AISL

SENIOR DESIGN:
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PROJECT ABSTRACT

What is AiSL?

AiSL is an innovative AI-powered American Sign Language (ASL) learning tool designed to support accessible and culturally respectful language learning. The platform uses natural language processing (NLP) to convert English sentences into ASL grammar, then displays the translation through a 3D avatar built in Unity. By emphasizing accurate grammar rather than direct translation, AiSL enhances linguistic understanding, inclusion, and cross-cultural communication. Learners can use playback controls to adjust speed, loop signs, and download practice materials. Developed in collaboration with the Deaf community, AiSL aims to bridge communication gaps and promote equitable, technology-driven education for diverse users.

PROJECT OVERVIEW

Project Purpose and Goals

The AiSL Project aims to create an accessible and interactive American Sign Language (ASL) learning tool that allows users to input an English sentence, convert it into accurate ASL grammar, and display the translation through a 3D avatar in Unity.

Unlike many existing tools that offer only direct word-for-word translation, AiSL focuses on linguistically correct ASL grammar, cultural respect, and authentic representation. The tool will:

- Help hearing learners build real conversational skills with ASL grammar.
- Provide a platform that encourages cultural understanding and inclusion.
- Serve as a bridge between ASL learners and Deaf communities through accurate translation and intuitive interaction.
- Promote accessible education through AI and 3D visualization technology.

USER STORY

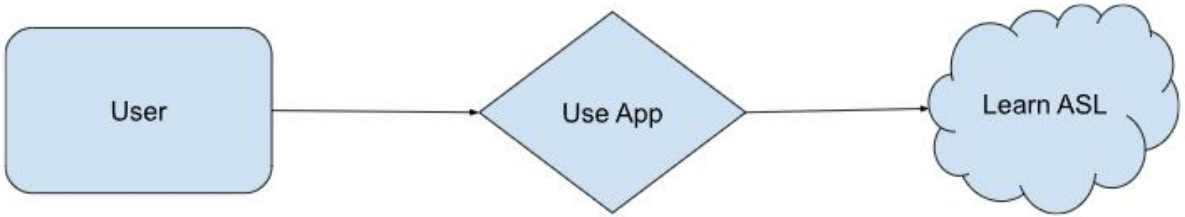
As a beginner ASL learner, I want to learn to sign more ASL. I want to sign specific sentences in the correct ASL grammar and word order. This will allow me to learn new words in sentences as relevant to me, rather than in fragments without knowing how to string words together.

- User
- Use App
- Learn ASL

DESIGN DIAGRAMS

Design Level 0:

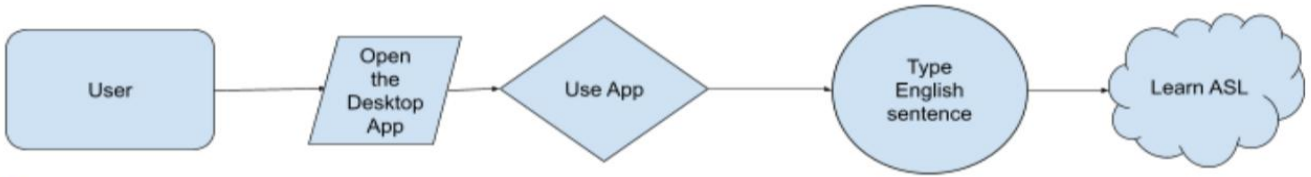
In this diagram, the user, which is represented by a square, is using the app to reach the goal of learning ASL, which is represented by a cloud.



DESIGN DIAGRAMS

Design Level 1:

In this diagram, the user, represented by a square, opens the application, represented by a parallelogram. The user uses the app, which is represented by a diamond. The user then types the English sentence as an input, which is represented by a rectangle. They reach the goal of learning ASL, represented by a cloud. The motions of each movement to the next stage is represented by lines.



DESIGN DIAGRAMS

Design Level 2:

This diagram uses conventions to show the system flow and user interaction. The rounded rectangle shows the user, the parallelogram shows a user action like opening the app, the diamond shows a system process or active use, the oval shows a step where input is provided, the rectangles show features or tools like downloading a video or using playback controls, and the cloud shows the final outcome or goal, which is learning ASL. Lines and arrows show the sequence of actions, indicating how the user moves from input to output. These conventions together depict what the project does. A user types an English sentence into the app, which is translated into a 3D avatar performing the sentence in ASL. Additional outputs like video download and playback controls support the user's learning process, all leading to the goal of learning ASL. This highlights the focus on inputs, such as typing a sentence, and outputs, such as seeing the ASL translation and practicing with playback, which define the system's functionality.

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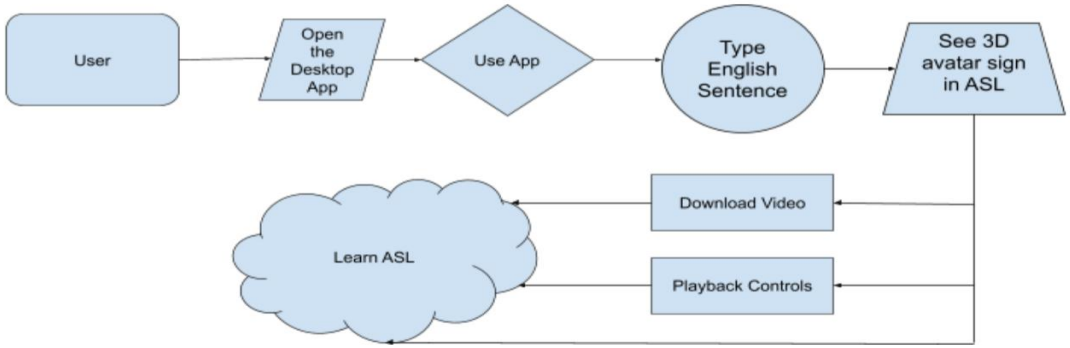

PROJECT CONSTRAINTS

- Technical
  - Platform/Integration
  - OS, third party APIs
  - Application hosting
- Resources
  - Free technical resources
  - Free hosting
- Time
  - With time constraint, it might be a rough prototype
- Ethical
  - Ethical consideration of Deaf culture and ASL
  - Accuracy towards ASL
  - Conduct interviews in the community

DIVISION OF WORK

Table 2. Effort Matrix:

Task	Ikran	Elshaddai	Fareena
Project setup and initial design	33%	33%	33%
Project Setup and map out the architecture design	33%	33%	33%
UI Prototype Design	25%	25%	50%
ASL Grammar research	50%	25%	25%
Build an English to ASL conversion pipeline	25%	50%	25%
Prepare 3D avatar	50%	25%	25%
Link ASL output to avatar animations	25%	25%	50%
Ensure smooth playback and interaction	50%	25%	25%
Test app flow	25%	50%	25%
Evaluate and refine accuracy	25%	50%	25%
Final integration and system test	33%	33%	33%
Prepare for Demo	33%	33%	33%

CURRENT STATE OF PROJECT

- UI Prototype Design
- ASL Grammar Research and Interviews conducted
- Project Setup
- Architecture and Integration map and design

EXPECTED ACCOMPLISHMENTS FOR END OF THIS TERM

- UI Prototype
- Complete ASL grammar research
- Finalize Architecture
- Build correct English to ASL pipeline
- Connect the two and integrate it into the app

EXPECTED DEMO

- User types in a sentence in English
- Avatar signs it instantly
- Change speed + replay
- Download video + show history
- Any issues → switch to backup clips

THANK YOU!