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HACKSPRINT 2.0

Team Name: Symphonix

Domain: MedTech

Category: Hardware

Project Title:

“YenMozhi”

(Assistive Communication Device for Autism)

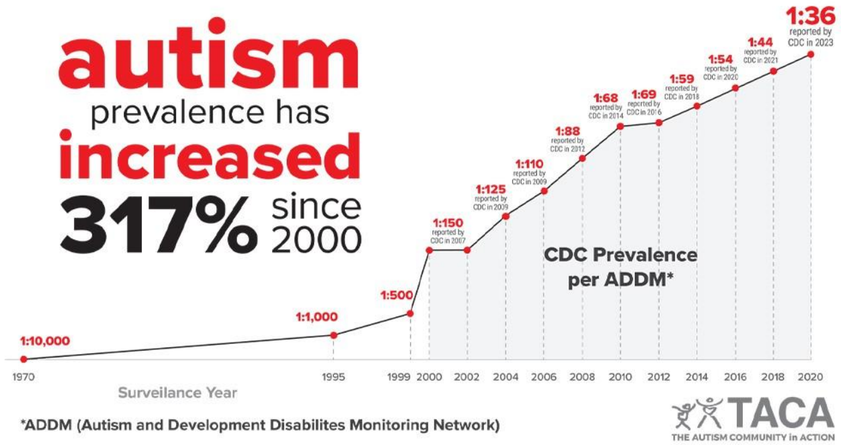
Giving a voice to interact with the World

Challenge Statement

User pain points:

- **Autistic individuals** struggle to express basic needs & emotions
- Lack of **communication** leads to isolation, dependency & reduced social interaction
- In **emergencies**, users are often unable to call for help

Fig.: Live interaction with Autistic students in a school



“சொல்லத் தெரியாததால்... அவர்களின் தேவைகள் கூட சொல்லப்படாமல் போகின்றன”

Technical/ Operational Challenges:

- **Motor coordination** difficulties make button - based or touch-based devices hard to use
- Lack of simple, stand-alone **hardware designed** specifically for such users

Current System Limitations:

- Existing assistive communication tools **rely on smartphones**, tablets or complex interfaces
- Most solutions are **expensive** & **not accessible** to all families or institutions

Current Autism Scenario:

Tamil Nadu : 3-4 lakh individuals (approx.)

India : 1.8-2.0 million children (1 in 68)

Globally : ~62 million people (≈1 in 127)

Proposed Solution

YenMozhi is a **stand-alone assistive device** that **converts the natural sounds** made by autistic or speech-impaired individuals into **clear, meaningful voice outputs.**

Fig. : YenMozhi Product (MVP)

Fig. : YenMozhi Product Design

Core Idea & Key Features:

- Converts natural vocal cues into clear spoken messages
- *Eg., "thaah" → "I need water", "ehh" → "I need help"*
- **One-tap activation** for easy use by motor-impared users
- Fully **offline** – no smartphone, app or internet required
- **Compact**, **portable** and child-friendly design

"ஒரு சிறிய சத்தம்... ஒரு தெளிவான குரலாக மாறுகிறது"

Live interaction with Autistic student

YenMozhi Product (MVP) size

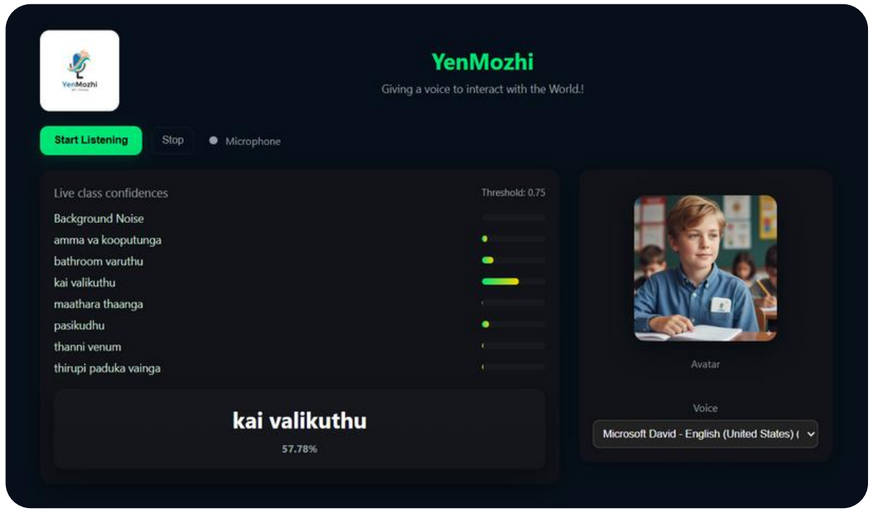
How it Solves the Problem & Why it's Better:

- Enables users to **express basic needs** independently & confidently
- **Reduces dependency** on caregivers & improves safety during emergencies
- **Simple interaction** avoids sensory overload & complex operations
- Extremely **low-cost** compared to existing AAC devices
- Designed for **real-world use** in schools, homes & therapy centres

Technical Description

Core Hardware

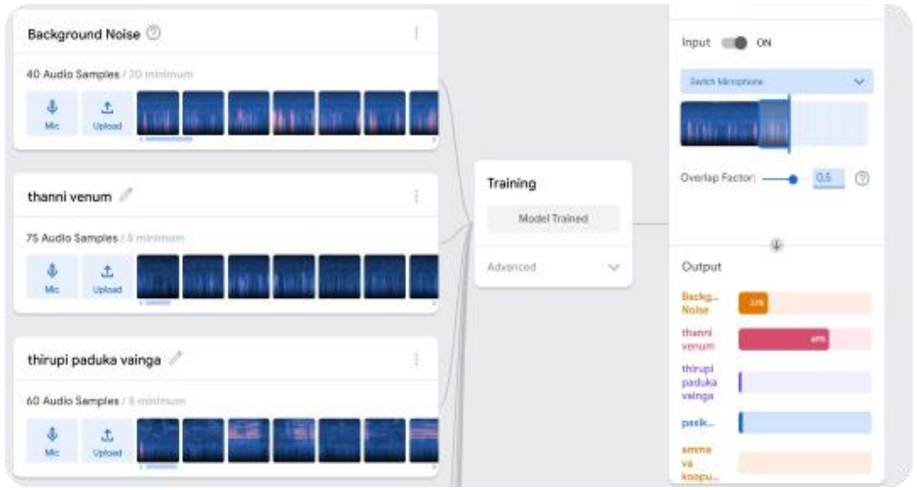
- Embedded programming (C/C++) for device logic and control
- Microcontroller-based system (low-power, fast response)
- Audio/ sound Detection Module for capturing user vocal cues
- Speaker module for clear voice outputs
- Rechargeable Li-ion battery with safe power management
- Custom-built lightweight chassis designed for daily use



Tap → ***Listen*** → ***Process*** → ***Speak***

YenMozhi Product (3D Chassis) →

YenMozhi Website (Demo) – yenmozhi.vercel.app



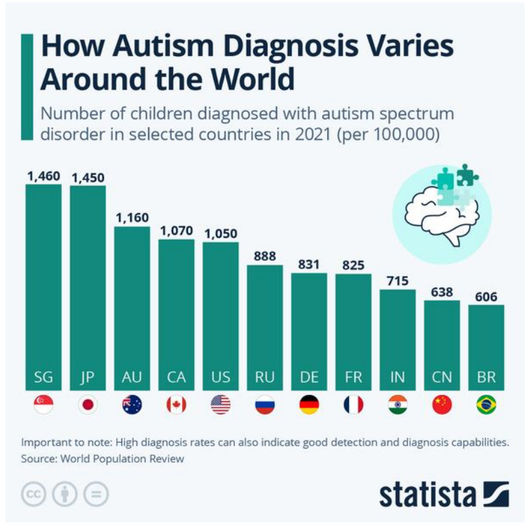
Core Software & Intelligence

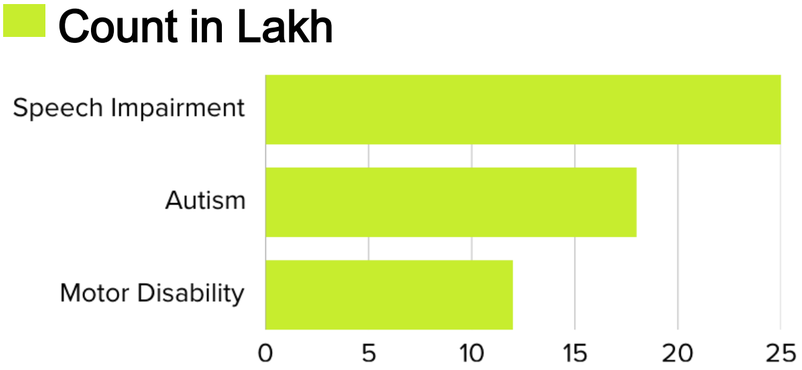
- **AI-assisted** sound classification for identifying user-specific vocal cues
- **ML-based** predefined phrase mapping, improving accuracy over iterations
- Embedded firmware enabling **offline real-time** processing
- **Tap-to-activate** logic for simplified interaction
- **Latency-optimized** audio response (2-3 seconds)

Impact & Target users

Primary Target Users

- **Autism children** (non-verbal or minimal verbal)
- **Speech-impaired** individuals
- Children with **cerebral palsy**
- Individuals with **motor coordination difficulties**
- **Special schools**, therapy centers, rehabilitation centers
- **NGOs** supporting children with development disorders





1 in 100 children has autism

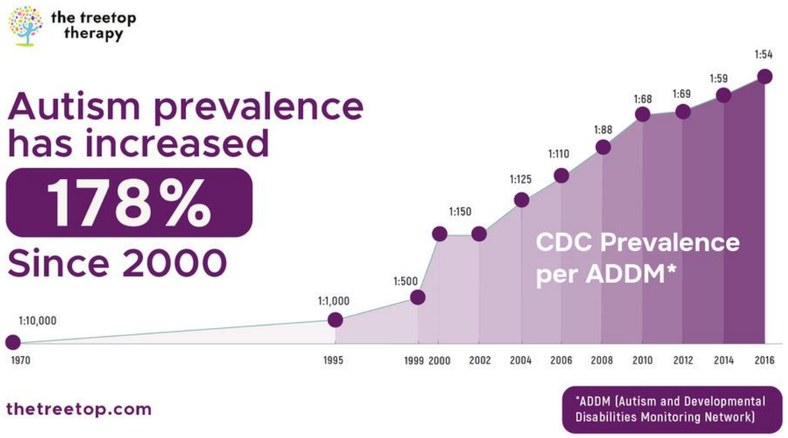
75M+ autistic individuals worldwide

“சிறிய சாதனம்... பெரிய மாற்றத்தை உருவாக்குகிறது”

1 in 6 people face mobility challenges

1.3B people live with disabilities

40% of autistic users have motor issues



Reason YenMozhi fits the Market

- **Works offline** → ideal for rural & low-income communities
- Extremely **affordable** compared to existing AAC devices
- **Simple user interaction** suits children with cognitive & motor challenges
- Built specially for Indian users

Feasibility & Viability

Technical Feasibility

- Built using **readily available** & **low-cost** hardware components
- **Simple embedded logic** ensures stable & reliable operation
- Fully **offline** system eliminates dependency on internet or smartphones
- **Low power consumption** enables long-duration portable use

Real-World Testing

- **Successfully tested** with autistic school children
- **Positive feedback** from teachers, therapists & parents
- Validated usability, clarity and **child-friendly** interaction

“ஒரு சத்தம்... ஒரு செய்தியாக மாறும் எளிய நடைமுறை”

“Innovation is not about creating machines; it’s about creating hope”

One Device → ***Many Voices*** → ***Inclusive Society***

Scalability & Future Enhancement Scope

- Design **supports mass manufacturing** at low cost
- **Easy deployment** in schools, therapy centres, NGOs & hospitals

Future enhancements include:

- **Multi-language** voice support
- Improved sound recognition **accuracy**
- Multiple devices **variants** for different age groups
- **Integration** with institutional assistive programs

Competitor Analysis

Direct Competitors

Proloquo2Go | Avaz AAC | Speech Assistant AAC | CoughDrop



What they do:

- Help users learn communication using symbols, pictures, signs and actions
- Used mainly in therapy or guided learning environments

Key Limitations in Real Life:

- Focus on teaching language, **not instant communication**
- **Requires** smartphones or tablets
- **Screen-based** interaction & multiple steps
- **Difficult** to use during emergencies or spontaneous situations
- **Not suitable** for users with motor or sensory challenges


These tools **assist learning**, but do not directly enable real-time communication in everyday situations

Indirect Competitors

- Picture cards & communication boards
- Gesture or sign-based communication
- Caregiver interpretation

Limitations:

- **Slow & Limited** expression
- **Not usable** in urgent or emergency scenarios
- Complete **dependency** on others

YenMozhi – Key Differentiator

01 Designed for Real-life

02 Stand-alone Hardware

03 Works in any situation

04 Instant communication

05 Converts natural sounds

Cost Estimate

Affordable & Scalable

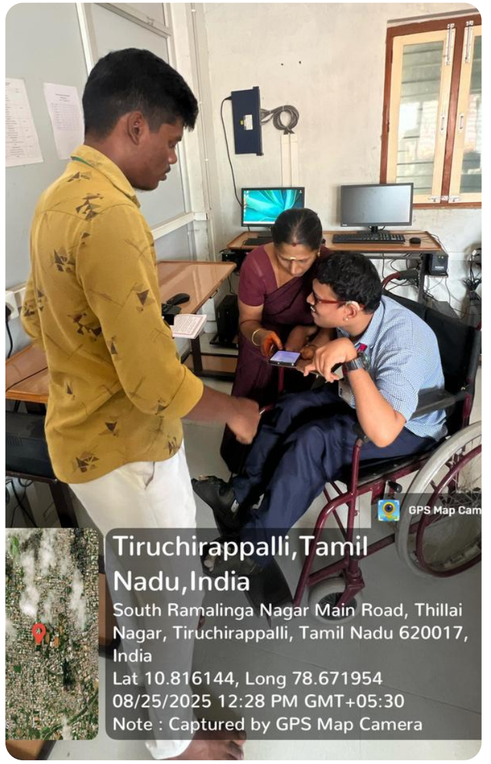
Prototype : ₹750–₹900

MVP : ₹1600–₹2000

Designed for families, schools, NGOs, therapy centers.

Cost Advantage & Viability

- Uses **low-cost**, easily available components
- **No licensing** or software subscription costs
- Suitable for low-cost **mass manufacturing**
- Enables **affordable** deployment through schools, NGOs and MedTech programs



Community Impact

- Demonstrated in **multiple schools** & **rural outreach** programs
- Engaged with **autistic children** directly for data & needs study
- Strong emotional acceptance from parents & caregivers

Team Name: Symphonix

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