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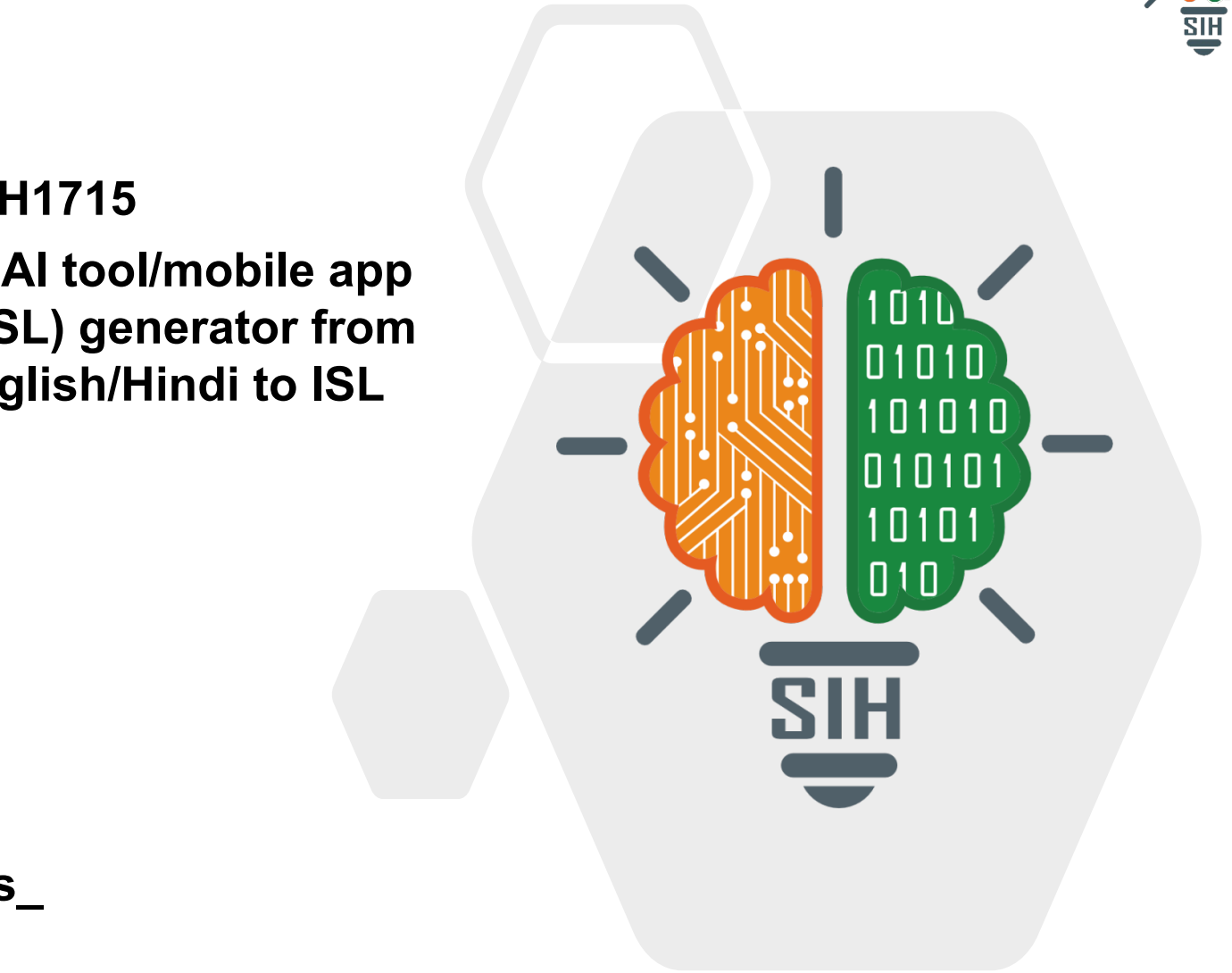
- **Problem Statement ID – SIH1715**
- **Problem Statement Title - AI tool/mobile app for Indian Sign language(ISL) generator from audio-visual content in English/Hindi to ISL content and vice versa**
- **Theme- Miscellaneous**
- **PS Category- Software**
- **Team ID- 33741**
- **Team Name: _Byte Busters_**



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Complete ISL Converter

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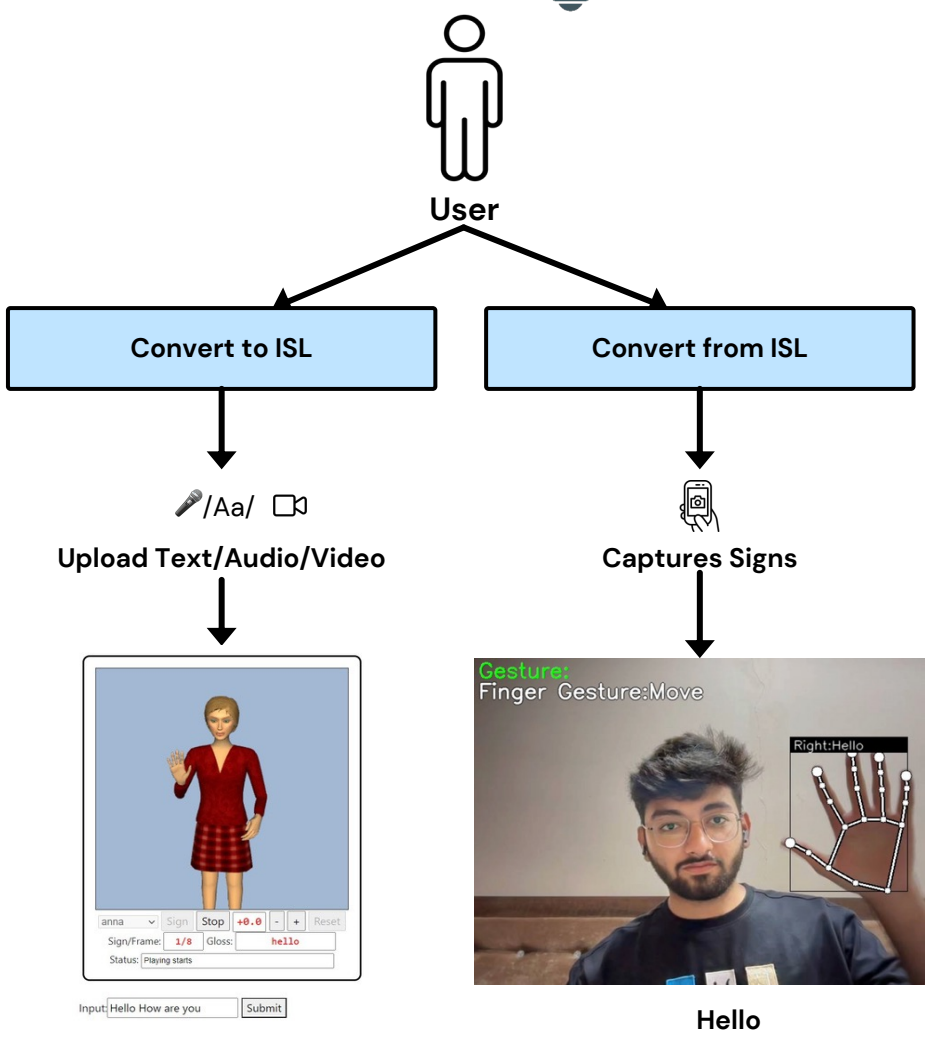
❖ Proposed Solution

Enhance communication accessibility for the deaf and mute community through a comprehensive mobile and web application.

Key Features:

1. **Convert Text/Audio/Video to ISL:** Transforms various inputs into ISL, enhancing accessibility for education and healthcare.
2. **Convert ISL to Text/Audio:** Facilitates expression and interaction among deaf and mute individuals, with non-manual features like facial expressions and body movements for recognition for nuanced communication.
3. **Public Announcements in ISL:** Automates announcements in ISL at public venues like airports and railways, supporting independent travel.
4. **Learn ISL:** Introduces an educational feature to aid learning of ISL, promoting wider adoption and understanding.

With this app, people who are deaf or mute can better integrate into society by bridging the communication gap and giving them a useful tool for daily interactions.



Prototype Use case diagram

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TECHNICAL APPROACH

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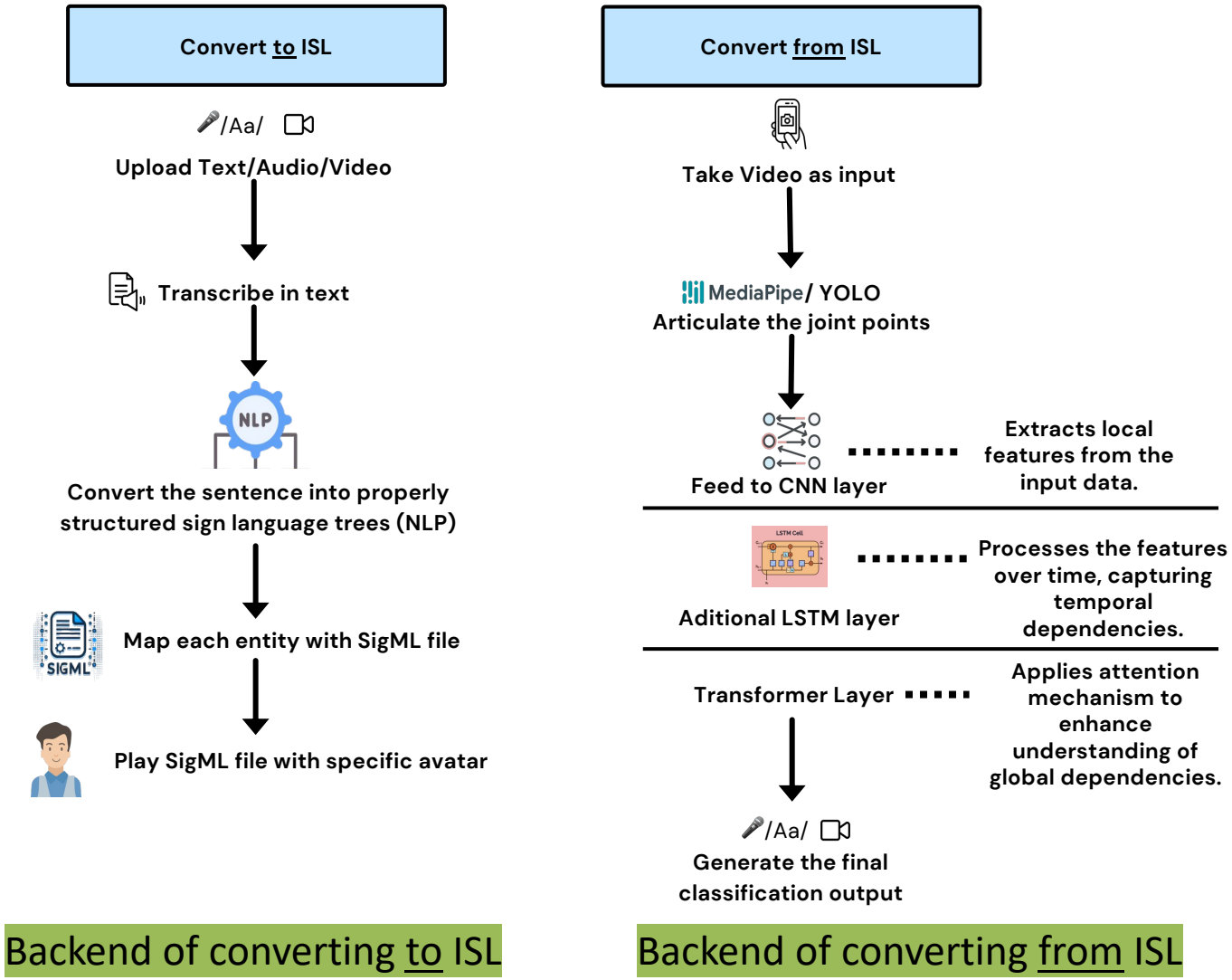
Technology Stack:

- **Frontend**: React JS for Web, Flutter for Mobile
- **Backend**: Node JS, Express JS, Fast API
- **Database:** MongoDB
- **Programming Languages:** Python, JavaScript, Java, Dart
- **NLP (Natural Language Processing):** Spacy, NLTK
- **Computer Vision:** Tensor flow, PyTorch, Keras, MediaPipe, Vision Transformer, ImageNet, OpenCV, YOLO
- **For Playing Avatars:** SigML Player, CWA Signing avatars
- **Open Source:** Yes, Completely open source
- **APIs:** Build from scratch



Backend of converting to ISL

Backend of converting from ISL

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FEASIBILITY AND VIABILITY

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Feasibility

Technical Feasibility
Utilize existing technologies for speech-to-text and ISL conversion.

Market Feasibility
High demand for ISL conversion and Current gaps in available solutions.

Economic Feasibility
- Automation reduces the need for live interpreters.
- Technology can lower costs in education, healthcare, and public services.

Potential Challenges	Solutions
Ensuring high and accurate recognition performance in diverse scenarios.	Using advance machine learning techniques like deep learning & computer vision to enhance recognition accuracy.
Accurately converting sign language, along with its nuances, into text for better quality results.	Incorporate natural language processing (NLP) techniques to understand context and intent.
Design the product for easy adoption by the public.	Develop an intuitive user interface with simple navigation and minimal learning curve.
Making the Solution Easily Accessible for Everyone.	Provide multi-language support and detailed tutorials for easy onboarding.

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IMPACT AND BENEFITS

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Impact:

1. **Promotes Independence**: Enables self-reliant travel and social engagement, fostering self-reliance and confidence.
2. **Public Announcements:** Delivers ISL announcements in key public venues using avatars like railway station announcement
3. **Content Conversion:** Translates Educational, News, and Entertainment content into ISL, promoting inclusivity.
4. **YouTube Integration:** Translates YouTube content to ISL, enhancing media accessibility in wide rage.

Benefits:

1. **Multilingual Support:** Caters to diverse linguistic needs, enhancing accessibility.
2. **Two-Way Communication**: Converts ISL back to text or audio, facilitating interactive exchanges.
3. **Real-Time Translation**: Offers immediate translation of text, audio, and video into ISL and wise versa, enabling fluid communication.
4. **Enhanced Accuracy**: Achieves superior translation precision compared to manual methods.

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RESEARCH AND REFERENCES

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