SMART INDIA HACKATHON 2024

TITLE PAGE

Problem Statement ID - SIH1715

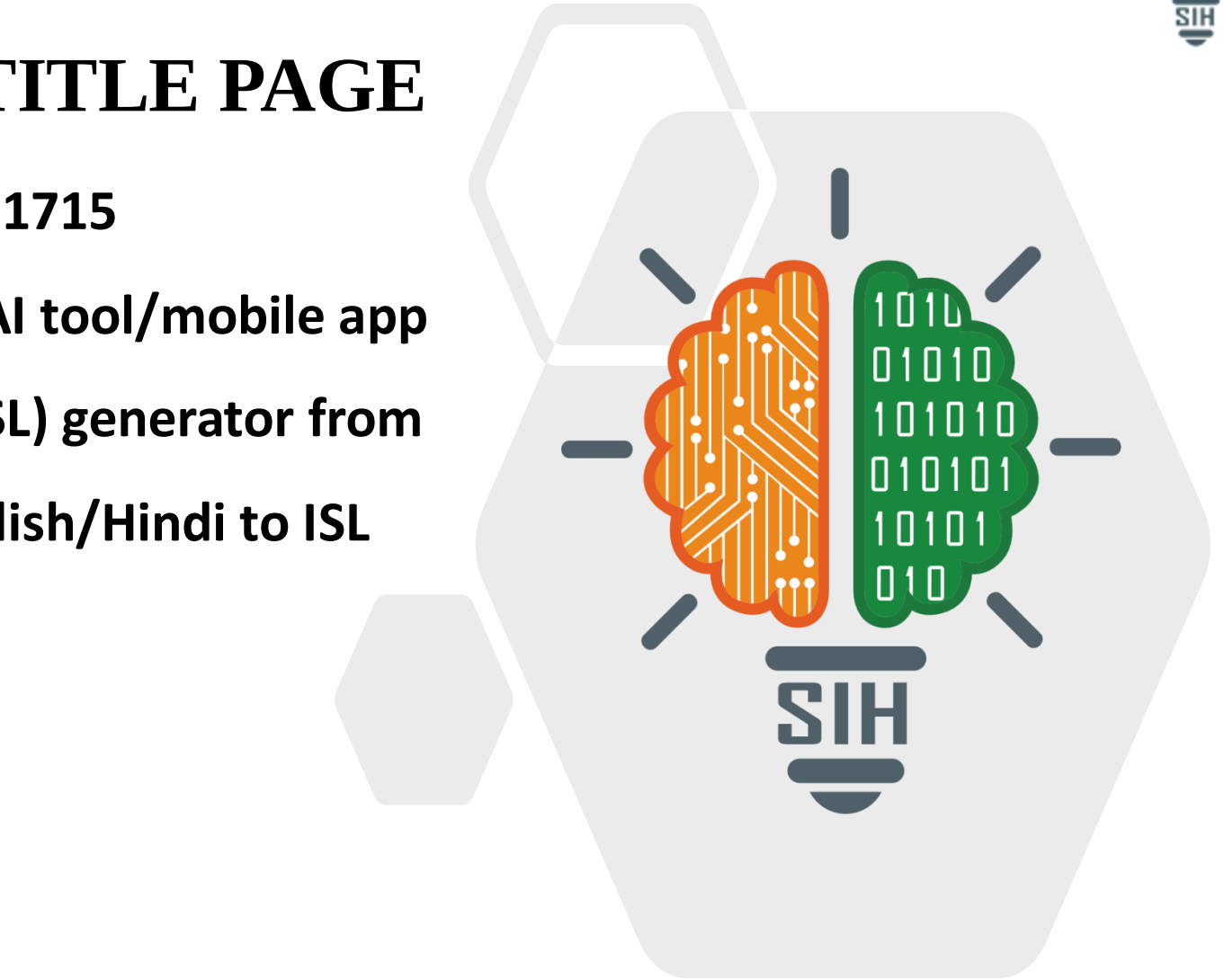
Problem Statement Title - AI tool/mobile app for Indian Sign Language (ISL) generator from audio-visual content in English/Hindi to ISL content and vice-versa.

Theme - Miscellaneous

PS Category - Software

Team ID - GLAUS40

Team Name - Access Denied



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IDEA TITLE

❖ Proposed Solution:

•**Realtime Text/Speech to ISL Converter:** Utilizes speech recognition and computer vision for seamless translation.

•**Emotion-Driven Animated Avatars:** Express emotions through realistic avatars for context-rich communication.

•**Learning with Augmented Reality:** Enhances learning experiences with immersive, interactive subject-based tutorials, with progress tracking for continuous skill development.

❖ How it Addresses the Problem:

•**Bridging the Gap:** Breaks down communication barriers between the deaf community and non-sign language users in real-time. Provides tools for self-paced learning in ISL, mathematics, and other subjects.

•**Innovation:**

Combines ISL conversion, emotion-based avatars, AR-enhanced learning, and a collaborative community tab, ensuring comprehensive, real-time communication.

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TECHNICAL APPROACH

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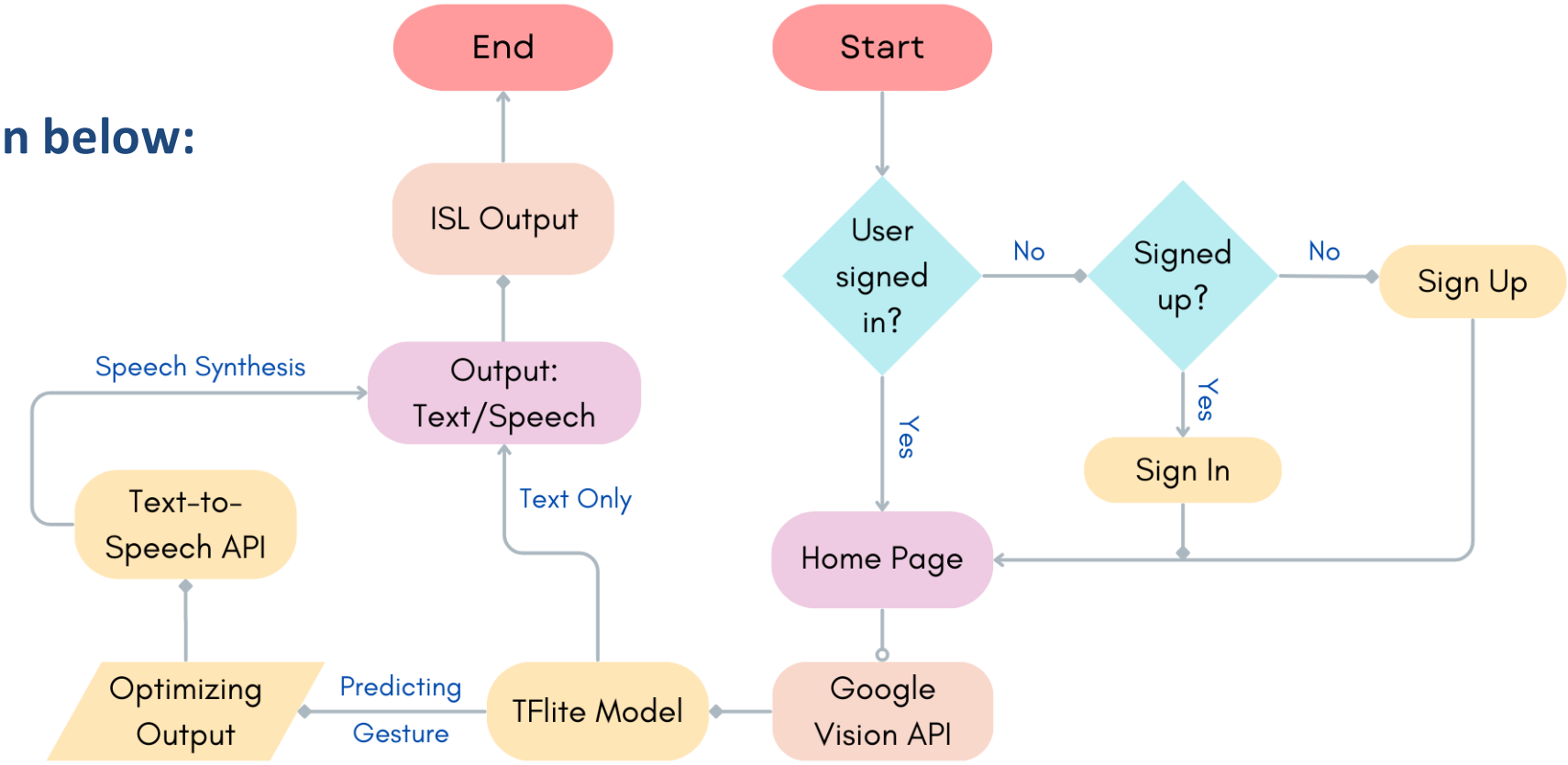
•**Technology Stack:** Flutter, for building a seamless, cross-platform app, Google ML Kit, TensorFlow Lite for machine learning and AR/VR integration, Firebase for real-time database management and user authentication.

❖ **Simplified flowchart is given below:**



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FEASIBILITY AND VIABILITY

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❖ Feasibility of the Idea:

•**Technical Viability:** Existing libraries for speech-to-text and animation; Easy to train ML model; feasible to build with a well-structured development timeline.

•**User Adoption:** High potential in schools, public places, and for personal communication.

❖ Challenges & Risks:

•**Accuracy of ISL Conversion:** Ensuring high accuracy and natural gestures of the ML model.

•**Emotional Interpretation:** Correctly capturing and displaying emotions in animated avatars.

•**AR Complexity:** Ensuring AR's technical demands and performance needs on various devices.

❖ Strategies to Overcome:

•**Iterative Testing:** Frequent testing with ISL experts to refine conversion accuracy.

•**Data-Driven Improvement:** Leveraging user feedback to enhance emotion and gesture recognition.

•**Scalable AR Design:** Focus on lightweight and optimized AR features for broader accessibility.

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IMPACT AND BENEFITS

❖ Social Impact:

•**Greater Inclusion:** Bridges communication gaps between the deaf community and non-sign language users by enabling seamless communication.

•**Improved Learning Resources:** Provides interactive tools for learning ISL and understanding content in a visually engaging way, improving literacy and life skills.

•**Empowerment and Independence:** Equips users with tools to independently access and understand content, enhancing self-sufficiency and confidence.

❖ Economic & Technological Impact:

•**Employability:** Increases job opportunities for the deaf and hard of hearing by improving communication in workplaces.

•**Technological Advancement**: Sets a benchmark for future assistive technologies, driving innovation in the field and influencing future developments.

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RESEARCH AND REFERENCES

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