfaras, G., Kavazidi, K., Foroglou,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
pp.33-48.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
and frequency bands combination. Cognitive Systems Research, 49,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
features		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
p.021002.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
13(2),		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
122-135.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
doi		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Vol. 49, Iss. 2		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
; Wheaton		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Neuroscience		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
EEG and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Clinical		

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Syndrome.		

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Toward an Attention-Based Diagnostic Tool for Patients With Locked-in		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
(2018)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
; et al		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Laureys, Steven		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
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Soddu, Andrea		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
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2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Chatelle Camille		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
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2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Habbal Dina		

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Lesenfants Damien;		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
References:		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
potential uses for BCI utilisation.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
connections. This shows that the non surgically invasive procedure of fMRI could hold		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
the fMRI method was shown to have a high accuracy showing potential for BCI		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
functional Magnetic Resonance Imaging (fMRI). Through trials involving 8 participants		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
the investigation was to show that a BCI could be envisioned that uses real-time		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
monitor real time decision making and attention in the subjects brain. The purpose of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
The investigation performed by Ekanayake et al(2018) aimed at showing the ability to		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
NeuroImage, 169, pp.462-472.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Real-time decoding of covert attention in higher-order visual areas.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf, N. and Rees, G. (2018).		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Ekanayake,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
enhance the subjects control.		

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that results and accuracy of control depend on the individual user and that training is required to		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
in the optimisation of BCI systems in how they control external peripherals. The study also finds		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
BCI is possible for both healthy subjects and injured subjects advancements still need to be made		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
suffering from spinal cord injuries. The investigation finds that while use of robotic arms through		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
where the subject was healthy as well as an investigation into use of robotic arms by patients		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
for industrial and assistive use in everyday lives. The work involved applications of a robotic arm		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
enhancing progress into creating robotic arm technologies for use as rehabilitation assistance and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
The aim of the investigation devised by Athanasiou et al.(2017) was to aim at developing and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
International, 2017, pp.1-17.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Robotics: Off-the-Shelf BCI Control of Anthropomorphic Robotic Arms. BioMed Research		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Foroglou, N., Astaras, A. and Bamidis, P. (2017). Towards Rehabilitation		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
A., Xygonakis, I., Pandria, N., Kartsidis, P., Arfaras, G., Kavazidi, K.,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Athanasiou,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
word.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
implementation of a dictionary device returned an accuracy of 82% in determining an unknown		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
displayed on a screen for the reader. The team involved found that this method and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
the investigation was able to devise a system where the unknown word and its meaning were		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
across a word that they are unfamiliar with or do not know the meaning of. Through this reading		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
measuring device. The investigation found a difference in brain waves when the subject comes		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
investigation involved 12 participants who were required to read text while connected to an EEG		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
when the subject is reading and determining whether the user knows the meaning of a word. The		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Khurana et all.(2018) devised an investigation into a method of reading a subjects brain waves		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Cognitive Systems Research, 49, pp.33-48.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
features and frequency bands combination.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Khurana,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
need of Neuroprosthetics to improve their quality of life.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
outweigh any potential risks while also working to minimise the potential for harm of subjects in		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
proper protections and safeguards in place the benefits and advantages of the devices far		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Glannon concludes that while there can be real dangers and issues with Neuroprosthetics with		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
from potential harm caused by the prosthetics to the subjects free will and how it will be affected.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
ethical situations. The situations relating to the ethical questions raised from augmentation range		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
out to review the issues facing the advancement and usage of Neuroprosthetics in a range of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
progress is made in the field the questions of ethical responsibilities only increase. Glannon sets		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
With Neuroprosthetics and Brain Computer Interfaces becoming more advanced and as more		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
p.021002.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering, 13(2),		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Glannon,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
unresponsive or vegetative even if there are no other visible signs or responsiveness.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
diagnosis LIS severity as well as help ensure that patients aren't inaccurately deemed		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
patients are given instructions or commands. The results found that this method may help better		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
better diagnosis of severity of LIS by measuring eye movement and EEG responsiveness after		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
syndrome (VS/UWS). The aim of the research was to investigate the viability of spectral entropy in		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
6 Patients suffering from LIS and 10 patients in a vegetative state/unresponsive wakefulness		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
vegetative/unresponsive subjects. The research trials were carried out on 20 Healthy Volunteers,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Locked in syndrome(LIS) and how they compared too healthy and completely		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Leesenfants et al.(2018) set out in this investigation to research the brain waves of victims of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
122-135.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
doi		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Vol. 49, Iss. 2		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
; Wheaton		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Neuroscience		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Clinical EEG and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Syndrome.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
for Patients With Locked-in		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Toward an Attention-Based Diagnostic Tool		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
; et al (2018)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Laureys, Steven		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
;		

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Soddu, Andrea		

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;		

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Chatelle Camille		

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;		

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Habbal Dina		

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Damien;		

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Lesenfants		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Summaries:		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Invasive, Non Invasive, Electrical Signals, External System		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Brain Computer Interface, Electroencephalography,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Keywords:		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
computer chip and measuring devices directly into the users brain.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
signals whilst Invasive BCI's usually involve complex surgeries to implant a		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
BCI's are usually wires implanted under the skull but above the brain to record		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
the connection can differ. Semi invasive		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
and semi invasive BCI's connect directly to the brain however the severity of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
infection or complications however produce less accurate readings. Invasive		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
surgery to connect to the subject and carry less risk of injury through		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
common. These systems do not require		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Non invasive forms of BCI usually refers to EEG as this are the most		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
categories relate to how the user or person is connected to an external device.		

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Glannon (2018)). These		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Walter		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
invasive classifications(

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
BCI's have different categories such as invasive, non invasive and semi		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
through an invasive implant in the brain.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
records electric signals within the brain. To restoring a person's sight		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Electroencephalography(EEG) which is a monitoring method that non invasively		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
devices can range from simple brain wave recorders i.e		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
external device. The uses for these		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
signals in the brain and uses these signals to directly interact with an		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
specific task. BCI's operate under the principle of measuring electrical		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
brain to an external system, usually a computer of some kind programmed for a		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Computer Interface(BCIs) is the technical term for a device that connects the		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Brain		

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Introduction:		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Enhancements.		

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Comparing the Possibilities of Future Technological Human		

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Final		

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are unable to speak or move due to brain injury.		

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information, potentially providing a platform for communication in patients who		

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processes, cognitive BCIs access varied and therefore more versatile		

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decoding accuracies reaching upto 70%. By utilising higher order mental		

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in three target regions were significantly above chance, with individual		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
of attention to real-world images presented at 4-quadrant locations. Accuracies		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
classification of brain activations. These were linked to the covert allocation		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
approach with quadrant-specific parameter estimates, to achieve single-block		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
attention. Using realtime fMRI, we implemented an online winner-takes-all		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
higher-order brain regions involved in complex cognitive processes such as		

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neuroimaging techniques. Here, we provide proof-of-principle for the use of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
motor and sensory brain regions, using surgical implants or non-invasive		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
devices for communication. Until now this has only been demonstrated in primary		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
(BCI) provide a means of using human brain activations to control		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
attention in higher-order visual areas		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
more than 70%.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
waves in EEG channels related to memory can provide classification accuracy of		

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experience or conditioning. Quantitatively, our results indicate that the beta		

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the brain signals are more discriminatory in participants with no prior		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
beneficial in discriminating between genuine and hoax suicide notes and that		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
prior experience or conditioned training in detection of suicide notes is not		

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is studied. Our study provides an important and interesting conclusion that		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
perusal is studied. Also, the discriminatory role of alpha waves and beta waves		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
emotion, attention, and memory in detection of suicidal ideation through		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
which may indicate genuine suicide attempt or a hoax suicide note. The role of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
ideation through data analysis of EEG signals elicited by reading of text notes,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
utility of EEG signals in suicidology, particularly for detection of suicidal		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
activities for suicidology		

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comparative study with other popular classification technique is also discussed.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
recorded using the proposed classifier combination approach. Finally, a		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
word for which the user has confusion in his mind. An accuracy of 82% has been		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Similarly, the pattern of brain waves has been found to be different for the		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
be totally different from the pattern when he is familiar with the word.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
comes across an unknown word then the pattern of his brain waves comes out to		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
at the time of unknown word perception can be detected, i.e., when the user		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
are reading 25 words. The results show that the characteristics of brain waves		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
unfamiliar with the text. EEG dataset of 12 users has been developed while they		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
been developed to provide the meaning of the word when a user is found to be		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
used to boost the prediction performance. A dictionary based pop-up window has		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Random Forest (RF) classifier. Next, a decision fusion approach has also been		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
frequency bands. The prediction of word-familiarity has been performed using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Root Mean Square (RMS) and power have been computed from beta and gamma		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
decomposition technique and four features, namely mean, standard deviation,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
reading the text. The recorded signals have been processed using Wavelet		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Word-familiarity refers whether a user is familiar with the word or not while		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
based on EEG signals from the users brain waves has been developed.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
particular, a word-familiarity prediction approach		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
(EEG). In		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Electroencephalography		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
words which are unfamiliar to the users while reading using		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
often disturbs communication and reading. This paper focuses on detecting those		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
features and frequency bands combination		

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doi: 021002		

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Number 2		

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,		

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13		

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Volume		

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Journal of Neural Engineering		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Glannon (2018) Ethical issues in neuroprosthetics.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Walter		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
techniques to better understand and treat brain disorders.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
brains. These questions should shape the evolution and application of novel		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
will generate new ethical and philosophical questions about people and their		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
may be an ethical obligation to conduct this research. Advances in neuroscience		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
can be ethically justified. Depending on their neurogenerative potential, there		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
therapeutic applications of neuroprosthetics outweighs the risk and therefore		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
. Provided that adequate protections are in place		

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Significance		

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their lives.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
people affected by damaged or dysfunctional brains and improve the quality of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
their identity. Neuroprosthetics can maximize benefit and minimize harm for		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
properties they had before injury or disease onset and thereby re-establish		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
also re-establish the connectedness and continuity of the psychological		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
agency for people affected by neurological and psychiatric disorders. They can		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
with these circuits, neuroprosthetics can restore varying degrees of autonomous		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
modulating dysregulation in neural circuits. As enabling devices that integrate		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
or improve motor and mental functions in bypassing areas of injury or		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
. Neuroprosthetics can restore		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
results		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Main		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
patients' best interests.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
to neuroprosthetic research and balancing technological innovation with		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
as how to establish and implement fair selection criteria in providing access		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
these questions. It also includes consideration of social justice issues such		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
. This review is an analysis and discussion of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Approach		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
identity.		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
indicated. These include informed consent, agency, autonomy (free will) and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
goals of particular neuroprosthetics and the conditions for which they are		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
psychological sequelae. Other ethical questions are more specific to the therapeutic		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
altering neural circuits against the potential harm from neurophysiological and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
raise general ethical questions about weighing the potential benefit of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
thought and behavior. These direct and indirect interventions in the brain		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
people with these conditions to gain or regain varying degrees of control of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
dysfunctional neural circuits, brain injury and limb loss. They can enable		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
interfaces and hippocampal prosthetics can bypass, replace or compensate for		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
prosthetics, deep brain stimulation, brain-computer interfaces, brain-to-brain		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
neurodevelopmental and neurodegenerative disorders. Cochlear implants, visual		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
congenital anomalies, traumatic brain injury, infection, amputation or		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
cognitive affective and volitional functions that have been impaired or lost from		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
neurally mediated functions. These include sensorimotor, visual, auditory,		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
devices or systems designed to generate, restore or modulate a range of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
xri/sid:primo&accountid=12528		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
using this system.		

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LIS patients, while none of the VS/UWS patients showed a response to command		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
entropy system could detect a response to command in all healthy subjects and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
detect command-following in patients with severe motor disabilities. The		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
present study provides evidence that an EEG-based measure of attention could		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
entropy could not distinguish individual VS/UWS patients from LIS patients. The		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
reached a lower accuracy than spectral entropy. Resting-state EEG spectral		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
respectively. VS/UWS patients were at chance level. EEG rhythms classification		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
classification. Spectral entropy classification during the attention-rest		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
paradigm, and compared with EEG rhythms (delta, theta, alpha, and beta)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
entropy was computed during a gaze-independent 2-class (attention vs rest)		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
state/unresponsive wakefulness syndrome (VS/UWS) were included. Spectral		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
volunteers, 6 LIS patients, and 10 patients with a vegetative		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
the issues of accuracy and training requirement. Data from 20 healthy		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
objective diagnostic tool for patients with locked-in syndrome (LIS), answering		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
focal attention in order to develop a motor-independent, portable, and		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
unconscious patients. We studied the use of spectral entropy as a measure of		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
severely brain-injured populations helping to distinguish conscious from		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
has been proposed as a supplemental tool for reducing clinical misdiagnosis in		

2018-04-18 13:23:00	Full SCI2010 Essay.docx	Addition
Locked-in Syndrome		

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Abstracts:		

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pp.462-472.		

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suicidology. Expert Systems with Applications, 103, pp.206-217.		

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and frequency bands combination. Cognitive Systems Research, 49, pp.33-48.		

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Khurana et all.(2018) devised an investigation into a method of reading a subjects brain waves when		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based		

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With Neuroprosthetics and Brain Computer Interfaces becoming more advanced and as more		

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Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of		

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subjects. The research trials were carried out on 20 Healthy Volounteers, 6 Patients suffering from		

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and restoring lost sensorimotor function in human patients. Noninvasive brain-computer		

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Advances in neural interfaces have demonstrated remarkable results in the direction of replacing		

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Arms.		

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Rehabilitation Robotics: Off-the-Shelf BCI Control of Anthropomorphic Robotic		

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comparative study with other popular classification technique is also discussed.		

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recorded using the proposed classifier combination approach. Finally, a		

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word for which the user has confusion in his mind. An accuracy of 82% has been		

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Similarly, the pattern of brain waves has been found to be different for the		

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be totally different from the pattern when he is familiar with the word.		

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comes across an unknown word then the pattern of his brain waves comes out to		

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at the time of unknown word perception can be detected, i.e., when the user		

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are reading 25 words. The results show that the characteristics of brain waves		

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unfamiliar with the text. EEG dataset of 12 users has been developed while they		

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been developed to provide the meaning of the word when a user is found to be		

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used to boost the prediction performance. A dictionary based pop-up window has		

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Random Forest (RF) classifier. Next, a decision fusion approach has also been		

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frequency bands. The prediction of word-familiarity has been performed using		

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Root Mean Square (RMS) and power have been computed from beta and gamma		

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decomposition technique and four features, namely mean, standard deviation,		

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reading the text. The recorded signals have been processed using Wavelet		

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Word-familiarity refers whether a user is familiar with the word or not while		

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based on EEG signals from the users brain waves has been developed.		

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particular, a word-familiarity prediction approach		

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(EEG). In		

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words which are unfamiliar to the users while reading using		

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often disturbs communication and reading. This paper focuses on detecting those		

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The appearance of unknown words		

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features and frequency bands combination		

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EEG based word familiarity using		

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techniques to better understand and treat brain disorders.		

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brains. These questions should shape the evolution and application of novel		

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will generate new ethical and philosophical questions about people and their		

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may be an ethical obligation to conduct this research. Advances in neuroscience		

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can be ethically justified. Depending on their neurogenerative potential, there		

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therapeutic applications of neuroprosthetics outweighs the risk and therefore		

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for research subjects and patients, the probable benefit of research into and		

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. Provided that adequate protections are in place		

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Significance		

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their lives.		

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people affected by damaged or dysfunctional brains and improve the quality of		

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their identity. Neuroprosthetics can maximize benefit and minimize harm for		

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properties they had before injury or disease onset and thereby re-establish		

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also re-establish the connectedness and continuity of the psychological		

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agency for people affected by neurological and psychiatric disorders. They can		

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with these circuits, neuroprosthetics can restore varying degrees of autonomous		

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modulating dysregulation in neural circuits. As enabling devices that integrate		

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or improve motor and mental functions in bypassing areas of injury or		

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. Neuroprosthetics can restore		

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results		

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Main		

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patients' best interests.		

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to neuroprosthetic research and balancing technological innovation with		

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as how to establish and implement fair selection criteria in providing access		

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these questions. It also includes consideration of social justice issues such		

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. This review is an analysis and discussion of		

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Approach		

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identity.		

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indicated. These include informed consent, agency, autonomy (free will) and		

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goals of particular neuroprosthetics and the conditions for which they are		

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psychological sequelae. Other ethical questions are more specific to the therapeutic		

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altering neural circuits against the potential harm from neurophysiological and		

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raise general ethical questions about weighing the potential benefit of		

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thought and behavior. These direct and indirect interventions in the brain		

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people with these conditions to gain or regain varying degrees of control of		

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dysfunctional neural circuits, brain injury and limb loss. They can enable		

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interfaces and hippocampal prosthetics can bypass, replace or compensate for		

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prosthetics, deep brain stimulation, brain-computer interfaces, brain-to-brain		

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neurodevelopmental and neurodegenerative disorders. Cochlear implants, visual		

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congenital anomalies, traumatic brain injury, infection, amputation or		

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cognitive affective and volitional functions that have been impaired or lost from		

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neurally mediated functions. These include sensorimotor, visual, auditory,		

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devices or systems designed to generate, restore or modulate a range of		

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Neuroprosthetics are artificial		

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Ethical issues in neuroprosthetics		

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using this system.		

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LIS patients, while none of the VS/UWS patients showed a response to command		

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entropy system could detect a response to command in all healthy subjects and		

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detect command-following in patients with severe motor disabilities. The		

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present study provides evidence that an EEG-based measure of attention could		

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entropy could not distinguish individual VS/UWS patients from LIS patients. The		

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reached a lower accuracy than spectral entropy. Resting-state EEG spectral		

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respectively. VS/UWS patients were at chance level. EEG rhythms classification		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
paradigm showed 93% and 91% accuracy in healthy volunteers and LIS patients		

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classification. Spectral entropy classification during the attention-rest		

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paradigm, and compared with EEG rhythms (delta, theta, alpha, and beta)		

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entropy was computed during a gaze-independent 2-class (attention vs rest)		

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state/unresponsive wakefulness syndrome (VS/UWS) were included. Spectral		

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volunteers, 6 LIS patients, and 10 patients with a vegetative		

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the issues of accuracy and training requirement. Data from 20 healthy		

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objective diagnostic tool for patients with locked-in syndrome (LIS), answering		

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focal attention in order to develop a motor-independent, portable, and		

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unconscious patients. We studied the use of spectral entropy as a measure of		

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severely brain-injured populations helping to distinguish conscious from		

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has been proposed as a supplemental tool for reducing clinical misdiagnosis in		

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Electroencephalography (EEG)		

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Locked-in Syndrome		

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Toward an Attention-Based Diagnostic Tool for Patients With		

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169, pp.462-472.		

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Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf,		

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Control of Anthropomorphic Robotic Arms.		

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Shelf BCI		

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Astaras, A. and Bamidis, P. (2017). Towards Rehabilitation Robotics: Off-the-		

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features		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

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13(2), p.021002.		

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Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering,		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
doi 122-135.		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
Vol. 49, Iss. 2		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
; Wheaton		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
Clinical EEG and Neuroscience		

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Syndrome.		

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for Patients With Locked-in		

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(2018) Toward an Attention-Based Diagnostic Tool		

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; et al		

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Lesenfants Damien;		

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References		

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169, pp.462-472.		

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decoding of covert attention in higher-order visual areas. NeuroImage,		

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Real-time		

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N. and Rees, G. (2018).		

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Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf,		

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for industrial and assistive use in everyday lives.		

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enhancing progress into creating robotic arm technologies for use as rehabilitation assistance and		

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The aim of the investigation devised by Athanasiou et al.(2017) was to aim at developing and		

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2017, pp.1-17.		

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International		

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BioMed Research		

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Robotic Arms.		

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Anthropomorphic		

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Shelf BCI Control of		

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Bamidis, P. (2017). Towards Rehabilitation Robotics: Off-the-		

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N., Astaras, A. and		

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Foroglou,		

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A., Xygonakis, I., Pandria, N., Kartsidis, P., Arfaras, G., Kavazidi, K.,		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
Athanasiou,		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
word.		

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implementation of a dictionary device returned an accuracy of 82% in determining an unknown		

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displayed on a screen for the reader. The team involved found that this method and		

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the investigation was able to devise a system where the unknown word and its meaning were		

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across a word that they are unfamiliar with or do not know the meaning of. Through this reading		

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measuring device. The investigation found a difference in brain waves when the subject comes		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
investigation involved 12 participants who were required to read text while connected to an EEG		

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when the subject is reading and determining whether the user knows the meaning of a word. The		

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Khurana et all.(2018) devised an investigation into a method of reading a subjects brain waves		

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Systems Research, 49, pp.33-48.		

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features and frequency bands combination. Cognitive		

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word familiarity using		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based		

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need of Neuroprosthetics to improve their quality of life.		

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outweigh any potential risks while also working to minimise the potential for harm of subjects in		

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proper protections and safeguards in place the benefits and advantages of the devices far		

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Glannon concludes that while there can be real dangers and issues with Neuroprosthetics with		

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from potential harm caused by the prosthetics to the subjects free will and how it will be affected.		

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ethical situations. The situations relating to the ethical questions raised from augmentation range		

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out to review the issues facing the advancement and usage of Neuroprosthetics in a range of		

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progress is made in the field the questions of ethical responsibilities only increase. Glannon sets		

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With Neuroprosthetics and Brain Computer Interfaces becoming more advanced and as more		

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13(2), p.021002.		

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Neural Engineering,		

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Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of		

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unresponsive or vegetative even if there are no other visible signs or responsiveness.		

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diagnosis LIS severity as well as help ensure that patients aren't inaccurately deemed		

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patients are given instructions or commands. The results found that this method may help better		

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better diagnosis of severity of LIS by measuring eye movement and EEG responsiveness after		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
syndrome (VS/UWS). The aim of the research was to investigate the viability of spectral entropy in		

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6 Patients suffering from LIS and 10 patients in a vegetative state/unresponsive wakefulness		

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vegetative/unresponsive subjects. The research trials were carried out on 20 Healthy Volunteers,		

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Locked in syndrome(LIS) and how they compared too healthy and completely		

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Leesenfants et al.(2018) set out in this investigation to research the brain waves of victims of		

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doi 122-135.		

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Vol. 49, Iss. 2		

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Neuroscience		

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Clinical EEG and		

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Syndrome.		

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Attention-Based Diagnostic Tool for Patients With Locked-in		

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Toward an		

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; et al (2018)		

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Lesenfants Damien;		

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Sumarries:		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
System		

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Electroencephalography, Invasive, Non Invasive, Electrical Signals, External		

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Keywords: Brain Computer Interface,		

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measuring devices directly into the users brain.		

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BCI's usually involve complex surgeries to implant a computer chip and		

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implanted under the skull but above the brain to record signals whilst Invasive		

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usually wires		

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the brain however the severity of the connection can differ. Semi invasive BCI's are		

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accurate readings. Invasive and semi invasive BCI's connect directly to		

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less risk of injury through infection or complications however produce less		

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These systems do not require surgery to connect to the subject and carry		

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to EEG as this are the most common.		

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connected to an external device. Non invasive forms of BCI usually refers		

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person is		

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). These categories relate to how the user or		

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Walter Glannon (2018)		

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invasive classifications(

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BCI's have different categories such as invasive, non invasive and semi		

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through an invasive implant in the brain.		

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records electric signals within the brain. To restoring a person's sight		

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Electroencephalography(EEG) which is a monitoring method that non invasively		

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uses for these devices can range from simple brain wave recorders i.e		

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interact with an external device. The		

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measuring electrical signals in the brain and uses these signals to directly		

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programmed for a specific task. BCI's operate under the principle of		

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that connects the brain to an external system, usually a computer of some kind		

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Brain Computer Interface(BCIs) is the technical term for a device		

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Introduction:		

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Enhancements.		

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Comparing the Possibilities of Future Technological Human		

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Final		

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Expert Systems with Applications, 103, pp.206-217.		

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analysis using EEG activities for suicidology.		

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dictionary device returned an accuracy of 82% in determining an unknown word.		

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on a screen for the reader. The team involved found that this method and implementation of a		

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investigation was able to devise a system where the unknown word and its meaning were displayed		

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across a word that they are unfamiliar with or do not know the meaning of. Through this reading the		

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measuring device. The investigation found a difference in brain waves when the subject comes		

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investigation involved 12 participants who were required to read text while connected to an EEG		

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the subject is reading and determining whether the user knows the meaning of a word. The		

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Systems Research, 49, pp.33-48.		

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features and frequency bands combination. Cognitive		

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word familiarity using		

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Neuroprosthetics to improve their quality of life.		

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any potential risks while also working to minimise the potential for harm of subjects in need of		

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proper protections and safeguards in place the benefits and advantages of the devices far outweigh		

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Glannon concludes that while there can be real dangers and issues with Neuroprosthetics with		

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potential harm caused by the prosthetics to the subjects free will and how it will be affected.		

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situations. The situations relating to the ethical questions raised from augmentation range from		

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to review the issues facing the advancement and usage of Neuroprosthetics in a range of ethical		

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progress is made in the field the questions of ethical responsibilities only increase. Glannon sets out		

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13(2), p.021002.		

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Neural Engineering,		

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other visible signs or responsiveness.		

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ensure that patients aren't inaccurately deemed unresponsive or vegetative even if there are no		

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commands. The results found that this method may help better diagnosis LIS severity as well as help		

2018-04-18 12:33:00	Full SCI2010 Essay.docx	Addition
by measuring eye movement and EEG responsiveness after patients are given instructions or		

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the research was to investigate the viability of spectral entropy in better diagnosis of severity of LIS		

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LIS and 10 patients in a vegetative state/unresponsive wakefulness syndrome (VS/UWS). The aim of		

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Brain-computer-interfaces		

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Electroencephalography		

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Laureys, Steven		

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Soddu, Andrea		

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Chatelle Camille		

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Habbal Dina		

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Laureys, Steven		

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Brain-computer-interfaces		

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Real-time decoding of covert		

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waves in EEG channels related to memory can provide classification accuracy of		

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This paper investigates the		

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Sentiment analysis using EEG		

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The appearance of unknown words		

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EEG based word familiarity using		

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neurally mediated functions. These include sensorimotor, visual, auditory,		

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Neuroprosthetics are artificial		

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Ethical issues in neuroprosthetics		

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Electroencephalography (EEG)		

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Toward an Attention-Based Diagnostic Tool for Patients With		

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Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment analysis using EEG activities for		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

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are unable to speak or move due to brain injury.		

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information, potentially providing a platform for communication in patients who		

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processes, cognitive BCIs access varied and therefore more versatile		

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decoding accuracies reaching upto 70%. By utilising higher order mental		

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in three target regions were significantly above chance, with individual		

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of attention to real-world images presented at 4-quadrant locations. Accuracies		

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classification of brain activations. These were linked to the covert allocation		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
approach with quadrant-specific parameter estimates, to achieve single-block		

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attention. Using realtime fMRI, we implemented an online winner-takes-all		

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higher-order brain regions involved in complex cognitive processes such as		

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neuroimaging techniques. Here, we provide proof-of-principle for the use of		

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motor and sensory brain regions, using surgical implants or non-invasive		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
devices for communication. Until now this has only been demonstrated in primary		

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(BCI) provide a means of using human brain activations to control		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
attention in higher-order visual areas		

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Real-time decoding of covert		

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https://www.sciencedirect.com/science/article/pii/S0957417418301507		

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more than 70%.		

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waves in EEG channels related to memory can provide classification accuracy of		

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experience or conditioning. Quantitatively, our results indicate that the beta		

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the brain signals are more discriminatory in participants with no prior		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
beneficial in discriminating between genuine and hoax suicide notes and that		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
prior experience or conditioned training in detection of suicide notes is not		

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is studied. Our study provides an important and interesting conclusion that		

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perusal is studied. Also, the discriminatory role of alpha waves and beta waves		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
emotion, attention, and memory in detection of suicidal ideation through		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
which may indicate genuine suicide attempt or a hoax suicide note. The role of		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
ideation through data analysis of EEG signals elicited by reading of text notes,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
utility of EEG signals in suicidology, particularly for detection of suicidal		

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This paper investigates the		

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activities for suicidology		

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Sentiment analysis using EEG		

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comparative study with other popular classification technique is also discussed.		

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recorded using the proposed classifier combination approach. Finally, a		

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word for which the user has confusion in his mind. An accuracy of 82% has been		

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Similarly, the pattern of brain waves has been found to be different for the		

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be totally different from the pattern when he is familiar with the word.		

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comes across an unknown word then the pattern of his brain waves comes out to		

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at the time of unknown word perception can be detected, i.e., when the user		

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are reading 25 words. The results show that the characteristics of brain waves		

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unfamiliar with the text. EEG dataset of 12 users has been developed while they		

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been developed to provide the meaning of the word when a user is found to be		

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used to boost the prediction performance. A dictionary based pop-up window has		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Random Forest (RF) classifier. Next, a decision fusion approach has also been		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
frequency bands. The prediction of word-familiarity has been performed using		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Root Mean Square (RMS) and power have been computed from beta and gamma		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
decomposition technique and four features, namely mean, standard deviation,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
reading the text. The recorded signals have been processed using Wavelet		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Word-familiarity refers whether a user is familiar with the word or not while		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
based on EEG signals from the users brain waves has been developed.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
particular, a word-familiarity prediction approach		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
(EEG). In		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
words which are unfamiliar to the users while reading using		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
often disturbs communication and reading. This paper focuses on detecting those		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
The appearance of unknown words		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
features and frequency bands combination		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
EEG based word familiarity using		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
doi: 021002		

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Number 2		

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Volume		

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Journal of Neural Engineering		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Glannon (2018) Ethical issues in neuroprosthetics.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Walter		

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http://iopscience.iop.org.ezproxy.lib.monash.edu.au/article/10.1088/1741-2560/13/2/021002/meta		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
techniques to better understand and treat brain disorders.		

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brains. These questions should shape the evolution and application of novel		

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will generate new ethical and philosophical questions about people and their		

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may be an ethical obligation to conduct this research. Advances in neuroscience		

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can be ethically justified. Depending on their neurogenerative potential, there		

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therapeutic applications of neuroprosthetics outweighs the risk and therefore		

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for research subjects and patients, the probable benefit of research into and		

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. Provided that adequate protections are in place		

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Significance		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
their lives.		

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people affected by damaged or dysfunctional brains and improve the quality of		

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their identity. Neuroprosthetics can maximize benefit and minimize harm for		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
properties they had before injury or disease onset and thereby re-establish		

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also re-establish the connectedness and continuity of the psychological		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
agency for people affected by neurological and psychiatric disorders. They can		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
with these circuits, neuroprosthetics can restore varying degrees of autonomous		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
modulating dysregulation in neural circuits. As enabling devices that integrate		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
or improve motor and mental functions in bypassing areas of injury or		

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. Neuroprosthetics can restore		

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results		

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Main		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
patients' best interests.		

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to neuroprosthetic research and balancing technological innovation with		

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as how to establish and implement fair selection criteria in providing access		

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these questions. It also includes consideration of social justice issues such		

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. This review is an analysis and discussion of		

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Approach		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
identity.		

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indicated. These include informed consent, agency, autonomy (free will) and		

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goals of particular neuroprosthetics and the conditions for which they are		

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psychological sequelae. Other ethical questions are more specific to the therapeutic		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
altering neural circuits against the potential harm from neurophysiological and		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
raise general ethical questions about weighing the potential benefit of		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
thought and behavior. These direct and indirect interventions in the brain		

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people with these conditions to gain or regain varying degrees of control of		

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dysfunctional neural circuits, brain injury and limb loss. They can enable		

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interfaces and hippocampal prosthetics can bypass, replace or compensate for		

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prosthetics, deep brain stimulation, brain-computer interfaces, brain-to-brain		

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neurodevelopmental and neurodegenerative disorders. Cochlear implants, visual		

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congenital anomalies, traumatic brain injury, infection, amputation or		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
cognitive affective and volitional functions that have been impaired or lost from		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
neurally mediated functions. These include sensorimotor, visual, auditory,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
devices or systems designed to generate, restore or modulate a range of		

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Neuroprosthetics are artificial		

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Ethical issues in neuroprosthetics		

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xri/sid:primo&accountid=12528		

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https://search-proquest-com.ezproxy.lib.monash.edu.au/docview/1999856284?OpenUrlRefId=info:		

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using this system.		

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LIS patients, while none of the VS/UWS patients showed a response to command		

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entropy system could detect a response to command in all healthy subjects and		

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detect command-following in patients with severe motor disabilities. The		

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present study provides evidence that an EEG-based measure of attention could		

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entropy could not distinguish individual VS/UWS patients from LIS patients. The		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
reached a lower accuracy than spectral entropy. Resting-state EEG spectral		

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respectively. VS/UWS patients were at chance level. EEG rhythms classification		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
paradigm showed 93% and 91% accuracy in healthy volunteers and LIS patients		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
classification. Spectral entropy classification during the attention-rest		

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paradigm, and compared with EEG rhythms (delta, theta, alpha, and beta)		

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entropy was computed during a gaze-independent 2-class (attention vs rest)		

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state/unresponsive wakefulness syndrome (VS/UWS) were included. Spectral		

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volunteers, 6 LIS patients, and 10 patients with a vegetative		

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the issues of accuracy and training requirement. Data from 20 healthy		

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objective diagnostic tool for patients with locked-in syndrome (LIS), answering		

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focal attention in order to develop a motor-independent, portable, and		

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unconscious patients. We studied the use of spectral entropy as a measure of		

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severely brain-injured populations helping to distinguish conscious from		

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has been proposed as a supplemental tool for reducing clinical misdiagnosis in		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Electroencephalography (EEG)		

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Locked-in Syndrome		

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Toward an Attention-Based Diagnostic Tool for Patients With		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Abstracts:		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
pp.462-472.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
169,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Real-time decoding of covert attention in higher-order visual areas. NeuroImage,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf, N. and Rees, G. (2018).		

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suicidology. Expert Systems with Applications, 103, pp.206-217.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment analysis using EEG activities for		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
and frequency bands combination. Cognitive Systems Research, 49, pp.33-48.		

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features		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
13(2), p.021002.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
doi 122-135.		

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Vol. 49, Iss. 2		

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; Wheaton		

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Clinical EEG and Neuroscience		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Syndrome.		

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for Patients With Locked-in		

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(2018) Toward an Attention-Based Diagnostic Tool		

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; et al		

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Lesenfants Damien;		

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References		

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169, pp.462-472.		

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decoding of covert attention in higher-order visual areas. Neurolmage,		

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Real-time		

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N. and Rees, G. (2018).		

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Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Expert Systems with Applications, 103, pp.206-217.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
analysis using EEG activities for suicidology.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
dictionary device returned an accuracy of 82% in determining an unknown word.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
on a screen for the reader. The team involved found that this method and implementation of a		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
investigation was able to devise a system where the unknown word and its meaning were displayed		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
across a word that they are unfamiliar with or do not know the meaning of. Through this reading the		

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measuring device. The investigation found a difference in brain waves when the subject comes		

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investigation involved 12 participants who were required to read text while connected to an EEG		

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the subject is reading and determining whether the user knows the meaning of a word. The		

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Khurana et al.(2018) devised an investigation into a method of reading a subjects brain waves when		

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Systems Research, 49, pp.33-48.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
features and frequency bands combination. Cognitive		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
word familiarity using		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Neuroprosthetics to improve their quality of life.		

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any potential risks while also working to minimise the potential for harm of subjects in need of		

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proper protections and safeguards in place the benefits and advantages of the devices far outweigh		

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Glannon concludes that while there can be real dangers and issues with Neuroprosthetics with		

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potential harm caused by the prosthetics to the subjects free will and how it will be affected.		

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situations. The situations relating to the ethical questions raised from augmentation range from		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
to review the issues facing the advancement and usage of Neuroprosthetics in a range of ethical		

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progress is made in the field the questions of ethical responsibilities only increase. Glannon sets out		

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With Neuroprosthetics and Brain Computer Interfaces becoming more advanced and as more		

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13(2), p.021002.		

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Neural Engineering,		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of		

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other visible signs or responsiveness.		

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ensure that patients aren't inaccurately deemed unresponsive or vegetative even if there are no		

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commands. The results found that this method may help better diagnosis LIS severity as well as help		

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by measuring eye movement and EEG responsiveness after patients are given instructions or		

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the research was to investigate the viability of spectral entropy in better diagnosis of severity of LIS		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
LIS and 10 patients in a vegetative state/unresponsive wakefulness syndrome (VS/UWS). The aim of		

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subjects. The research trials were carried out on 20 Healthy Volunteers, 6 Patients suffering from		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
in syndrome(LIS) and how they compared too healthy and completely vegetative/unresponsive		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Leesenfants et al.(2018) set out in this investigation to research the brain waves of victims of Locked		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
doi 122-135.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Vol. 49, Iss. 2		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
; Wheaton		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Neuroscience		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Clinical EEG and		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Syndrome.		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
Attention-Based Diagnostic Tool for Patients With Locked-in		

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Toward an		

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; et al (2018)		

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Lesenfants Damien;		

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Sumarries:		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
System		

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Electroencephalography, Invasive, Non Invasive, Electrical Signals, External		

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Brain Computer Interface,		

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Keywords:		

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measuring devices directly into the users brain.		

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BCI's usually involve complex surgeries to implant a computer chip and		

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implanted under the skull but above the brain to record signals whilst Invasive		

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the brain however the severity of the connection can differ. Semi invasive BCI's are usually wires		

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accurate readings. Invasive and semi invasive BCI's connect directly to		

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less risk of injury through infection or complications however produce less		

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These systems do not require surgery to connect to the subject and carry		

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to EEG as this are the most common.		

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connected to an external device. Non invasive forms of BCI usually refers		

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person is		

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). These categories relate to how the user or		

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Walter Glannon (2018)		

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invasive classifications(

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BCI's have different categories such as invasive, non invasive and semi		

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through an invasive implant in the brain.		

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records electric signals within the brain. To restoring a person's sight		

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Electroencephalography(EEG) which is a monitoring method that non invasively		

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uses for these devices can range from simple brain wave recorders i.e		

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interact with an external device. The		

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measuring electrical signals in the brain and uses these signals to directly		

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programmed for a specific task. BCI's operate under the principle of		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
that connects the brain to an external system, usually a computer of some kind		

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Brain Computer Interface(BCIs) is the technical term for a device		

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Introduction:		

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Enhancements.		

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Comparing the Possibilities of Future Technological Human		

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Final		

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are unable to speak or move due to brain injury.		

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information, potentially providing a platform for communication in patients who		

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processes, cognitive BCIs access varied and therefore more versatile		

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decoding accuracies reaching upto 70%. By utilising higher order mental		

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in three target regions were significantly above chance, with individual		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
of attention to real-world images presented at 4-quadrant locations. Accuracies		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
classification of brain activations. These were linked to the covert allocation		

2018-04-18 12:02:00	Full SCI2010 Essay.docx	Addition
approach with quadrant-specific parameter estimates, to achieve single-block		

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attention. Using realtime fMRI, we implemented an online winner-takes-all		

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higher-order brain regions involved in complex cognitive processes such as		

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neuroimaging techniques. Here, we provide proof-of-principle for the use of		

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motor and sensory brain regions, using surgical implants or non-invasive		

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devices for communication. Until now this has only been demonstrated in primary		

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(BCI) provide a means of using human brain activations to control		

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attention in higher-order visual areas		

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the brain signals are more discriminatory in participants with no prior		

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prior experience or conditioned training in detection of suicide notes is not		

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ideation through data analysis of EEG signals elicited by reading of text notes,		

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can be ethically justified. Depending on their neurogenerative potential, there		

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therapeutic applications of neuroprosthetics outweighs the risk and therefore		

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for research subjects and patients, the probable benefit of research into and		

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. Provided that adequate protections are in place		

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Significance		

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their lives.		

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people affected by damaged or dysfunctional brains and improve the quality of		

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their identity. Neuroprosthetics can maximize benefit and minimize harm for		

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properties they had before injury or disease onset and thereby re-establish		

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also re-establish the connectedness and continuity of the psychological		

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agency for people affected by neurological and psychiatric disorders. They can		

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with these circuits, neuroprosthetics can restore varying degrees of autonomous		

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modulating dysregulation in neural circuits. As enabling devices that integrate		

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or improve motor and mental functions in bypassing areas of injury or		

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. Neuroprosthetics can restore		

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results		

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Main		

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patients' best interests.		

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to neuroprosthetic research and balancing technological innovation with		

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as how to establish and implement fair selection criteria in providing access		

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these questions. It also includes consideration of social justice issues such		

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. This review is an analysis and discussion of		

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Approach		

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identity.		

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indicated. These include informed consent, agency, autonomy (free will) and		

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goals of particular neuroprosthetics and the conditions for which they are		

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psychological sequelae. Other ethical questions are more specific to the therapeutic		

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altering neural circuits against the potential harm from neurophysiological and		

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raise general ethical questions about weighing the potential benefit of		

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thought and behavior. These direct and indirect interventions in the brain		

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people with these conditions to gain or regain varying degrees of control of		

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dysfunctional neural circuits, brain injury and limb loss. They can enable		

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interfaces and hippocampal prosthetics can bypass, replace or compensate for		

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prosthetics, deep brain stimulation, brain-computer interfaces, brain-to-brain		

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neurodevelopmental and neurodegenerative disorders. Cochlear implants, visual		

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congenital anomalies, traumatic brain injury, infection, amputation or		

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cognitive affective and volitional functions that have been impaired or lost from		

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devices or systems designed to generate, restore or modulate a range of		

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using this system.		

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LIS patients, while none of the VS/UWS patients showed a response to command		

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entropy system could detect a response to command in all healthy subjects and		

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detect command-following in patients with severe motor disabilities. The		

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present study provides evidence that an EEG-based measure of attention could		

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entropy could not distinguish individual VS/UWS patients from LIS patients. The		

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reached a lower accuracy than spectral entropy. Resting-state EEG spectral		

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respectively. VS/UWS patients were at chance level. EEG rhythms classification		

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paradigm showed 93% and 91% accuracy in healthy volunteers and LIS patients		

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classification. Spectral entropy classification during the attention-rest		

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paradigm, and compared with EEG rhythms (delta, theta, alpha, and beta)		

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entropy was computed during a gaze-independent 2-class (attention vs rest)		

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state/unresponsive wakefulness syndrome (VS/UWS) were included. Spectral		

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volunteers, 6 LIS patients, and 10 patients with a vegetative		

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the issues of accuracy and training requirement. Data from 20 healthy		

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objective diagnostic tool for patients with locked-in syndrome (LIS), answering		

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focal attention in order to develop a motor-independent, portable, and		

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unconscious patients. We studied the use of spectral entropy as a measure of		

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severely brain-injured populations helping to distinguish conscious from		

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has been proposed as a supplemental tool for reducing clinical misdiagnosis in		

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Locked-in Syndrome		

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Abstracts:		

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pp.462-472.		

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169,		

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Real-time decoding of covert attention in higher-order visual areas. NeuroImage,		

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suicidology. Expert Systems with Applications, 103, pp.206-217.		

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and frequency bands combination. Cognitive Systems Research, 49, pp.33-48.		

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features		

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Brain-computer-interfaces		

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for communication. Until now this has only been demonstrated in primary motor and sensory brain		

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Brain-computer-interfaces		

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Real-time decoding of covert attention in higher-order visual areas		

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https://www.sciencedirect.com/science/article/pii/S0957417418301507		

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This paper investigates the utility of EEG signals in suicidology, particularly for detection of suicidal		

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Sentiment analysis using EEG activities for suicidology		

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The appearance of unknown words often disturbs communication and reading. This paper focuses on		

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EEG based word familiarity using features and frequency bands combination		

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Walter Glannon (2018) Ethical issues in neuroprosthetics.		

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potential, there may be an ethical obligation to conduct this research. Advances in neuroscience will		

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Neuroprosthetics are artificial devices or systems designed to generate, restore or modulate a range		

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Ethical issues in neuroprosthetics		

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Electroencephalography (EEG) has been proposed as a supplemental tool for reducing clinical		

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are unable to speak or move due to brain injury.		

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information, potentially providing a platform for communication in patients who		

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processes, cognitive BCIs access varied and therefore more versatile		

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decoding accuracies reaching upto 70%. By utilising higher order mental		

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in three target regions were significantly above chance, with individual		

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of attention to real-world images presented at 4-quadrant locations. Accuracies		

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classification of brain activations. These were linked to the covert allocation		

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approach with quadrant-specific parameter estimates, to achieve single-block		

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attention. Using realtime fMRI, we implemented an online winner-takes-all		

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higher-order brain regions involved in complex cognitive processes such as		

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neuroimaging techniques. Here, we provide proof-of-principle for the use of		

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motor and sensory brain regions, using surgical implants or non-invasive		

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(BCI) provide a means of using human brain activations to control		

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Sentiment analysis using EEG		

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can be ethically justified. Depending on their neurogenerative potential, there		

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therapeutic applications of neuroprosthetics outweighs the risk and therefore		

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for research subjects and patients, the probable benefit of research into and		

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. Provided that adequate protections are in place		

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Significance		

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their lives.		

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people affected by damaged or dysfunctional brains and improve the quality of		

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their identity. Neuroprosthetics can maximize benefit and minimize harm for		

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properties they had before injury or disease onset and thereby re-establish		

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also re-establish the connectedness and continuity of the psychological		

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agency for people affected by neurological and psychiatric disorders. They can		

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with these circuits, neuroprosthetics can restore varying degrees of autonomous		

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modulating dysregulation in neural circuits. As enabling devices that integrate		

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or improve motor and mental functions in bypassing areas of injury or		

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. Neuroprosthetics can restore		

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results		

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Main		

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patients' best interests.		

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to neuroprosthetic research and balancing technological innovation with		

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as how to establish and implement fair selection criteria in providing access		

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these questions. It also includes consideration of social justice issues such		

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. This review is an analysis and discussion of		

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Approach		

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identity.		

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indicated. These include informed consent, agency, autonomy (free will) and		

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goals of particular neuroprosthetics and the conditions for which they are		

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psychological sequelae. Other ethical questions are more specific to the therapeutic		

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altering neural circuits against the potential harm from neurophysiological and		

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raise general ethical questions about weighing the potential benefit of		

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thought and behavior. These direct and indirect interventions in the brain		

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people with these conditions to gain or regain varying degrees of control of		

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dysfunctional neural circuits, brain injury and limb loss. They can enable		

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interfaces and hippocampal prosthetics can bypass, replace or compensate for		

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prosthetics, deep brain stimulation, brain-computer interfaces, brain-to-brain		

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neurodevelopmental and neurodegenerative disorders. Cochlear implants, visual		

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congenital anomalies, traumatic brain injury, infection, amputation or		

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cognitive affective and volitional functions that have been impaired or lost from		

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neurally mediated functions. These include sensorimotor, visual, auditory,		

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devices or systems designed to generate, restore or modulate a range of		

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Neuroprosthetics are artificial		

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Ethical issues in neuroprosthetics		

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https://search-proquest-com.ezproxy.lib.monash.edu.au/docview/1999856284?OpenUrlRefId=info:		

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using this system.		

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LIS patients, while none of the VS/UWS patients showed a response to command		

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entropy system could detect a response to command in all healthy subjects and		

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detect command-following in patients with severe motor disabilities. The		

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present study provides evidence that an EEG-based measure of attention could		

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entropy could not distinguish individual VS/UWS patients from LIS patients. The		

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reached a lower accuracy than spectral entropy. Resting-state EEG spectral		

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respectively. VS/UWS patients were at chance level. EEG rhythms classification		

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paradigm showed 93% and 91% accuracy in healthy volunteers and LIS patients		

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classification. Spectral entropy classification during the attention-rest		

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paradigm, and compared with EEG rhythms (delta, theta, alpha, and beta)		

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entropy was computed during a gaze-independent 2-class (attention vs rest)		

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state/unresponsive wakefulness syndrome (VS/UWS) were included. Spectral		

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volunteers, 6 LIS patients, and 10 patients with a vegetative		

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the issues of accuracy and training requirement. Data from 20 healthy		

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objective diagnostic tool for patients with locked-in syndrome (LIS), answering		

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focal attention in order to develop a motor-independent, portable, and		

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unconscious patients. We studied the use of spectral entropy as a measure of		

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severely brain-injured populations helping to distinguish conscious from		

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has been proposed as a supplemental tool for reducing clinical misdiagnosis in		

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Electroencephalography (EEG)		

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Locked-in Syndrome		

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Toward an Attention-Based Diagnostic Tool for Patients With		

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Abstracts:		

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pp.462-472.		

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169,		

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Real-time decoding of covert attention in higher-order visual areas. NeuroImage,		

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Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf, N. and Rees, G. (2018).		

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suicidology. Expert Systems with Applications, 103, pp.206-217.		

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Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment analysis using EEG activities for		

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and frequency bands combination. Cognitive Systems Research, 49, pp.33-48.		

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features		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

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13(2), p.021002.		

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Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering,		

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doi 122-135.		

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Vol. 49, Iss. 2		

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; Wheaton		

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Clinical EEG and Neuroscience		

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Syndrome.		

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for Patients With Locked-in		

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(2018) Toward an Attention-Based Diagnostic Tool		

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; et al		

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Lesenfants Damien;		

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References		

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decoding of covert attention in higher-order visual areas. NeuroImage,		

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Real-time		

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N. and Rees, G. (2018).		

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Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf,		

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Expert Systems with Applications, 103, pp.206-217.		

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analysis using EEG activities for suicidology.		

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Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment		

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Systems Research, 49, pp.33-48.		

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features and frequency bands combination. Cognitive		

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word familiarity using		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based		

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13(2), p.021002.		

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Neural Engineering,		

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Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of		

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other visible signs or responsiveness.		

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ensure that patients aren't inaccurately deemed unresponsive or vegetative even if there are no		

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commands. The results found that this method may help better diagnosis LIS severity as well as help		

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by measuring eye movement and EEG responsiveness after patients are given instructions or		

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the research was to investigate the viability of spectral entropy in better diagnosis of severity of LIS		

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LIS and 10 patients in a vegetative state/unresponsive wakefulness syndrome (VS/UWS). The aim of		

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subjects. The research trials were carried out on 20 Healthy Volounteers, 6 Patients suffering from		

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in syndrome(LIS) and how they compared too healthy and completely vegetative/unresponsive		

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Leesenfants et al.(2018) set out in this investigation to research the brain waves of victims of Locked		

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doi 122-135.		

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Vol. 49, Iss. 2		

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; Wheaton		

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Neuroscience		

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Clinical EEG and		

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Syndrome.		

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Attention-Based Diagnostic Tool for Patients With Locked-in		

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Toward an		

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; et al (2018)		

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;		

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Lesenfants Damien;		

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Sumarries:		

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System		

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Electroencephalography, Invasive, Non Invasive, Electrical Signals, External		

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Brain Computer Interface,		

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Keywords:		

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measuring devices directly into the users brain.		

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BCI's usually involve complex surgeries to implant a computer chip and		

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implanted under the skull but above the brain to record signals whilst Invasive		

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the brain however the severity of the connection can differ. Semi invasive BCI's are usually wires		

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accurate readings. Invasive and semi invasive BCI's connect directly to		

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less risk of injury through infection or complications however produce less		

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These systems do not require surgery to connect to the subject and carry		

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to EEG as this are the most common.		

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connected to an external device. Non invasive forms of BCI usually refers		

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person is		

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). These categories relate to how the user or		

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Walter Glannon (2018)		

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invasive classifications(

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BCI's have different categories such as invasive, non invasive and semi		

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through an invasive implant in the brain.		

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records electric signals within the brain. To restoring a person's sight		

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Electroencephalography(EEG) which is a monitoring method that non invasively		

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uses for these devices can range from simple brain wave recorders i.e		

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interact with an external device. The		

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measuring electrical signals in the brain and uses these signals to directly		

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programmed for a specific task. BCI's operate under the principle of		

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that connects the brain to an external system, usually a computer of some kind		

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Brain Computer Interface(BCIs) is the technical term for a device		

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Introduction:		

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Enhancements.		

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Comparing the Possibilities of Future Technological Human		

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Final		

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communication in patients who are unable to speak or move due to brain injury.		

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access varied and therefore more versatile information, potentially providing a platform for		

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decoding accuracies reaching upto 70%. By utilising higher order mental processes, cognitive BCIs		

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locations. Accuracies in three target regions were significantly above chance, with individual		

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These were linked to the covert allocation of attention to real-world images presented at 4-quadrant		

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quadrant-specific parameter estimates, to achieve single-block classification of brain activations.		

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such as attention. Using realtime fMRI, we implemented an online winner-takes-all approach with		

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proof-of-principle for the use of higher-order brain regions involved in complex cognitive processes		

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regions, using surgical implants or non-invasive neuroimaging techniques. Here, we provide		

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(BCI) provide a means of using human brain activations to control devices		

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beta waves in EEG channels related to memory can provide classification accuracy of more than 70%.		

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participants with no prior experience or conditioning. Quantitatively, our results indicate that the		

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between genuine and hoax suicide notes and that the brain signals are more discriminatory in		

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experience or conditioned training in detection of suicide notes is not beneficial in discriminating		

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and beta waves is studied. Our study provides an important and interesting conclusion that prior		

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detection of suicidal ideation through perusal is studied. Also, the discriminatory role of alpha waves		

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genuine suicide attempt or a hoax suicide note. The role of emotion, attention, and memory in		

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ideation through data analysis of EEG signals elicited by reading of text notes, which may indicate		

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study with other popular classification technique is also discussed.		

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82% has been recorded using the proposed classifier combination approach. Finally, a comparative		

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been found to be different for the word for which the user has confusion in his mind. An accuracy of		

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different from the pattern when he is familiar with the word. Similarly, the pattern of brain waves has		

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the user comes across an unknown word then the pattern of his brain waves comes out to be totally		

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characteristics of brain waves at the time of unknown word perception can be detected, i.e., when		

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12 users has been developed while they are reading 25 words. The results show that the		

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provide the meaning of the word when a user is found to be unfamiliar with the text. EEG dataset of		

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used to boost the prediction performance. A dictionary based pop-up window has been developed to		

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been performed using Random Forest (RF) classifier. Next, a decision fusion approach has also been		

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have been computed from beta and gamma frequency bands. The prediction of word-familiarity has		

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technique and four features, namely mean, standard deviation, Root Mean Square (RMS) and power		

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while reading the text. The recorded signals have been processed using Wavelet decomposition		

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waves has been developed. Word-familiarity refers whether a user is familiar with the word or not		

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(EEG). In particular, a word-familiarity prediction approach based on EEG signals from the users brain		

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Electroencephalography		

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detecting those words which are unfamiliar to the users while reading using		

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Number 2		

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Volume 13		

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disorders.		

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should shape the evolution and application of novel techniques to better understand and treat brain		

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generate new ethical and philosophical questions about people and their brains. These questions		

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outweighs the risk and therefore can be ethically justified. Depending on their neurogenerative		

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patients, the probable benefit of research into and therapeutic applications of neuroprosthetics		

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. Provided that adequate protections are in place for research subjects and		

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Significance		

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their lives.		

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minimize harm for people affected by damaged or dysfunctional brains and improve the quality of		

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or disease onset and thereby re-establish their identity. Neuroprosthetics can maximize benefit and		

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re-establish the connectedness and continuity of the psychological properties they had before injury		

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autonomous agency for people affected by neurological and psychiatric disorders. They can also		

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devices that integrate with these circuits, neuroprosthetics can restore varying degrees of		

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functions in bypassing areas of injury or modulating dysregulation in neural circuits. As enabling		

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. Neuroprosthetics can restore or improve motor and mental		

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Main results		

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patients' best interests.		

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criteria in providing access to neuroprosthetic research and balancing technological innovation with		

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includes consideration of social justice issues such as how to establish and implement fair selection		

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. This review is an analysis and discussion of these questions. It also		

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Approach		

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Real-time decoding of covert attention in higher-order visual areas. NeuroImage, 169,		

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Ekanayake, J., Hutton, C., Ridgway, G., Scharnowski, F., Weiskopf, N. and Rees, G. (2018).		

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suicidology. Expert Systems with Applications, 103, pp.206-217.		

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Prasad, D., Liu, S., Chen, S. and Quek, C. (2018). Sentiment analysis using EEG activities for		

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features and frequency bands combination. Cognitive Systems Research, 49, pp.33-48.		

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Khurana, V., Kumar, P., Saini, R. and Roy, P. (2018). EEG based word familiarity using		

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13(2), p.021002.		

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Glannon, W. (2016). Ethical issues in neuroprosthetics. Journal of Neural Engineering,		

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Brain Computer Interface, Electroencephalography, Invasive, Non Invasive,		

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communication in patients who are unable to speak or move due to brain injury.		

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access varied and therefore more versatile information, potentially providing a platform for		

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decoding accuracies reaching upto 70%. By utilising higher order mental processes, cognitive BCIs		

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locations. Accuracies in three target regions were significantly above chance, with individual		

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These were linked to the covert allocation of attention to real-world images presented at 4-quadrant		

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quadrant-specific parameter estimates, to achieve single-block classification of brain activations.		

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such as attention. Using realtime fMRI, we implemented an online winner-takes-all approach with		

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proof-of-principle for the use of higher-order brain regions involved in complex cognitive processes		

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regions, using surgical implants or non-invasive neuroimaging techniques. Here, we provide		

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for communication. Until now this has only been demonstrated in primary motor and sensory brain		

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(BCI) provide a means of using human brain activations to control devices		

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higher-order visual areas		

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Real-time decoding of covert attention in		

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beta waves in EEG channels related to memory can provide classification accuracy of more than 70%.		

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participants with no prior experience or conditioning. Quantitatively, our results indicate that the		

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between genuine and hoax suicide notes and that the brain signals are more discriminatory in		

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experience or conditioned training in detection of suicide notes is not beneficial in discriminating		

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and beta waves is studied. Our study provides an important and interesting conclusion that prior		

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detection of suicidal ideation through perusal is studied. Also, the discriminatory role of alpha waves		

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genuine suicide attempt or a hoax suicide note. The role of emotion, attention, and memory in		

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ideation through data analysis of EEG signals elicited by reading of text notes, which may indicate		

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This paper investigates the utility of EEG signals in suicidology, particularly for detection of suicidal		

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suicidology		

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Sentiment analysis using EEG activities for		

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study with other popular classification technique is also discussed.		

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82% has been recorded using the proposed classifier combination approach. Finally, a comparative		

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been found to be different for the word for which the user has confusion in his mind. An accuracy of		

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different from the pattern when he is familiar with the word. Similarly, the pattern of brain waves has		

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the user comes across an unknown word then the pattern of his brain waves comes out to be totally		

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characteristics of brain waves at the time of unknown word perception can be detected, i.e., when		

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12 users has been developed while they are reading 25 words. The results show that the		

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provide the meaning of the word when a user is found to be unfamiliar with the text. EEG dataset of		

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used to boost the prediction performance. A dictionary based pop-up window has been developed to		

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been performed using Random Forest (RF) classifier. Next, a decision fusion approach has also been		

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have been computed from beta and gamma frequency bands. The prediction of word-familiarity has		

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technique and four features, namely mean, standard deviation, Root Mean Square (RMS) and power		

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while reading the text. The recorded signals have been processed using Wavelet decomposition		

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waves has been developed. Word-familiarity refers whether a user is familiar with the word or not		

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(EEG). In particular, a word-familiarity prediction approach based on EEG signals from the users brain		

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detecting those words which are unfamiliar to the users while reading using		

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The appearance of unknown words often disturbs communication and reading. This paper focuses on		

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frequency bands combination		

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EEG based word familiarity using features and		

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disorders.		

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should shape the evolution and application of novel techniques to better understand and treat brain		

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generate new ethical and philosophical questions about people and their brains. These questions		

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potential, there may be an ethical obligation to conduct this research. Advances in neuroscience will		

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outweighs the risk and therefore can be ethically justified. Depending on their neurogenerative		

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patients, the probable benefit of research into and therapeutic applications of neuroprosthetics		

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. Provided that adequate protections are in place for research subjects and		

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Significance		

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their lives.		

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minimize harm for people affected by damaged or dysfunctional brains and improve the quality of		

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or disease onset and thereby re-establish their identity. Neuroprosthetics can maximize benefit and		

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re-establish the connectedness and continuity of the psychological properties they had before injury		

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autonomous agency for people affected by neurological and psychiatric disorders. They can also		

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devices that integrate with these circuits, neuroprosthetics can restore varying degrees of		

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functions in bypassing areas of injury or modulating dysregulation in neural circuits. As enabling		

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. Neuroprosthetics can restore or improve motor and mental		

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Main results		

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patients' best interests.		

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criteria in providing access to neuroprosthetic research and balancing technological innovation with		

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includes consideration of social justice issues such as how to establish and implement fair selection		

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injury, infection, amputation or neurodevelopmental and neurodegenerative disorders. Cochlear		

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of neurally mediated functions. These include sensorimotor, visual, auditory, cognitive affective and		

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Neuroprosthetics are artificial devices or systems designed to generate, restore or modulate a range		

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Ethical issues in neuroprosthetics		

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misdiagnosis in severely brain-injured populations helping to distinguish conscious from unconscious		

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Electroencephalography (EEG) has been proposed as a supplemental tool for reducing clinical		

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Patients With Locked-in Syndrome		

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directly into the users brain.		

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usually involve complex surgeries to implant a computer chip and measuring device		

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implanted under the skull but below the brain to record signals whilst Invasive BCI's		

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however the severity of the connection can differ. Semi invasive BCI's are usually wires		

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accurate readings. Invasive and semi invasive BCI's connect directly to the brain		

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carry less risk of injury through infection or complications however produce less		

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most common. These systems do not require surgery to connect to the subject and		

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external device. Non invasive forms of BCI usually refers to EEG BCI's as these are the		

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classifications(). These categories relate to how the user or person is connected to an		

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BCI's have different categories such as invasive, non invasive and semi invasive		

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within the brain. To restoring a person's sight through an invasive implant in the brain.		

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EEG for short which is a monitoring method that non invasively records electric signals		

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these devices can range from simple brain wave recorders i.e Electroencephalography or		

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the brain and uses these signals to directly interact with an external device. The uses for		

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for a specific task. BCI's operate under the principle of measuring electrical signals in		

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connects the brain to an external device, usually a computer of some kind programmed		

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Brain Computer Interfaces or BCI's for short is the technical term for a device that		

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Introduction:		

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Comparing the possibilities of future technological human enhancements.		