F25-B: NERVE (pratyay2/emcheng2)

Pratyay Gopal & Everitt Cheng (*prtayay2/emcheng2*)
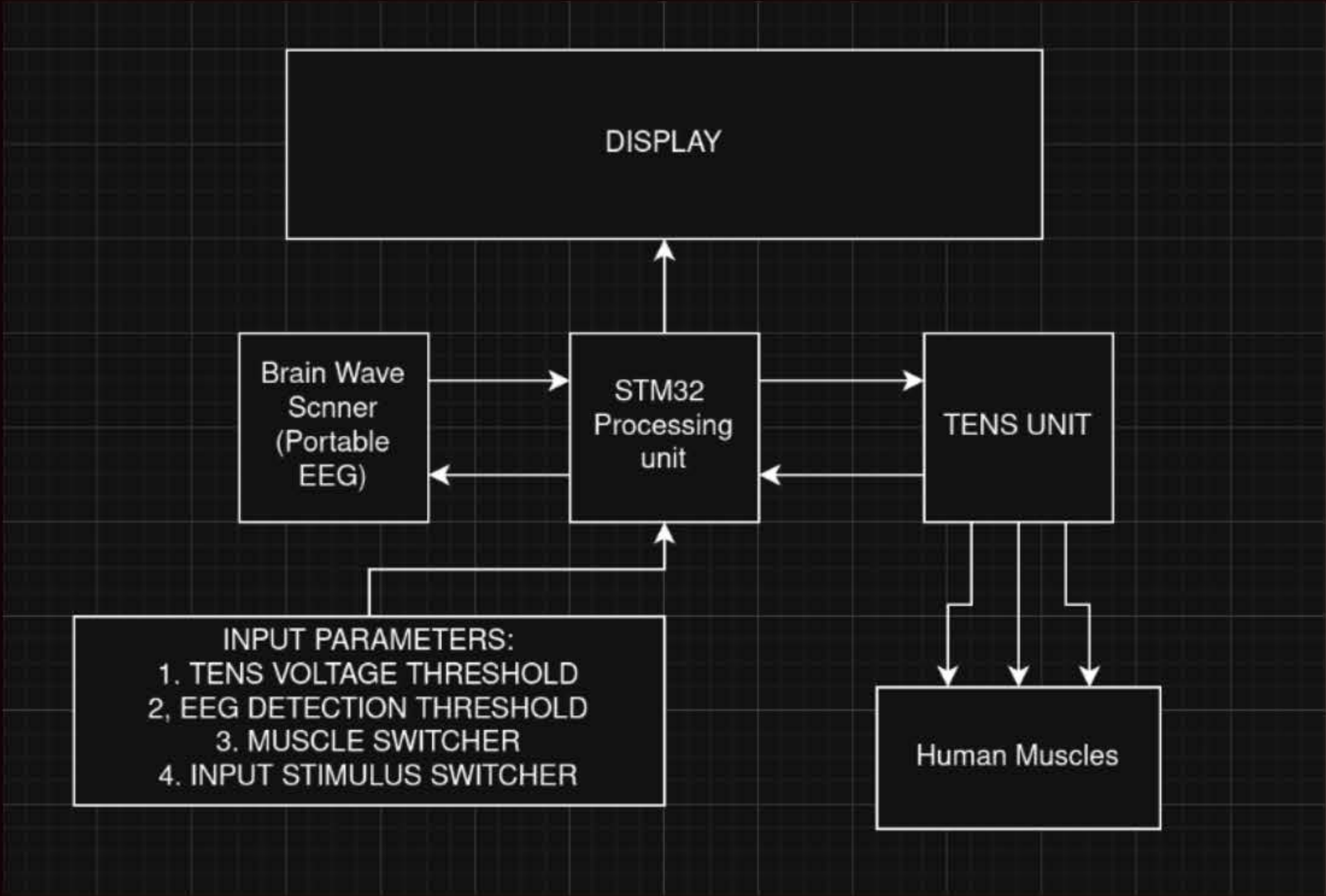
- **Project Name**

  - **Neural Emulation of Relayed Voltage Elements (N.E.R.V.E)**

- **Abstract**

  - For this project we are attempting to develop a control loop from our brain to our muscles bypassing our CNS(Central Nervous System). In essence we want to develop an external nerve that can be used independent of our internal nervous system. First we want to start small, by implementing an electrical signal output from the microcontroller(STM32) to our muscles using a TENS unit. We want to visualize the outcomes of our experimentations. Our final goal is to achieve something that can be used to externally control certain parts of our body without the need of internal nerves. Although ambitious, we want to attempt to create an exposed nerve purely for academic purposes.

- **Block Diagram**

- **Project Goals**

  - **First:** for our first demonstration, we would like to be able to demonstrate our knowledge of the capabilities of the TENS unit/portable EEG(Electroencephalogram ↗) integrated with a STM32 microcontroller. We would like to implement it in such a way to where brain waves are displayed through an external display.

  - **Final:** for our final demonstration, we hope to spike an intensity in the user's brain waves causing a muscular contraction in the body. Possibly overzealous, we also would like to expand upon this concept further in controlling more nerves, and implement various detections of brain wave measurements, not just intensity. These topics require a deeper fundamental understanding of biology/neuroscience and not just ECE.

- **Low Level Coding**

  - We will ideally be using some form of low level communication protocol like UART, I2C, SPI, or AXI. This mostly depends on the external peripherals like the TENS unit and the portable EEG that we will acquire. This purely depends on the SDK provided by the hardware, we will update these specifications when we are able to physically interact with the hardware.

- **Tentative Schedule**

Tentative Schedule: (3 CH)

Mon	Tue	Wed	Thu	Fri	Sat	Sun
10:00pm -12:00pm	4:00pm - 5:00pm	N/A	3:00pm - 5:00 pm	N/A	1:00pm - 2:00pm	3:00pm - 5:00pm

- **Links:**

TENS UNIT: https://www.amazon.com/TENS-7000-Digital-Unit-Accessories/dp/B00NCRE4GO ↗