SHRI RAMDEOBABA COLLEGE OF ENGINEERING AND MANAGEMENT

Department of Information Technology

Semester -VII (2019-20)

Seminar on

Using Brain Computer Interface for Automation

by

- **Sanidhya Pawar(Roll No. 57)**
- **Shivam Vishwakarma(Roll No. 62)**
- **Yash Nagpure(Roll No. 72)**

Under the guidance of,

Prof. Rakesh K. Kadu

Assistant Professor,

IT Department, RCOEM, Nagpur

Contents

- Introduction
- Literature Review
- Existing Model
- Proposed Model
- Hardware Components
- Software Components
- Architecture of Proposed Model
- Project Timeline
- Applications

Introduction

- A brain-computer interface (BCI) is a new interface for communication between the human brain and a digital computer.
- Different brain states are the result of different patterns of neural interaction.
- These patterns lead to waves characterized by different amplitudes and frequencies.
- An Electroencephalogram (EEG) based brain-computer interface can be used in order to automate different devices.
- This project deals with the acquisition of raw brainwave signals from brain, using BCI technology.
- The Brainwave measuring unit/ Brainwave Sensor will receive the brain wave signals and convert it into raw data using MATLAB GUI platform.

Literature Review

Sr. No.	Title	Paper / Research Article	Authors	Organization
1.	EEG - Controlled Wheelchair Movement: Using Wireless Network	Biosensors and Bio-Electronics Research Article	Pranob Kumar Charles, Murali Krishna, Praneeth Kumar GV, Lakshmi Prasad D	Electronics and Communication Department, Andhra Loyola Institute of Engineering and Technology, JNTUK, Vijayawada, Andhra Pradesh, India
2.	Brain Controlled Home Automation System	International Research Journal of Engineering and Technology (IRJET)	Vidya G. , Vipitha E. , Hridya S.	Dept. of Electrical and Electronics Engineering, Mar Athanasius College of Engineering, Kothamangalam, Kerala, India

Existing Model

- The Existing model for Automation of devices is based on Electromyography.
- Specially-abled people need to Depend on others for different activities.
- Also, No proper BCI based models are available in India aimed towards helping specially-abled patients.
- Drawbacks of existing model:
  - Time consuming process, (can be Automated).
  - Need Human interaction.

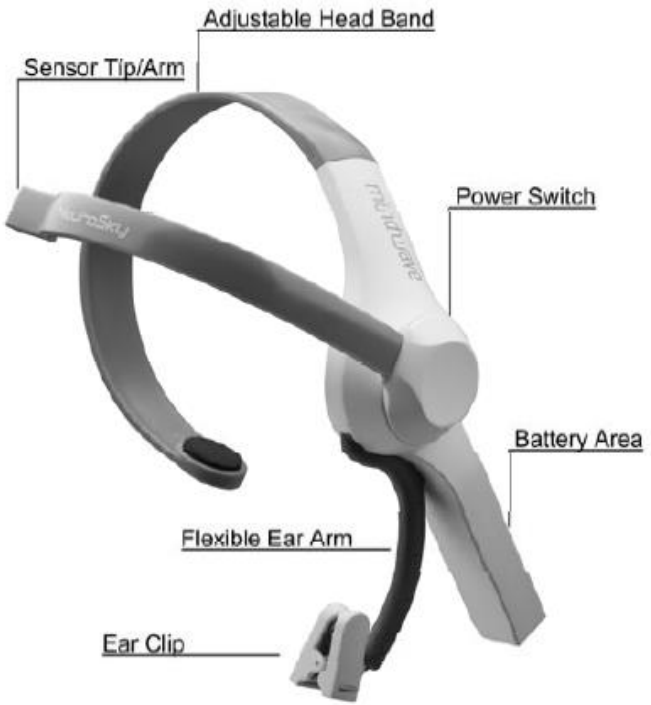
Proposed Model

- We will be using inputs from two states of brain and a motor function which are Attention, Meditation and Eye-blinks respectively.
- Analyzing the thoughts of what the subject patient wishes to accomplish based on the inputs.
- Implementing Self controlled operating facility
- Aimed for helping people suffering with Disability or for people who are in Stage 1 of Alzheimer.

Hardware Components

- Brainwave Brain-sense Device (TGAM Sensor)
- Arduino UNO/ Raspberry Pi
- Bluetooth Module
- Relays
- Jumpers and cables

Hardware Components



Mindwave

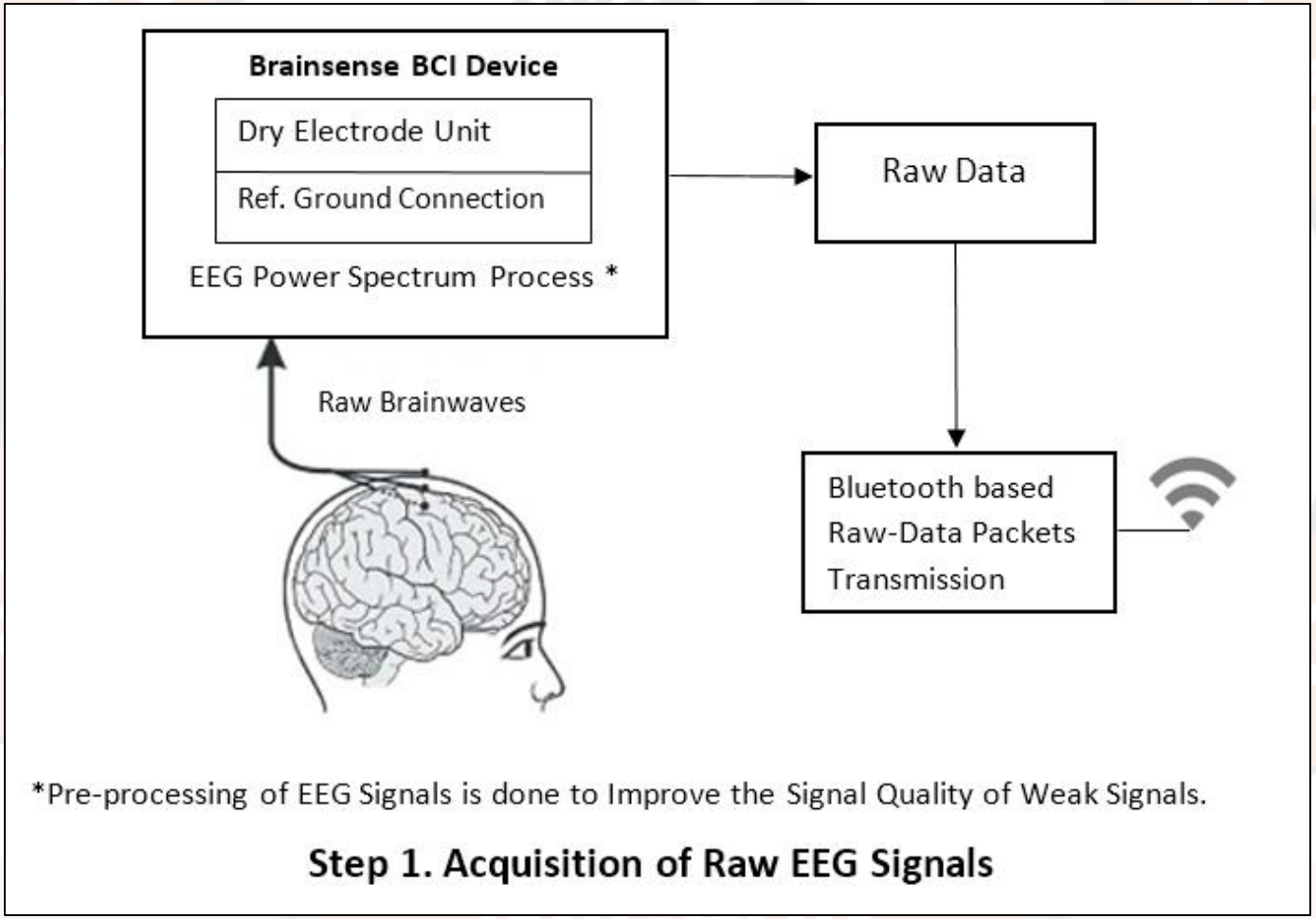
Brainsense

TGAM Sensor

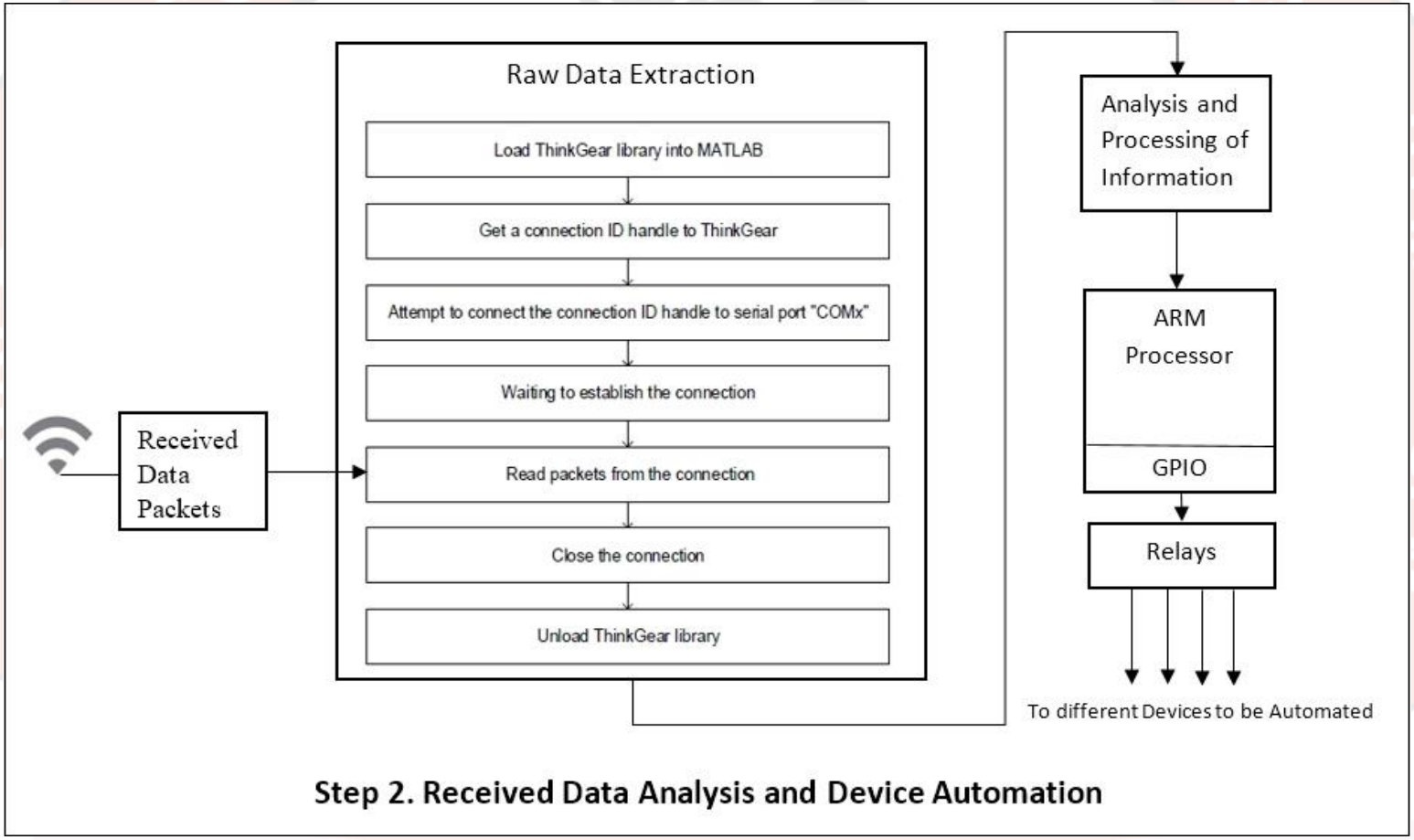
Software Components

- MATLAB
- X-CTU for Serial Communication

Architecture of Proposed Model

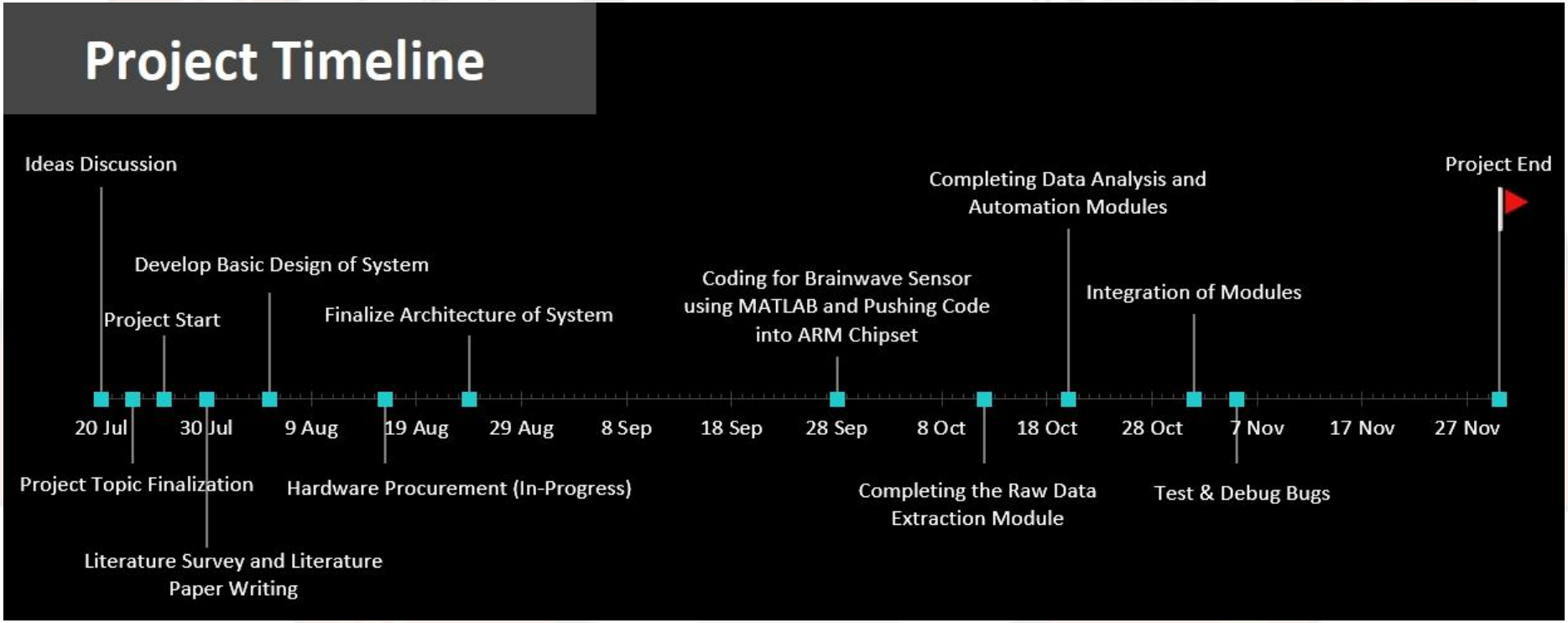


Architecture of Proposed Model



Step 2. Received Data Analysis and Device Automation

Project's Timeline



Other Applications of BCI Technology

- Brain controlled Wheelchair.
- Brain controlled Keyboard for devices.
- Drowsy Driver Detection System.
- Neuro Marketing – Application of Neuroscience in marketing domain for analysis of customer's buying decisions.