

# AI for Bharat Hackathon

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Team Name : LearnSign

Team Leader Name : Amith K M

Problem Statement : Build an AI-powered solution that improves access to information, resources or opportunities for communities and public systems.

## Problem Statement :

1. **7+ million deaf & hard-of-hearing people in India** face daily communication barriers.
2. Sign language learning today is mostly **unstructured, non-interactive, and hard to practice**.
3. Existing resources are **passive** (videos/books) – no “learn by doing”.
4. Learners don’t get **real-time correction**, so mistakes go unnoticed.
5. Lack of **age-based learning programs** makes it difficult for children to learn effectively.
6. No tools for **practice, quizzes, and measurable evaluation**.
7. No proper **progress tracking**, scoring, or performance improvement insights.
8. This creates a major gap in **education access, inclusion, and real-world communication**.

**Public Impact:** Enables affordable and scalable sign language learning, improves accessibility in **schools, families, and community services**, and bridges communication gaps for inclusive society

## The Solution: LearnSign's Innovative Platform

**Solution:** LearnSign is an “**Duolingo for Sign Language**” - AI-powered Indian sign language (ISL) Learning + translation platform that uses a **webcam + computer vision** to detect signs and give **real-time feedback**.

### Key Innovations

1. **Webcam-Based Quizzes** : Interactive assessments where learners perform signs live.
2. **Understands Signs in Real-Time**: AI-powered computer vision detects **hand gestures (and facial cues)** instantly.
3. **Provides Instant AI Feedback**: Immediate results: **Correct / Incorrect + actionable improvement tips + score**.
4. **Age-Tailored Courses**: Structured content designed for: **1–5 years, 6–10 years, 10–15 years**
5. **Video Lessons**: Expert-led sign demonstrations for step-by-step learning.
6. **Progress Tracking**: Tracks learning milestones, quiz performance, and skill growth.

## How is LearnSign Different from Existing Ideas?

- Most current solutions are **static** (videos/books) → LearnSign is **interactive** like Duolingo
- Existing apps don't validate learning → LearnSign provides **real-time AI verification**
- Not personalized → LearnSign adapts with **skill levels + progress tracking**
- Many platforms focus only on translation → LearnSign focuses on **learning + mastery + accessibility**

## How will LearnSign solve the problem?

- Uses **webcam + AI computer vision** to detect signs instantly
- Provides **instant AI feedback**: correct/incorrect + correction guidance
- Delivers a **structured learning path**, divided into **age-based courses** (kids → students → adults)
- Includes an **interactive quiz mode**, where users perform signs live and get **real-time evaluation + scoring**
- Bridges the communication gap by converting signs into **instant text output**
- Makes learning **easy, engaging, and scalable** for:
  1. Schools
  2. Families
  3. Communities & NGOs

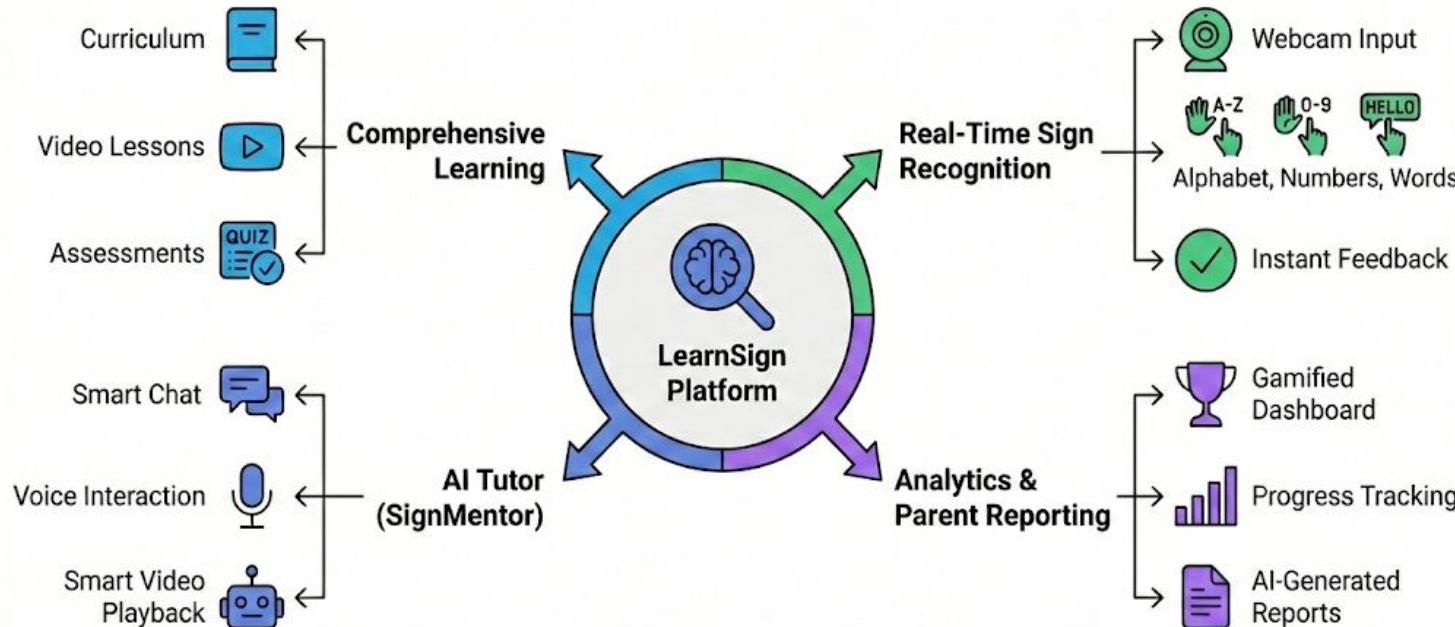
## USP (Unique Selling Proposition)

LearnSign = “Duolingo for Sign Language + Real-Time AI Coach”

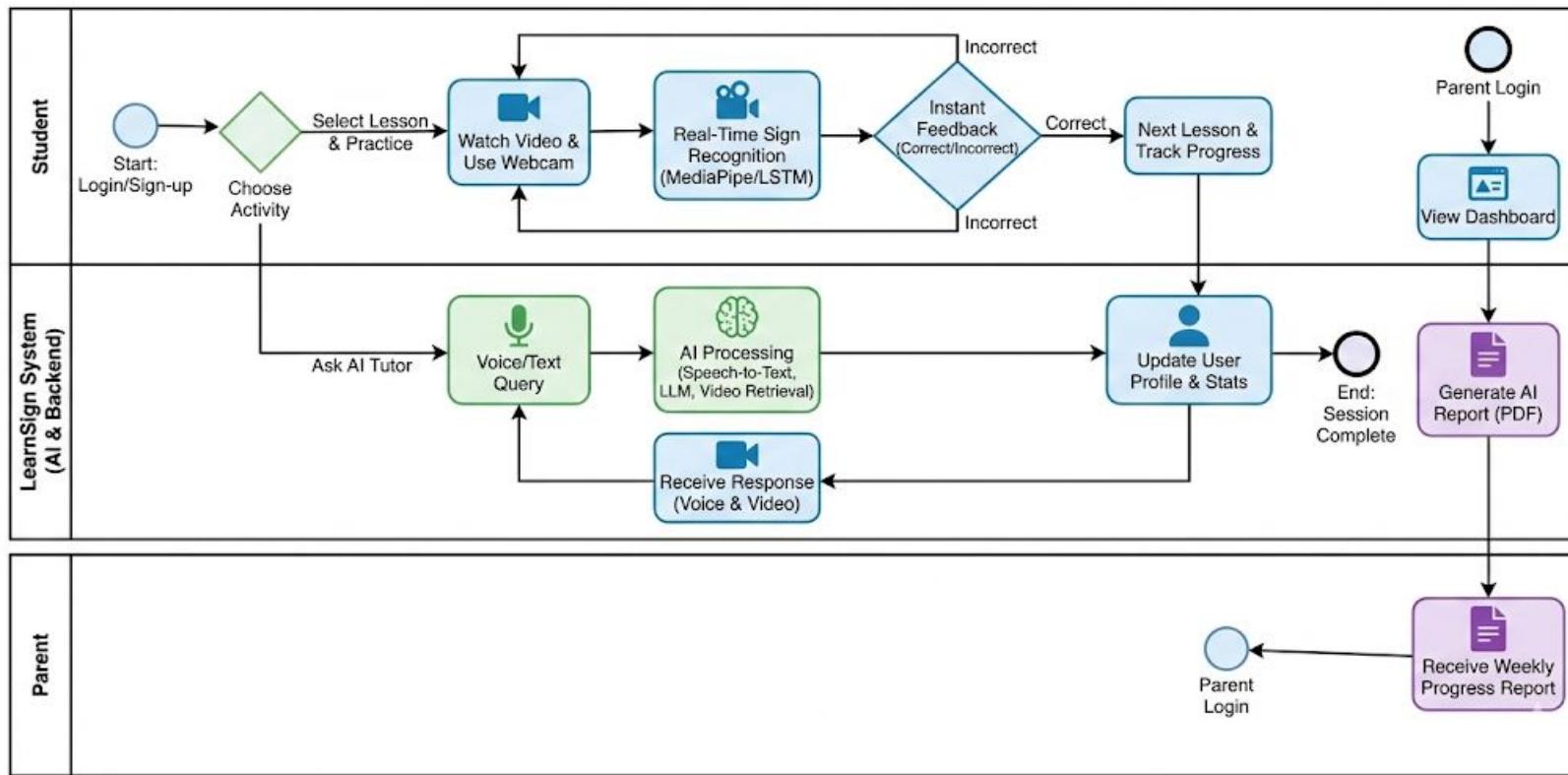
- **Live Sign Recognition** using webcam + AI (no extra devices needed)
- **Instant AI Feedback** – correct/incorrect + improvement guidance in seconds
- **Structured curriculum by age:** Courses designed for **1–4, 5–10, 15+** with step-by-step learning paths
- **Gamified Progress Tracking** – levels, scores, badges & learning milestones
- **Multilingual Support** – text-to-sign in multiple languages (future: speech output)
- **Built for Public Impact** – designed to empower deaf & mute communities

LearnSign transforms Indian sign language learning into an interactive AI-powered experience making accessibility scalable, measurable, and engaging.

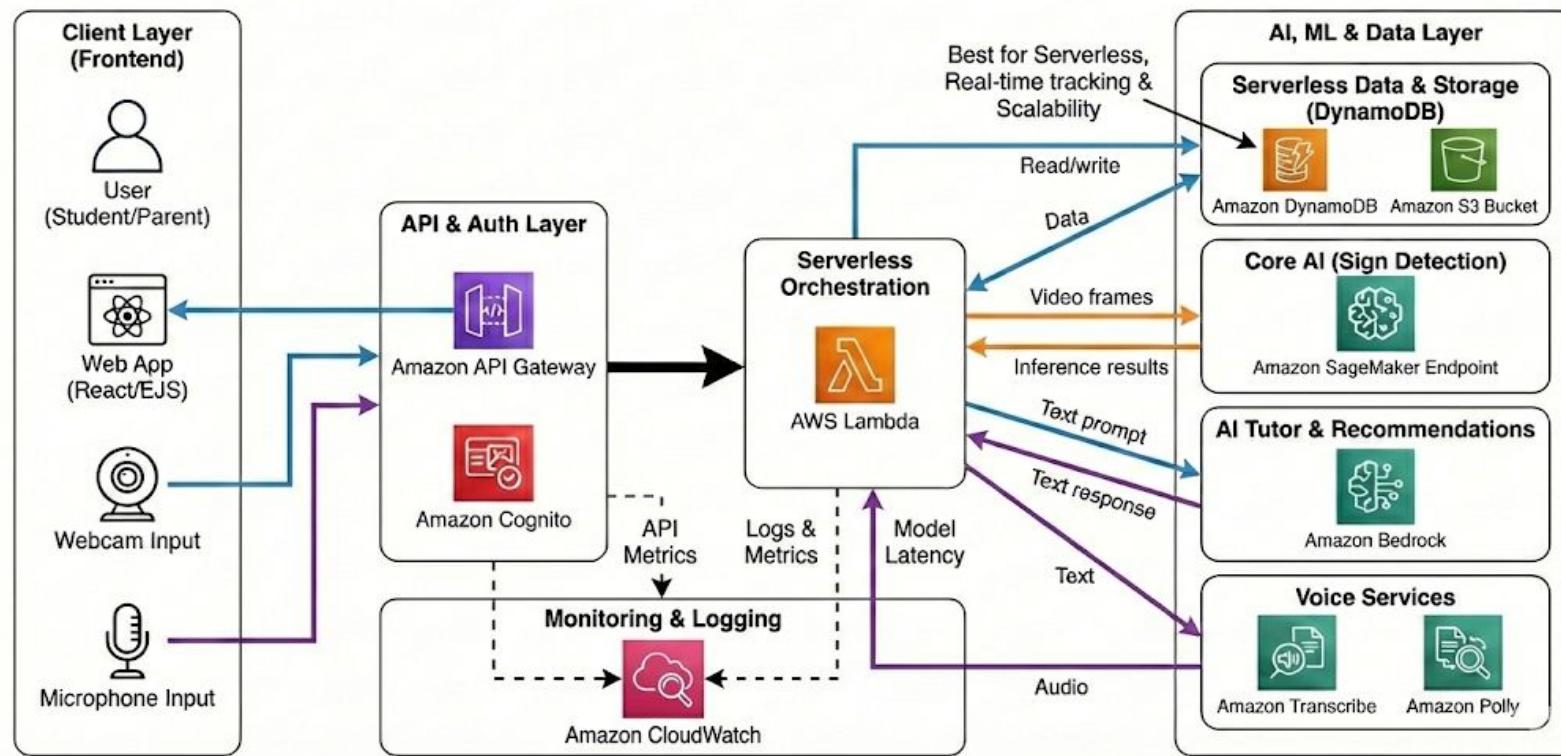
## LearnSign: General Features Diagram



## LearnSign: User Journey & System Interaction Flow



## LearnSign: Proposed AWS Serverless Architecture with Core Features



## Technologies to be used in the solution

1. **Frontend:** React.js / EJS, HTML/CSS/JS,
2. **AI/ML:** MediaPipe + Sign Classification Model (LSTM / RF), Python, OpenCV, TensorFlow/Keras (LSTM model)
3. **Deployment:** AWS Lambda + API Gateway (Serverless Hosting)
4. **Backend:** Node.js + Express.js (API Development)
5. **Auth & User Management:** Amazon Cognito
6. **Storage & DB:** Amazon S3 + Amazon DynamoDB
7. **GenAI Support (Tutor):** Amazon Bedrock
8. **Monitoring:** Amazon CloudWatch

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