PANTECH SOLUTIONS
Technology Beyond the Dreams

BRAIN CONTROLLED ROBOT DESIGN

Organized by

Pantech Solutions

&

National Institute of Technology Karnataka, Surathkal [STEP]

All Participants, Please fill the Attendance form, Link will be given in the description after 11:10 A.M

ABOUT NITK

01

PROFILE

Founded in 1960 | Well known as Karnataka Regional Engineering College (KREC)

02

VISION

To facilitate transformation of students into good human beings, responsible citizens & competent professionals, focusing on the assimilation, generation and dissemination of knowledge.

ABOUT PANTECH

01 **PROFILE**
Founded in 2004 | 7 Branches | 100+ Team

02 **OUR SERVICES**
Lab equipment, Engineering Kits, Components, Sensors and All level Projects

03 **R & D**
Manufacturer of Lab equipment's & Development boards | Industrial &Funded projects | Online retail store of engineering products and projects

04 **TRAINING**
1500+ Workshops | 250+ FDP | 100+ Seminars

PANTECH TECHNOLOGY

Manufacturer of Embedded development Boards | FPGA Boards | Sensors | Interface Modules | E- Vehicle | Renewable energy systems | Motors and Drivers |Power electronics | Power Systems

ELECTRONICS & ELECTRICAL

ROBOTICS & MECHANICAL

Robotics | Mechanical components | 3D design and printing | Autonomous Robot design

Machine Learning | Deep Learning | NLP | Chatbot | Block chain | Data science and AI boards | AR & VR products | Android development | Cyber security | Cloud & Mobile computing | IoT

AI & Software

BRAIN COMPUTER INTERFACE

Brain wave analysis | Brain controlled applications | Manufacturer of EEG headband

AGENDA | BRAIN COMPUTER INTERFACE[BCI]

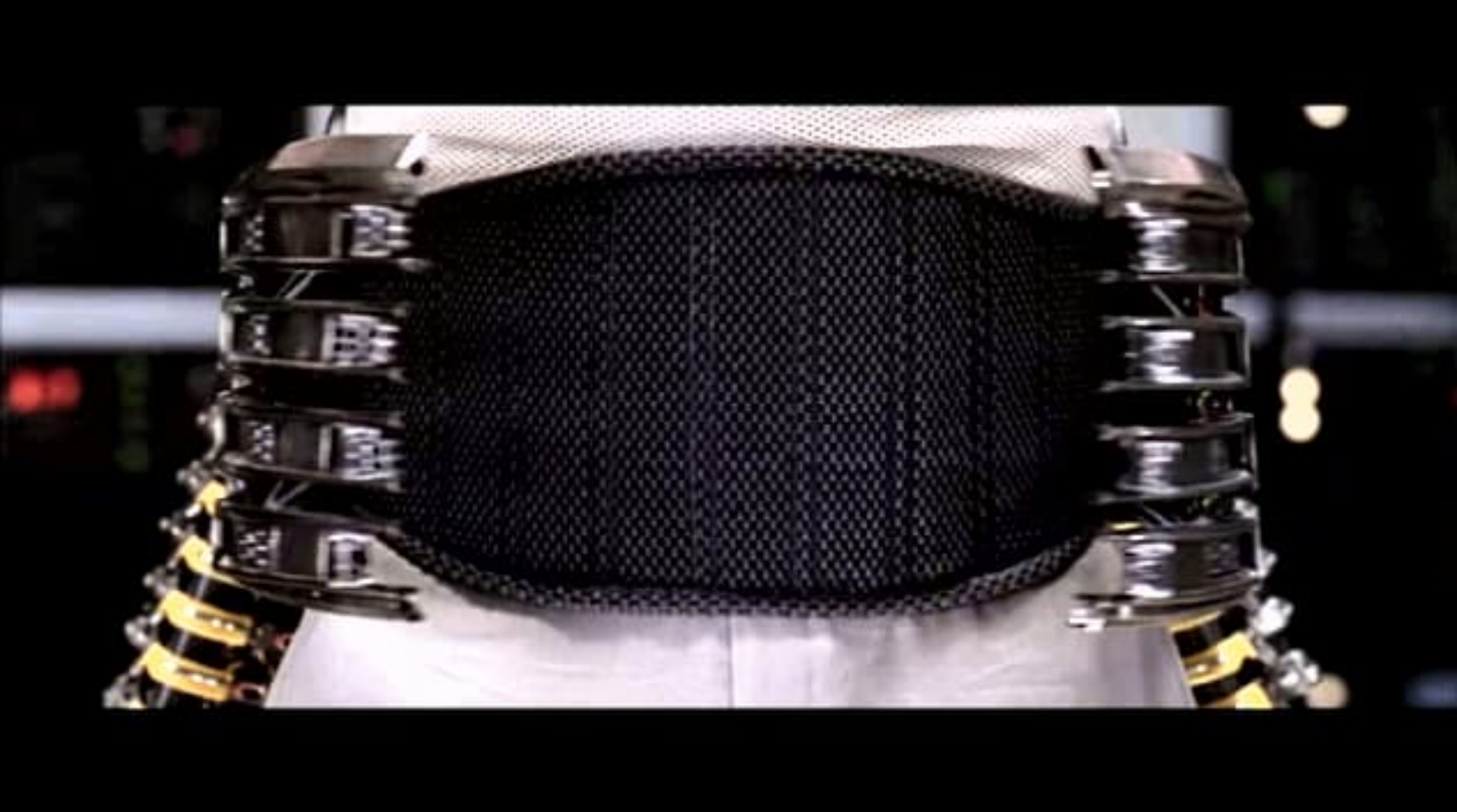
- Overview on Brain computer Interface
- Live Demo on BCI using EEG Headband | Brainsense
- Robot Design Arduino | Motor Driver
- Bluetooth Configuration
- Assembly and Connections
- Working principle
- Video Demo on BCI Application using Matlab | Arduino | Raspberry Pi & OpenBCI

BRAIN COMPUTER INTERFACE

BCI (Brain Computer Interface)
Communication using Thoughts of Brain (EEG) without using any Muscle control, Especially for Severely Paralyzed people

OVERVIEW

- Application of BCI
- Neuralink — Brainsense
- Anatomy & Function mapping — Electrode Placement & Signal Detection
- BCI Devices — Types of Electrodes
- Bio Signal — EEG & its Bands



BRAINSENSE FEATURES

Specification

- Direct connect to dry electrode
- One EEG channel + Reference + Ground
- RAW EEG at 512Hz
- Operating voltage 2.97 ~3.63V
- 3-100Hz frequency range

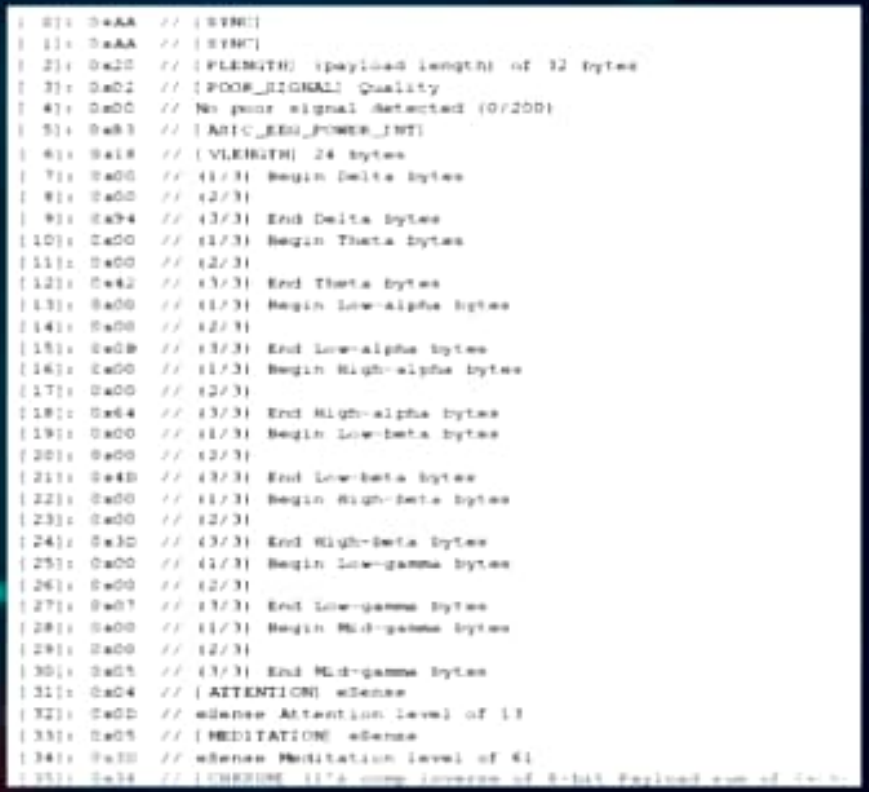
Data Outputs

RAW EEG Signal | Attention | Meditation
Delta, Theta, alpha, beta and gamma waves

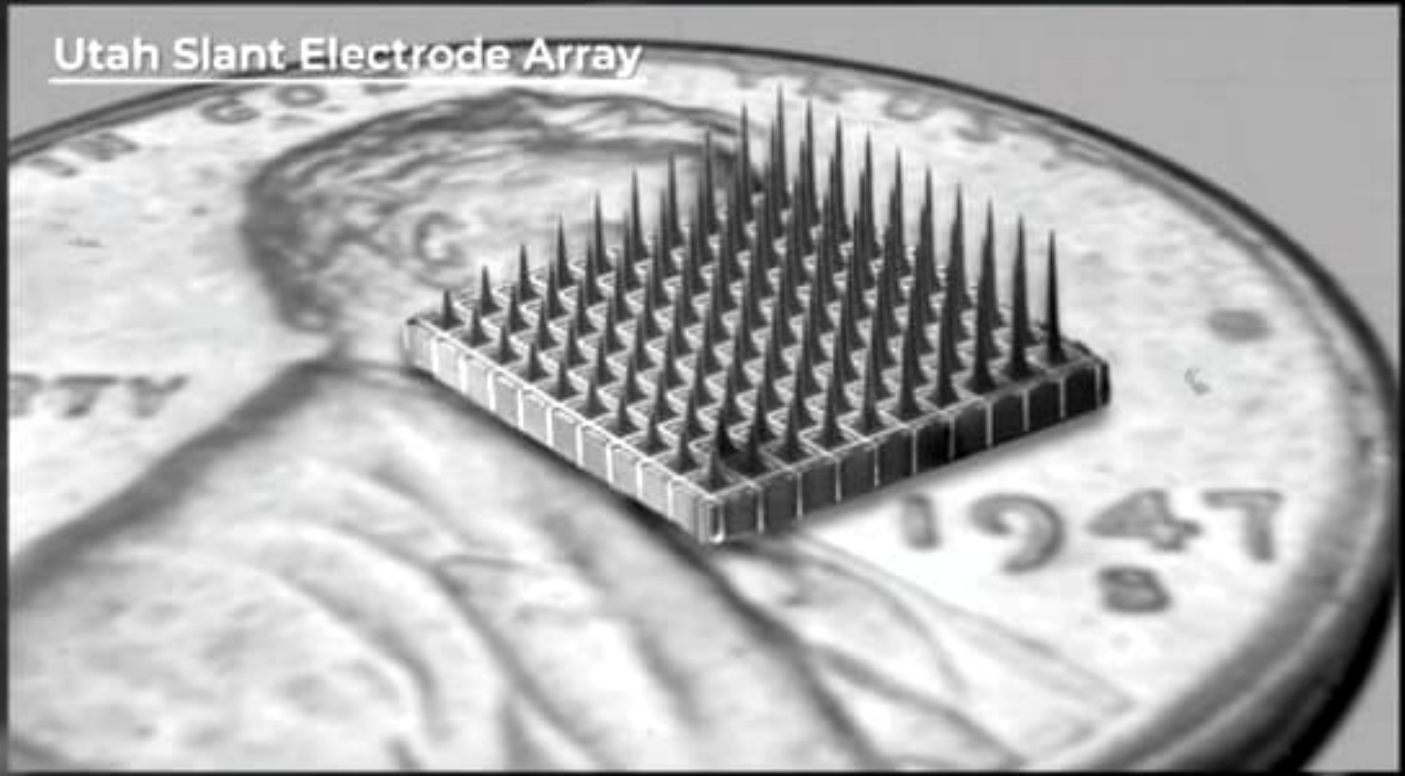
THINKGEAR MODULE

Specification

- TGAM MODULE offers e-Sense technology
- Outputs Attention, Meditation and Physical eye blinks from raw EEG data
- 2.79cm x 1.52cm x 0.25cm, weighs 130mg
- Communicates through UART interface at Baudrate 1200, 9600 or 57600



TGAM PACKET FORMAT



Video source - Real Engineering & Neuralink

ARDUINO UNO

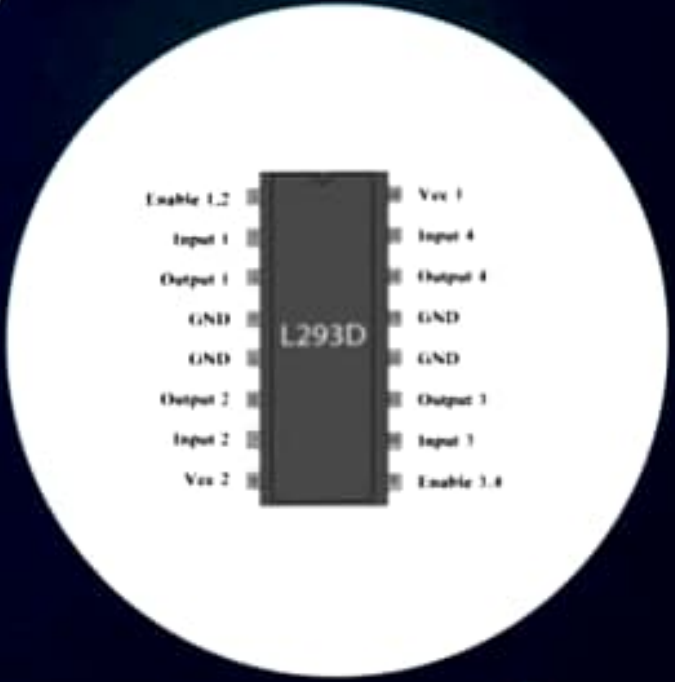
Specification

- Power : Vin, 3.3V, 5V, GND
- Analog Pins: A0 - A5
- IO Pins: D0 – D13
- Serial – 0 (Rx) & 1 (Tx)
- External Interrupt: 2 & 3
- PWM : 3, 5, 6, 9 & 11
- Inbuilt LED: D13

MOTOR DRIER - L293D

Specification

- Voltage Range: 4.5 to 36 V
- Separate Input-Logic Supply
- Output Current 1A per channel
- H- Bridge



BLUETOOTH CONFIGURATION

Specification

- Finding Serial Unique number of Brainsense
- Connection using Arduino/NodeMCU
- Set Bluetooth in Configurable Mode
- Configure AT Commands using Terminal software.
- While configuring each AT commands verify is it returning OK.

BLUETOOTH CONFIGURATION

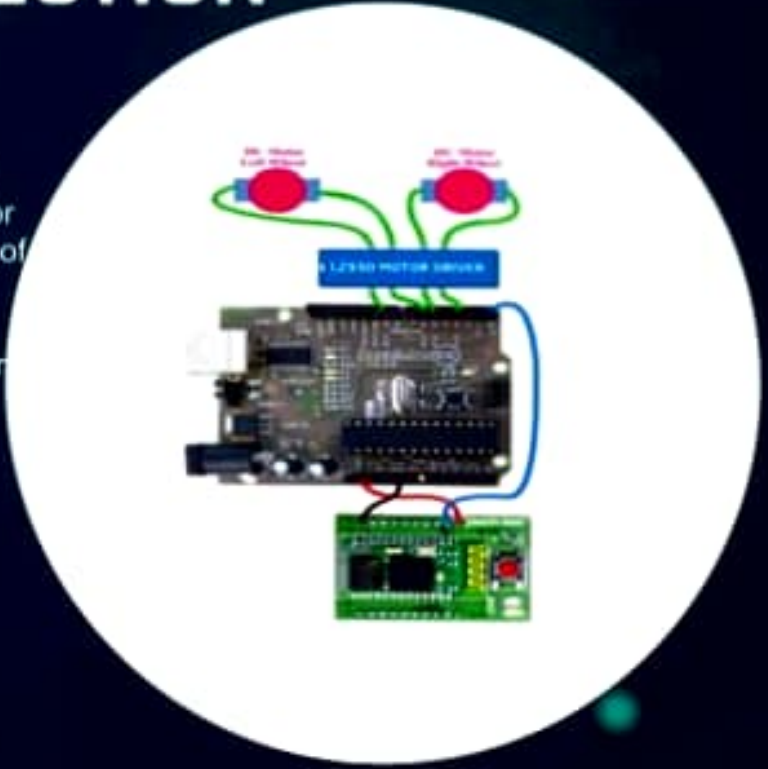
AT Commands

- AT+NAME="PANTECH"
- AT+UART="57600,0,0"
- AT+ROLE="1"
- AT+PSWD="1234"
- AT+CMODE="0"
- AT+BIND="XXXX,YY,ZZZZZZ"(Brainsense UniqueNumber)
- AT+IAC="9E8B33"
- AT+CLASS="0"
- AT+INQM="1,9,48"

ASSEMBLY & CONNECTION

Connection

- Then Arduino data line (GPIO) is given to motor driver (L2930) and then it is given to pins of motor driver. After that output of driver is given to input of the motor
- The Transmitter and Receiver of the Arduino is connected to Bluetooth Receiver and Transmitter



WORKING OF BCI APPLICATION

ARDUINO | BRAINSENSE

BRAIN WAVES

BRAINSENSE

SIGNAL
ACQUISITION

BLUETOOTH
(HC-05)

ARDUINO

SIGNAL
PROCESSIN

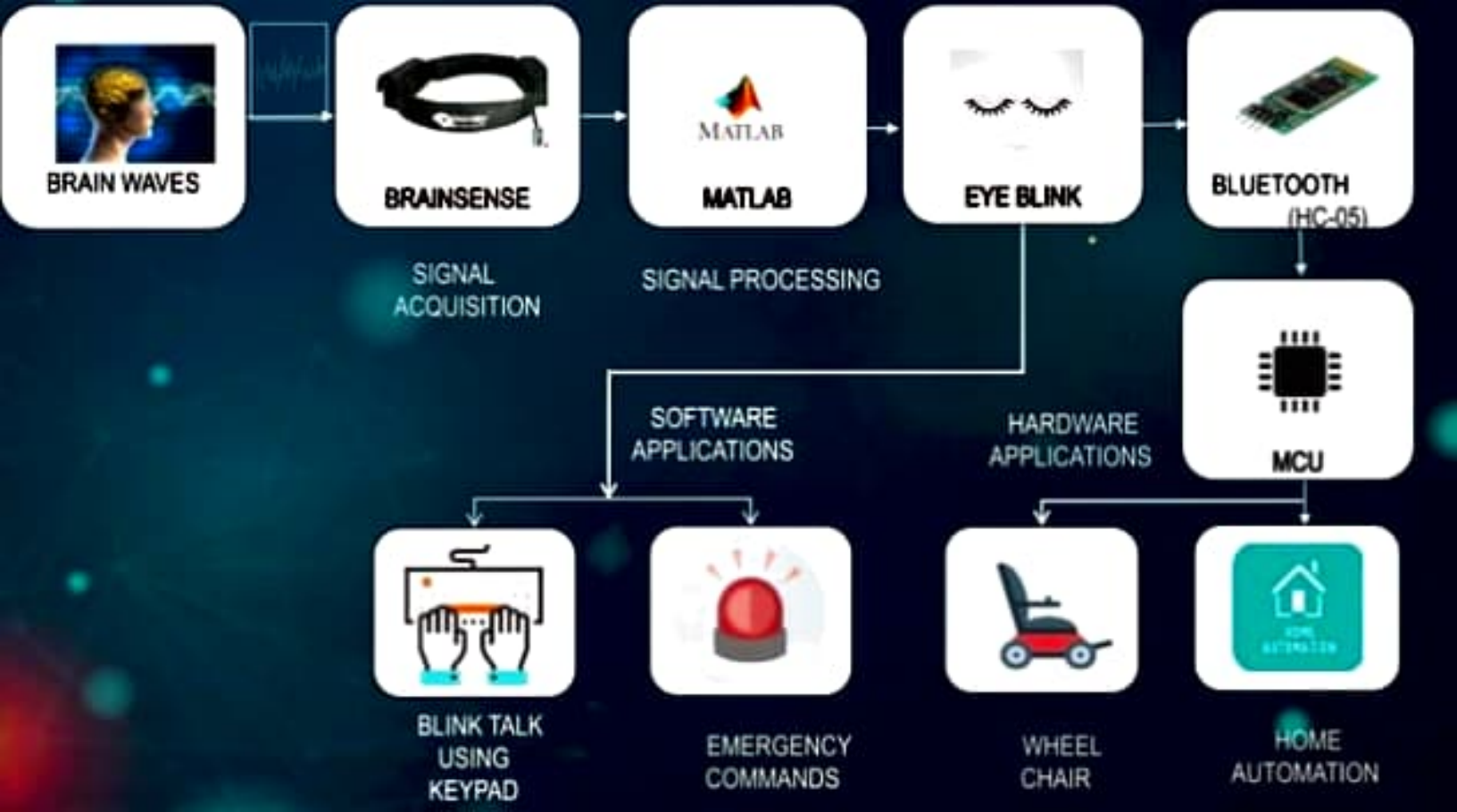
HARDWARE
APPLICATIONS

WHEEL
CHAIR

HOME
AUTOMATION

WORKING OF BCI APPLICATION

MATLAB | BRAINSENSE | ARDUINO


BRAIN WAVES
BRAINSENSE
MATLAB
MATLAB
EYE BLINK
BLUETOOTH
(HC-05)
SIGNAL
ACQUISITION
SIGNAL PROCESSING
SOFTWARE
APPLICATIONS
HARDWARE
APPLICATIONS
MCU
BLINK TALK
USING
KEYPAD
EMERGENCY
COMMANDS
WHEEL
CHAIR
HOME
AUTOMATION

APPLICATIONS OF

BRAIN COMPUTER INTERFACE