Portable Brain Computer Interface for ALS Patients – SDT 08 – Victor Flamini, Cody Stephens, Angelo Guiliano, Hoang Nguyen
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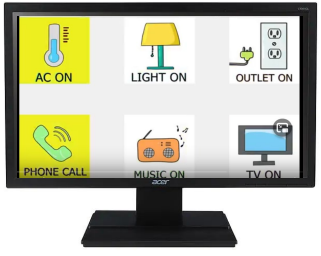
Problem

- ALS degenerates motor neurons causing loss of autonomy, heavy dependence on caregivers
- Brain-computer interfaces (BCI) use neural activity to execute actions
- Current BCIs are **intrusive** and **expensive**

Objective: Improve user experience in an affordable BCI system.

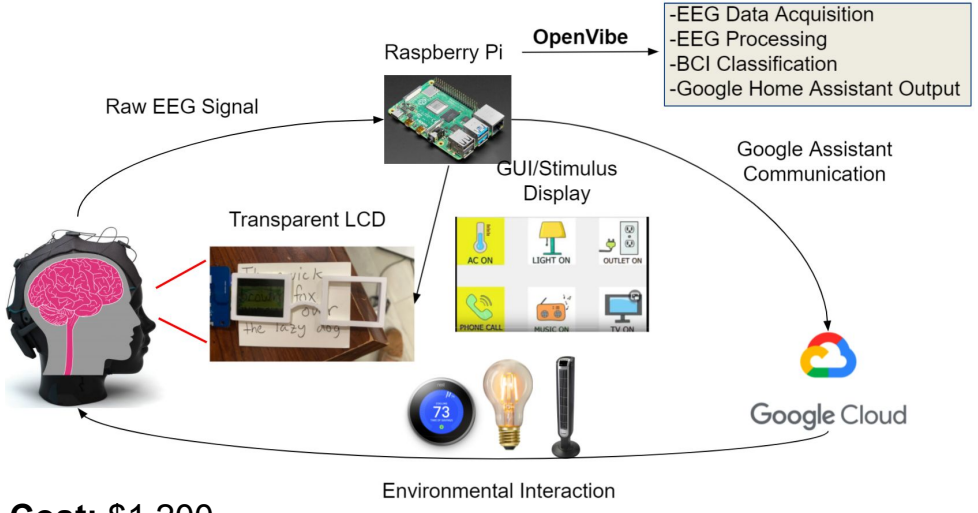
Too Expensive



Too Large

Requirements: Visible display & maintain FOV, stimulus displays in time, maintain system functionality

Solution: Modified AR Glasses With BCI



Cost: $1,200

Added System Components:
Raspberry Pi 4B, Transparent TFT LCD, 3D Printed Frames

Weight: Under 1 pound for total system

Testing Results

LCD refresh rate: ~34 FPS
System RAM Usage: 19.6%
Processing time:
~501 ms from signal input to process output

User Field of View

Eye	Vision Span (°)	% of Total Vision
Left Eye	79	83.1
Right Eye	68	71.6

Future Plans

- Hands-free on/off switch
- Higher screen resolution
- Further increase field of view with screen

Impact

- Reduce system cost by 50%
- Overall size minimized: environmental interaction increased
- **Restoration of autonomy**