



EEG-BASED BRAIN COMPUTER INTERFACE SYSTEM FOR EMOTION RECOGNITION

SWATHI N SHAYANA

4MH16CS106

BATCH: B22

GUIDE: PROF. KAVYAPRIYA ML

CONTENTS

- INTRODUCTION
- LITERATURE SURVEY
- OVERVIEW
- SYSTEM ARCHITECTURE
- APPLICATIONS
- SMART ENVIRONMENT
- CONCLUSION AND FUTURE SCOPE
- REFERENCES

INTRODUCTION

- What is BCI ?
- What is EEG ?
- Why EEG ?



LITERATURE SURVEY

TITLE	AUTHORS AND PUBLICATIONS	CONCLUSIONS
Electroencephalograph (EEG) Based Emotion Recognition System: A Review	Kalyani P. Wagh and K. Vasanth, Springer Nature Singapore Pte Ltd, 2019	Gave an overview of the various steps involved in BCI for recognising emotions through EEG signals.
Brain Computer Interface (BCI)	Abdallah Abdelaziz, International Journal of Computer Science and Mobile Computing, September 2019.	Showed which part of the brain is responsible for generating which type of emotion. It explains the advantages of using EEG signals to classify human emotions over other techniques.
Emotion Recognition Based on Brain-Computer Interface Systems	Taciana Saad Rached and Angelo Perkusich, INTECH, 2019	Classified the emotions into six different types : happy, sad, fear, frustrated, satisfied and pleasant. They used music videos to induce emotions in the participants for the experiment.

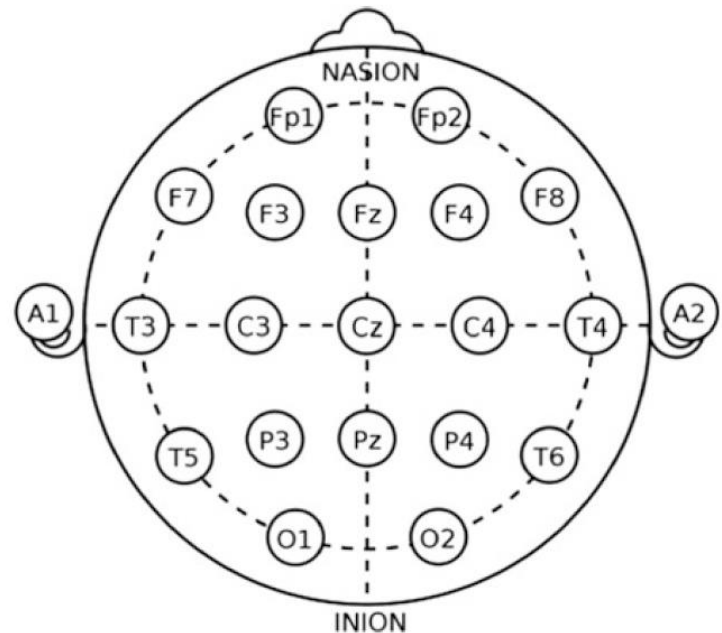
TITLE	AUTHORS AND PUBLICATIONS	CONCLUSIONS
Brain Computer Interface: Applications and P300 Speller Overview.	Dr. Maulika S. Patel, Vaishali Patelia, Proceedings of Institute of Electrical and Electronics Engineers (IEEE), 10th ICCCNT, 2019	Describes the various application fields of BCI. Gave a brief description of the headset used to acquire EEG signals and the two types of brain signal acquisition methods.
“EEG -Based Brain Controlled Home Automation System	S Aiswarya, K Moogambikai, K Abarna, M Deepa, S Menaga, International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering, February 2019	Uses the attention level of human brain to control different appliances which is the invention of smart environment using Brain Computer Interface. A system was built to turn ON and OFF various home appliances using BCI.

OVERVIEW



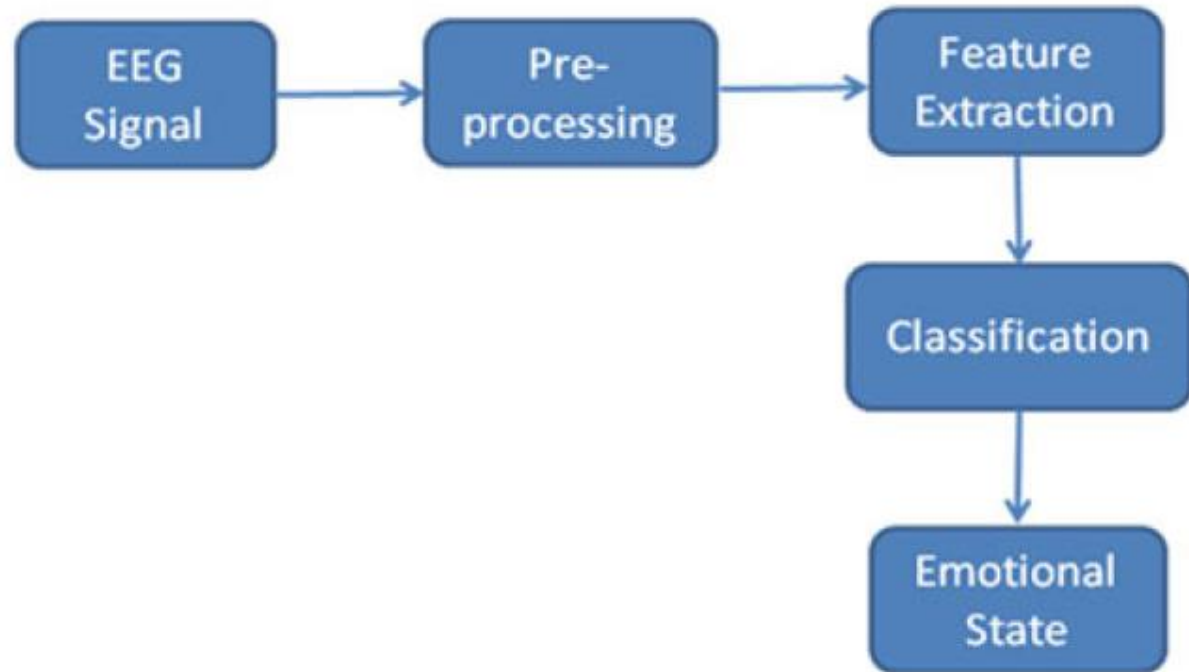
Headsets

Electrode Placement



SYSTEM ARCHITECTURE

Steps involved :-



SIGNAL ACQUISITION

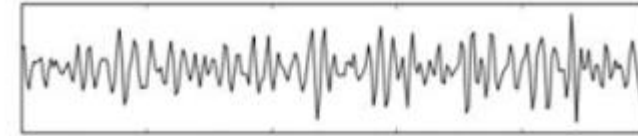
- ✓ Invasive
- ✓ Non-invasive
- ✓ Frequency bands

PREPROCESSING

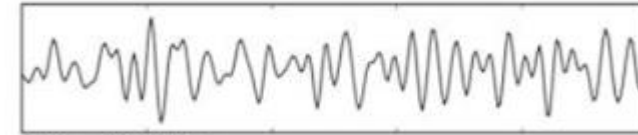
- ✓ Why do we need it
- ✓ Artifacts

FEATURE EXTRACTION

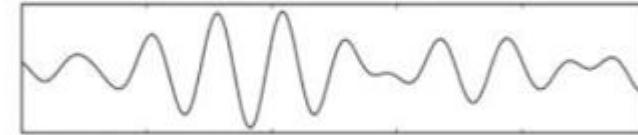
- ✓ Time-Frequency domain features
- ✓ Wavelet Transform



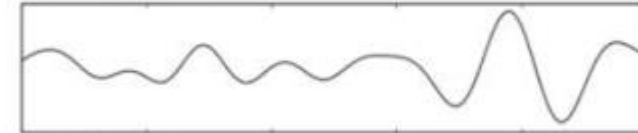
Gamma: 30-100+ Hz



Beta: 12-30 Hz



Alpha: 8-12 Hz

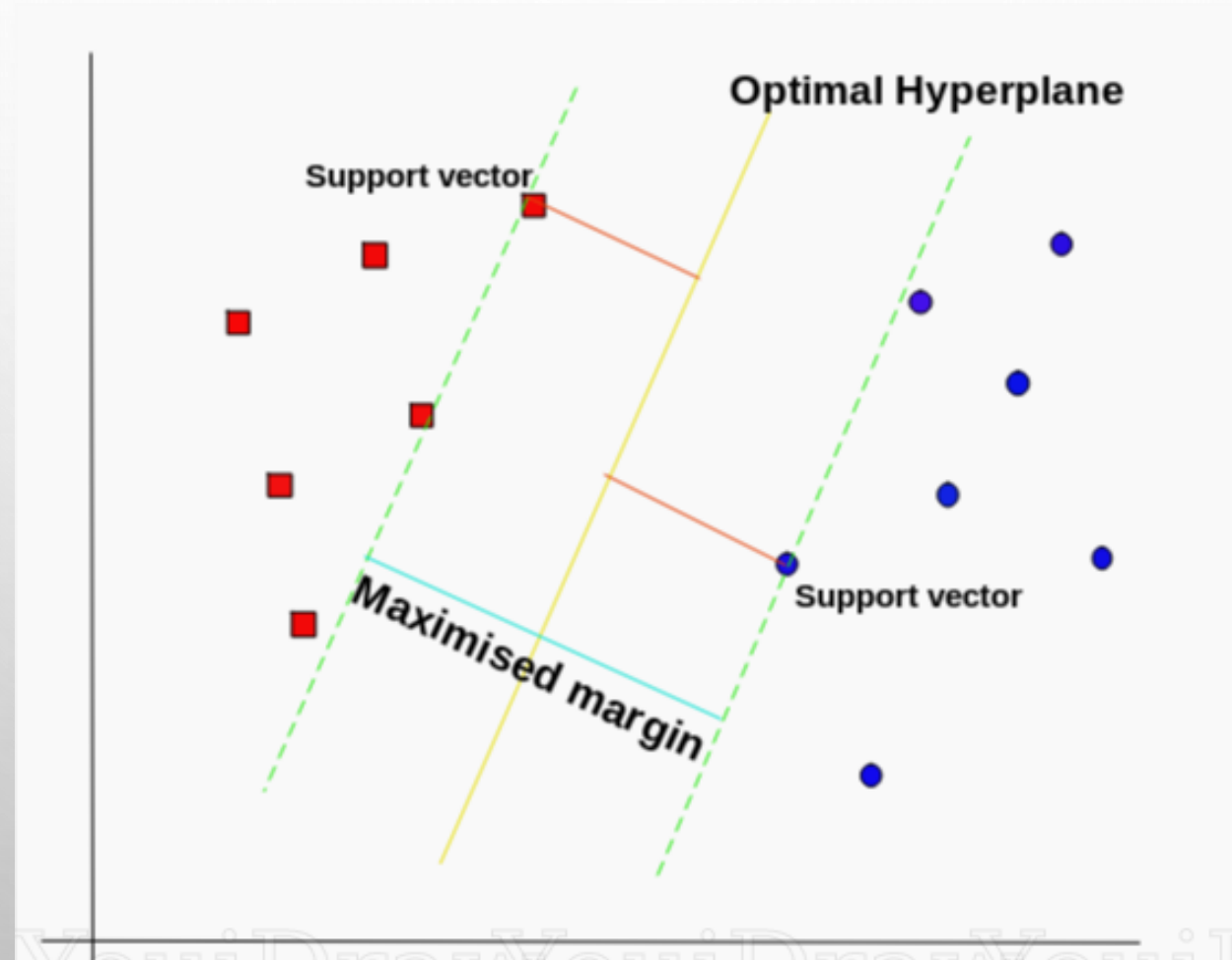


Theta: 4-7 Hz



Delta: 0-4 Hz

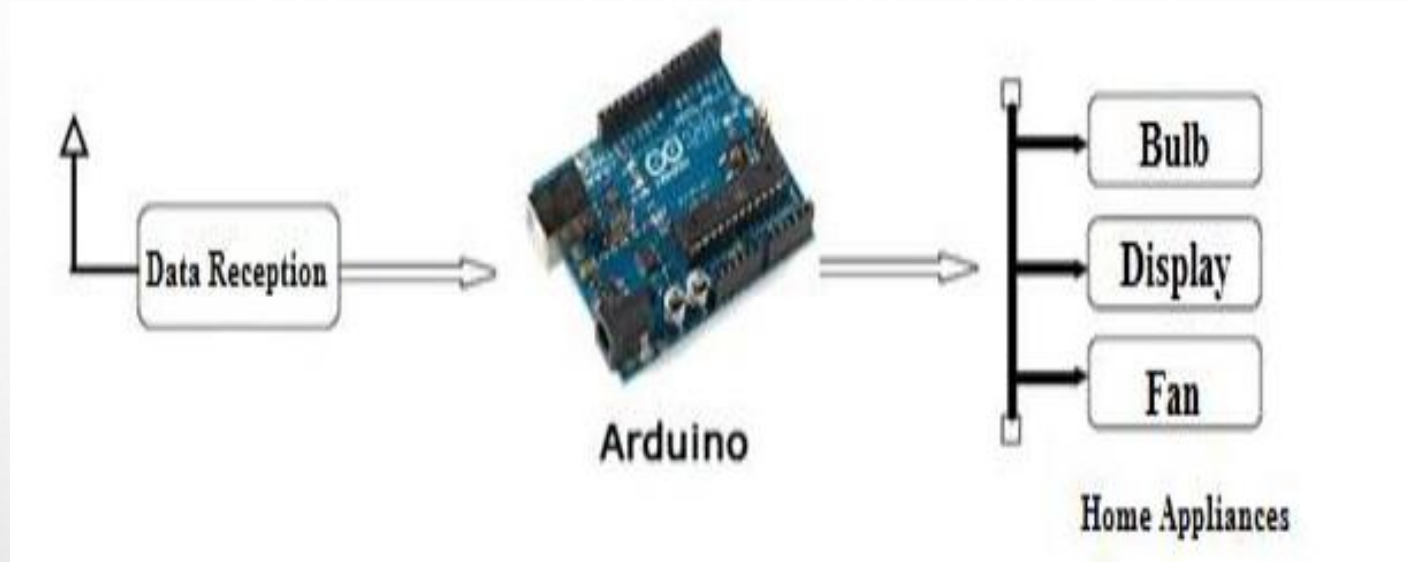
CLASSIFICATION – SUPPORT VECTOR MACHINE



APPLICATIONS

- MEDICAL
- ENTERTAINMENT
- EDUCATION
- PROSTHETIC LIMBS
- SMART ENVIRONMENT





SMART ENVIRONMENT

CONCLUSION AND FUTURE SCOPE

- NEXT DISRUPTIVE TECHNOLOGY
- CHANGING THE LIVES OF PEOPLE
- RESEARCH IS STILL IN ITS INFANCY
- IMPLANTED SILICON CHIPS
- COMPUTERS WITH BIOLOGICAL SENSORS

REFERENCES

- [1] KALYANI P. WAGH AND K. VASANTH, “ELECTROENCEPHALOGRAPH (EEG) BASED EMOTION RECOGNITION SYSTEM: A REVIEW”, SPRINGER NATURE SINGAPORE PTE LTD, 2019
- [2] ABDALLAH ABDELAZIZ, “BRAIN COMPUTER INTERFACE (BCI)”, INTERNATIONAL JOURNAL OF COMPUTER SCIENCE AND MOBILE COMPUTING, SEPTEMBER 2019.
- [3] TACIANA SAAD RACHED AND ANGELO PERKUSICH, “EMOTION RECOGNITION BASED ON BRAIN-COMPUTER INTERFACE SYSTEMS”, INTECH, 2019.
- [4] DR. MAULIKA S. PATEL, VAISHALI PATELIA, “BRAIN COMPUTER INTERFACE: APPLICATIONS AND P300 SPELLER OVERVIEW”, PROCEEDINGS OF INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE), 10TH ICCCNT, 2019
- [5] S .AISWARYA, K .MOOGAMBIKAI, K .ABARNA, M .DEEPA, S .MENAGA,, “EEG -BASED BRAIN CONTROLLED HOME AUTOMATION SYSTEM”, INTERNATIONAL JOURNAL OF ADVANCED RESEARCH IN ELECTRICAL, ELECTRONICS AND INSTRUMENTATION ENGINEERING, FEBRUARY 2019.

THANK YOU