



InnVedX Code Hackathon

Team name- *VIANRA*

Member name

1. Khushi Kushwaha (Leader)
2. Harsita Singh
3. Shweta Prajapati
4. Astitva Goswami

Problem statements-

Problem Statement 15: Open Innovation – Build for Bharat
Any real-world problem aligned with national development goals.



PROBLEM & SOLUTION

Problem statement : Millions of individuals suffering from stroke, ALS, cerebral palsy, or locked-in syndrome lose their ability to speak.

Proposed solution

- ✓ EEG Headband
- ✓ Signal Processing
- ✓ AI Decoder
- ✓ Text-to-Speech
- ✓ Avatar & Dashboard
- ✓ User-Friendly App
- ✓ Emergency Alert
- ✓ Data Security

How it Works

- ✓ Voice for the Speech-Impaired
- ✓ Real-Time Communication
- ✓ Accessible & Inclusive
- ✓ Wearable & User-Friendly
- ✓ Emergency Alerts
- ✓ Enhances Quality of Life

Uniqueness & Innovation

- ✓ Direct brain-to-speech conversion
- ✓ Non-invasive, low-cost wearable
- ✓ EEG headset.
- ✓ Multilingual, real-time communication.
- ✓ AI-driven personalization & adaptability.
- ✓ Emergency SOS feature for critical situations.



Tech Stack & Methodology

Signal Processing Pipeline

- ✓ EEG Signal Acquisition
- ✓ Bandpass Filtering (Alpha & Beta waves)
- ✓ Artifact Removal (Eye blinks / Noise reduction)
- ✓ Feature Extraction (FFT & Power Spectral Density)
- ✓ CNN-Based Classification
- ✓ Intent-to-Speech Mapping

Tech Stack

- ✓ Python
- ✓ TensorFlow / PyTorch (CNN model)
- ✓ Real-time Signal Processing Libraries
- ✓ Android / Web App Interface

Security & Privacy

- ✓ End-to-end encryption
- ✓ Role-based access control
- ✓ Patient consent management
- ✓ Local storage option
- ✓ GDPR-aligned architecture



USP, Business & Conclusion

Unique Selling Proposition

- ✓ Non-invasive EEG system
- ✓ Affordable & India-focused
- ✓ Works with smartphone/tablet
- ✓ No cloud dependency (edge processing)
- ✓ Quick personalized calibration

Technical Feasibility

- ✓ CNN-based neural intent classification
- ✓ Real-time processing
- ✓ Deployable in hospitals & home care
- ✓ Scalable architecture

Business Model

- ✓ Hardware device sales
- ✓ Monthly subscription for AI personalization
- ✓ Hospital partnerships
- ✓ Rehabilitation center integration

NeuroVox is a practical, scalable, and affordable assistive communication system designed for Bharat. By combining neuroscience and AI, we aim to restore communication, dignity, and independence to millions.