I2.03 Neuroergonomics

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TEXAS STATE
INGRAM SCHOOL OF ENGINEERING

INDUSTRIAL ENGINEERING
Neuroergonomics

Project Breakdown

Increased mental fatigue is leading to an increase in physical fatigue along with decreased workflow and injury in the manual material handling industry.

The primary purpose of the project is to detect mental fatigue in material handling workers. In order to complete this purpose, brain wave activity needs to be collected. The Emotive device is the tool that will be used to collect EEG data.

Objectives

Learn how to use the device

Design experiments for collecting data

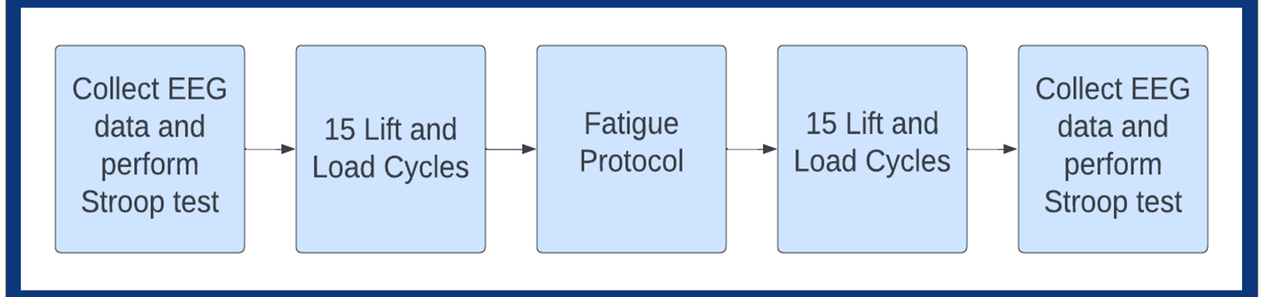
Collect mental fatigue data using the Emotive device

Process the data to reduce noise

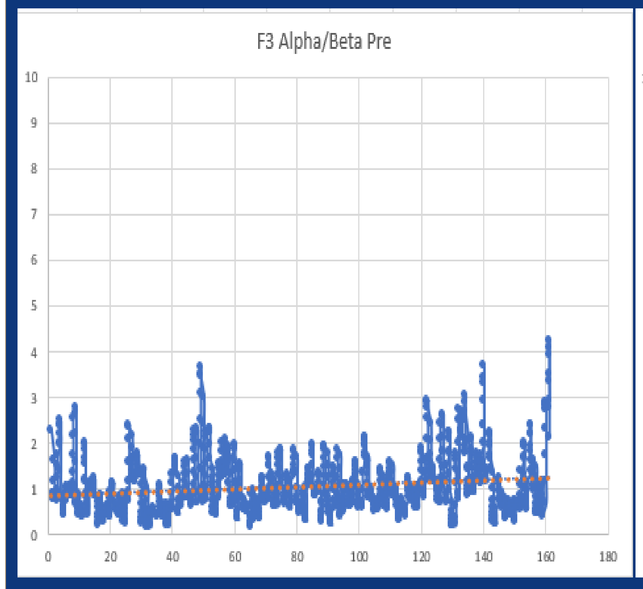
Analyze data and find results

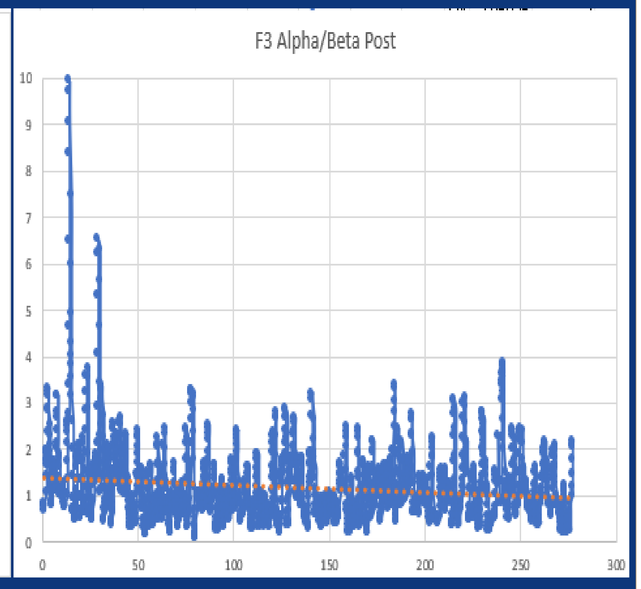
wave	frequency(Hz)	description
Theta	4 to 8	relaxed
Alpha	8 to 12	passive attention
Beta	12 to 35	active attention
Gamma	35+	concentration

Data and Data Collection



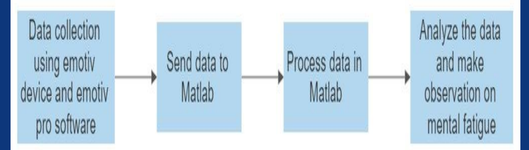
	Pre		Post		Z test	
Node	average	stdev	average	stdev	Conclusion	p-value
AF3	1.745	1.284	1.863	1.519	Different	9.60E-03
F7	1.713	1.303	1.928	1.683	Different	9.00E-07
F3	1.059	0.611	1.186	0.819	Different	4.36E-08
FC5	1.167	0.703	1.333	0.987	Different	1.39E-09
AF4	1.488	1.022	1.609	1.188	Different	7.68E-04
F4	1.039	0.581	1.114	0.684	Different	2.68E-04
F8	1.434	0.924	1.526	1.164	Different	6.74E-03
FC6	1.369	0.731	1.205	0.742	Different	1.15E-11





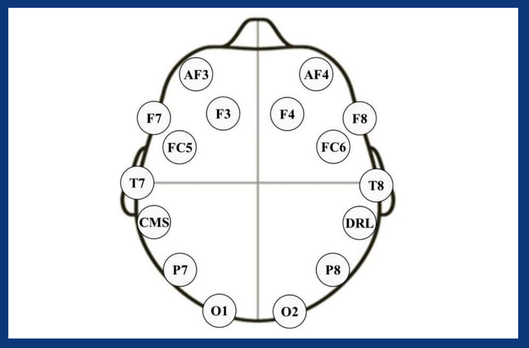
Key Information

Flow of Data



Fatigue Detectors

1	(α+θ)/β
2	α/β
3	(α+θ)/(α+β)
4	θ/β



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