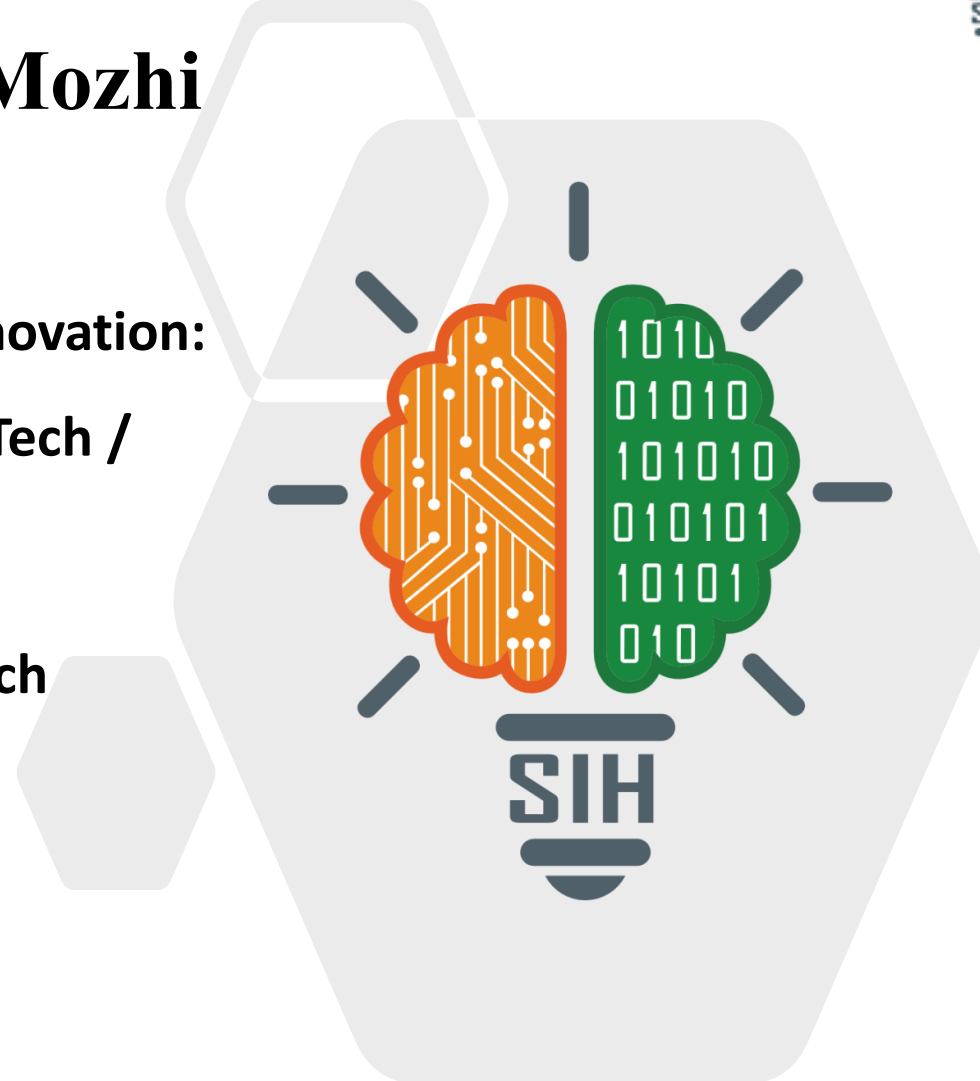


YenMozhi

- Problem Statement ID – **SIH25114**
- Problem Statement Title - “**Student Innovation: Swadeshi for Atmanirbhar Bharat - MedTech / BioTech / HealthTech**”
- Theme – **MedTech / BioTech / HealthTech**
- PS Category - **Hardware**
- Team ID – **66441**
- Team Name - **Symphonix**



Proposed Solution

- **Autistic students struggle** to express needs, leading to isolation & difficulty in emergencies. Existing solutions are mostly software-based, often complex, expensive or inaccessible.
- Our Solution – **YenMozhi** (My Voice) transforms distinct sounds – such as “*thaaah*” for water, “*eehh*” for help - into clear speech output.
- Helps the teachers, peers and strangers understand and respond instantly.
- It is completely child – friendly and has a straight forward **tap-to-activate** design without complicated buttons.
- Supports real-time voice alerts for urgent situation. Portable, affordable and **works offline**, making it practical for daily use anywhere.



Fig. 1 : Live interaction with Autism students in a school

Technologies used :

1. **Hardware** : ESP32 Controller, Mic, Speaker, Sound Sensor, Battery
2. **Software** : TensorFlow Lite, Python, JavaScript
3. **Connectivity** : Works fully offline (Wi-Fi optional for updates)
4. **Enclosure** : Custom 3D-printed lightweight chassis, compact and easy to carry

Methodology & Process :

1. **Tap to Activate** – Device turns on
2. **Mic captures sound** – User makes sound
3. **ML Model Processes** – TensorFlow Lite recognizes sound
4. **AI Maps to Phrase** – Correct word/phrase identifies
5. **Speaker outputs clear voice** – Plays meaningful speech

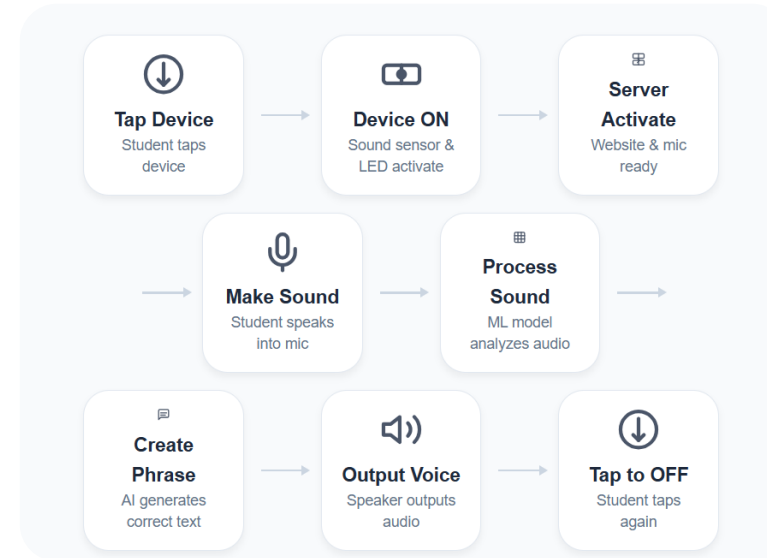


Fig. 2 : YenMozhi Function Flow Diagram



Fig. 3 : YenMozhi Final Device



Fig. 4 : YenMozhi 3D Design

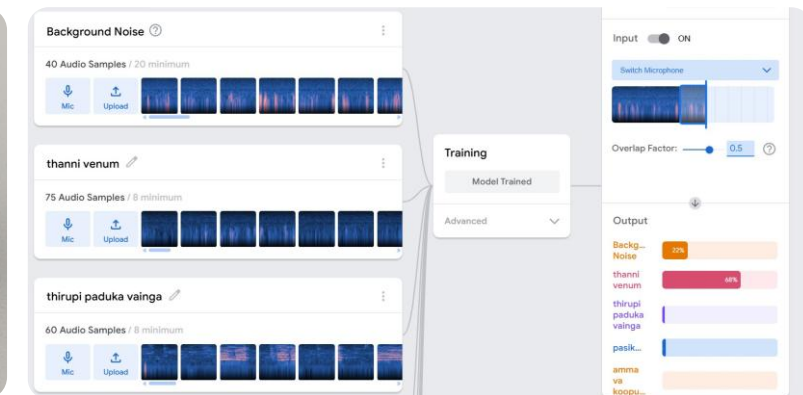


Fig. 5 : ML Model Training

Feasibility:

- Used low-cost, widely available components to build an **affordable product**.
- **Works offline**, making it reliable even without internet connectivity.
- Portable & battery-powered, **easy for students** to carry & use anytime.
- **Successfully tested** with real autistic student sounds during field validation.
- **Scalable design** that can be expanded for more users and future features.
- **Tap-to-activate system**, ensuring accessibility for users with diverse hand movements (common among autistic and cerebral palsy individuals).

Challenges & Risks:

- **Training ML** model for multiple students with unique sounds.
- **Handling background noise** to avoid misrecognition.
- Ensuring durability & easy operations.

Strategies to Overcome:

- **Expand training dataset** with more sound samples for better accuracy.
- Add **noise filtering** & signal preprocessing techniques.
- Use a sturdy, **safe casing** & reliable tap sensor mechanism.



Fig. 6 : YenMozhi Device



Fig. 7 : Device testing with Target User

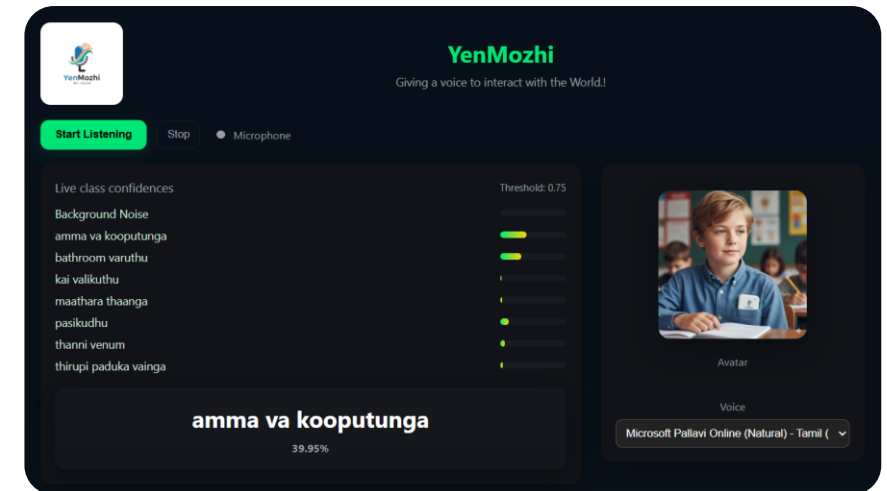


Fig. 8 : YenMozhi official website (for testing)

Social Impact :

- **Gives a voice** to autistic individuals who have never spoken, fostering connection and belonging.
- Provides peace of mind to parents, knowing their autistic child can **communicate in emergencies**.
- Fosters a more inclusive society by **bridging the communication gap** for students with unique needs.

Economic & Practical Benefits :

- A uniquely **affordable solution**, making assistive technology accessible to a wider community.
- **Symphonix** (my own startup) is committed to making this a real-time, usable device with a minimal cost.
- The system **works reliably** anywhere, even without internet connectivity.
- Affordable at approximately **₹450 - ₹600** per unit, making it accessible to a wider community.

Our Deeper Purpose :

- More than a project, YenMozhi is a **mission to empower others** & help them to be heard.
- The emotional response from a parent validated our belief that this device brings profound, real-world value.
- Make YenMozhi as **common & accessible** as hearing aids, so every family & school can use it.
- We are building a future where every voice, no matter how quiet, can spark change.



Fig. 8, 9 : YenMozhi live deployment & performance check

Data-Driven Approach : The project is grounded in extensive research on autism prevalence, with a specific focus on India, where over **18 million** individuals (~3% of the population) are affected.

Empirical Validation : The solution was validated through **direct field interactions** with autistic students, confirming its real-world need & impact.

AI for Accessibility: The AI model was developed using Teachable Machine and TensorFlow Lite, frameworks that make machine learning applicable to social & assistive technology projects.

Project Demonstration : The YenMozhi's **web software** serves as a live demonstration of our working prototype.

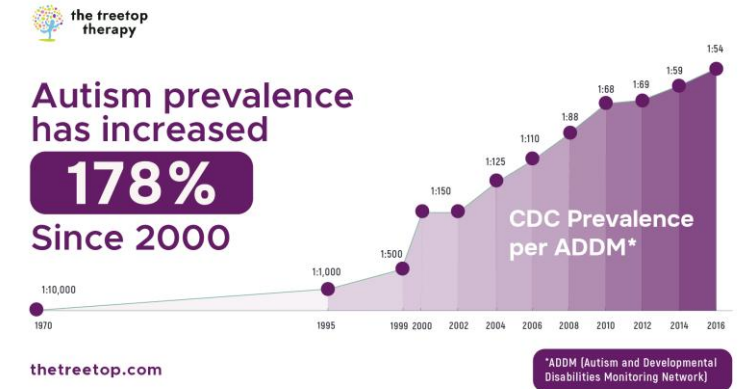
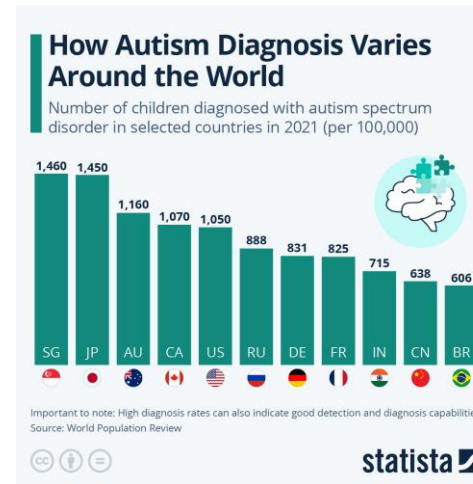


Fig. 10, 11 : Reports on rate of Autism

Access Documentation :



Live URL : yenmozhi.vercel.com

Official website of YenMozhi



Live URL : [click here](#)

YenMozhi project demonstration (Video)