GRAVIDEZ–SONGGAY–UYBAAN
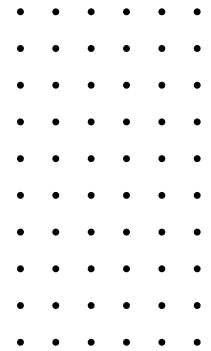
ASL GLOSS–TEXT TRANSLATOR

USER MANUAL
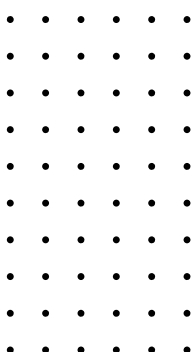
TABLE OF CONTENT

ASL GLOSS-TEXT TRANSLATOR

The ASL Gloss-to-Text Translator is a web-based tool developed as part of a thesis study that addresses the challenge of inaccurate contextual translations of American Sign Language (ASL) glosses into natural English text. Inaccurate translations hinder effective communication, particularly for the Deaf and signing communities who rely on gloss-based representations in various digital or academic settings.

This project explores the use of a T5 Transformer model to improve the contextual accuracy of gloss translations. The system was trained and evaluated using a pipeline that involved data generation, web scraping, and expert validation to ensure high-quality, linguistically sound inputs.

SYSTEM REQUIREMENTS

This system is designed to run locally on a standard desktop or laptop. Below are the minimum and recommended system specifications for smooth operation.

HARDWARE REQUIREMENTS

Component	Minimum	Recommended
CPU	Dual-core processor	Quad-core processor or higher
RAM	4 GB	8 GB or more
Storage	5 GB available space	6+ GB (for models and dependencies)
GPU	Not required	(Optional) CUDA-enabled GPU for faster inference

SOFTWARE REQUIREMENTS

Component	Required Version
Operating System	Windows 10+, macOS, or Linux
Python	3.8 or later
Pip	Latest (usually bundled with Python)
Web Browser	Chrome, Firefox, Edge, or Safari

WHAT'S INCLUDED

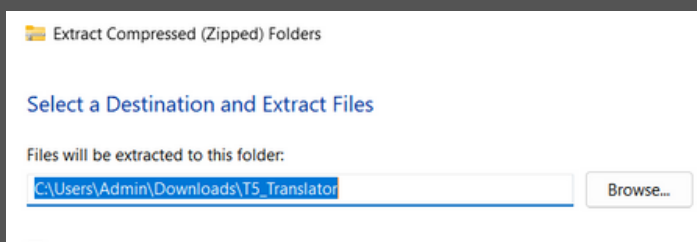| When you unzip the app folder (T5_Translator), you will see:		
T5	Contains the fine-tuned T5 model specifically trained for gloss-to-text translation in sign language processing.	
WPy64-31241	Includes all necessary dependencies and a pre-configured Python environment required to run the translator application.	
attention_hea tmap.png	Visual representation of the attention weights from the T5 model, illustrating how the model focuses on different gloss tokens.	
README.pdf	A comprehensive user manual that provides setup instructions, usage guidelines, and troubleshooting tips for using the translator.	
run.bat	A Windows batch file that launches the translator application with a single click, simplifying execution for users.	
T5_Translatio n.py	The core Python script that performs gloss-to-text translation using the fine-tuned T5 model.	

t5
WPy64-31241
attention_heatmap.
README.pdf
run.bat
T5_Translation.py

HOW TO USE THE APP

Step 1: Unzip the App Folder
Unzip the folder T5_Translator.zip to any location (e.g., your desktop or USB drive).

Extract Compressed (Zipped) Folders

Select a Destination and Extract Files

Files will be extracted to this folder:

C:\Users\Admin\Downloads\T5_Translator   Browse...

Step 2: Run the Translator
a. Open the folder
b. Double-click run.bat

attention_heatmap
README
run
T5_Translation
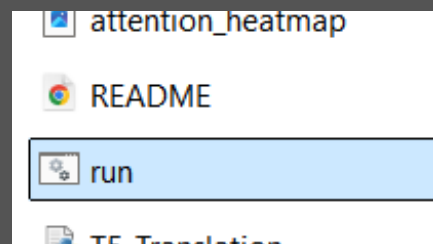
WHAT TO EXPECT AFTER DOUBLE-CLICKING `RUN.BAT`

A black terminal window will open, and you'll see a brief pause (around 40–60 seconds) with no message at first. This delay is normal while the model is being loaded into memory.

After the delay, you will see messages similar to this:

```
Please wait... Loading the model and
tokenizer. This may take a moment.

The `lang_code_to_id` attribute is
deprecated. The logic is natively handled in
the `tokenizer.added_tokens_decoder` this
attribute will be removed in `transformers`
v4.38

The `fairseq_tokens_to_ids` attribute is
deprecated. The logic is natively handled in
the `tokenizer.added_tokens_decoder` this
attribute will be removed in `transformers`
v4.38

Special tokens have been added in the
vocabulary, make sure the associated word
embeddings are fine-tuned or trained.

Model and tokenizer loaded successfully.
* Running on local URL:
http://127.0.0.1:7860
* To create a public link, set `share=True`
in `launch()`.
```

OPEN THE APP MANUALLY IN YOUR BROWSER

1. Open your preferred browser (e.g., Chrome, Edge, Firefox)

2. Type or paste this into the address bar:

`http://127.0.0.1:7860`

3. Press enter and the app will be ready to use

HOW TO TRANSLATE

1. In the browser window, find the textbox labeled "Enter Gloss Text"
2. Type your gloss input (e.g., HELLO. HOW ARE YOU-Q)
3. Click Translate

Gloss-to-Text Translation with Beam Search & Attention Visualization

Glosses are simplified representations of sign language that use short, linear sequences of words or symbols. This tool demonstrates how a Gloss-to-Text model can be used to translate glosses into full textual sentences using beam search.

Example of Gloss:

○ "HELLO. HOW ARE YOU-Q"

○ In sign language, a "gloss" can be a direct representation of a sign or gesture using simple words.

○ The model will take such glosses and attempt to produce grammatically correct sentences in the target language.

Enter Gloss Text

HELLO. HOW ARE YOU-Q

Translate

Translated Text

Hello. How are you doing?

Transformation Process ◀

Use via API · Built with Gradio · Settings ⚙

Output Sections:

After clicking Translate, you'll see several results:

Section	Description
Translated Text	The best sentence generated from your gloss input
Alternative Translations	Other options from beam search
Tokenization	Internal token structure of output and input tokens
Predicted Words	Top predictions with confidence

IMPORTANT NOTES
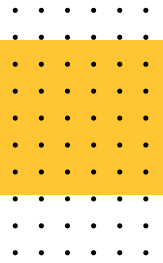
You do not need to install anything — the app runs entirely offline.

Deprecation warnings can be ignored — they don't affect functionality.

Wait 40–60 second pause before output appears is normal — just wait.

If you close the terminal, the app will stop running. Keep it open while using the app.

UNDERSTANDING ASL GLOSS

ASL gloss is a way of writing down American Sign Language using simplified English words to represent each sign. It serves as a bridge between sign language and spoken/written language for the purposes of documentation, teaching, and machine learning.

However, ASL gloss does not follow English grammar. Instead, it:

- **Uses capitalized English words to represent signs**
- **Follows ASL grammar and syntax, not English word order**
- **Excludes articles, auxiliary verbs, and sometimes pronouns**
- **Often relies on context and non-manual markers (like facial expressions) in actual use**

ASL gloss is not meant to be a complete or exact written form of ASL. It's a linguistic approximation that provides a readable format for analysis and training, particularly useful when training AI models like the T5 Transformer in this project.

🖊 Example Comparison

Type	Expression
English Sentence	I'm going to dance tonight.
ASL Gloss	NIGHT ME GO DANCE
Raw Sign Language	Signs performed with facial/body expression and no spoken words
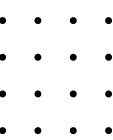
GLOSSING RULES

✅ 1. USE ALL CAPS

Always write gloss words in uppercase to distinguish them from regular English sentences.

CORRECT	INCORRECT
ME GO STORE	Me go store

✅ 2. FOLLOW ASL WORD ORDER: TIME → TOPIC → COMMENT

ASL has its own grammar, often structured like:

[Time] → [Subject/Topic] → [Verb/Comment]

English	ASL Gloss
I went to the store yesterday	YESTERDAY ME GO STORE
My mom will cook tomorrow	TOMORROW MOTHER COOK
He is eating now	NOW HE EAT

✅ 3. WH-QUESTIONS PLACE THE WH-WORD AT THE END

For questions using who, what, where, when, why, how, place the WH-word at the **end** of the gloss sentence.

English	ASL Gloss
Where is your bag?	YOUR BAG WHERE
What are you doing?	YOU DO WHAT

GLOSSING RULES

4. USE ONLY CONTENT WORDS

Avoid filler words or grammatical connectors that are not signed in ASL.

Do NOT include:

- *Articles: a, an, the*
- *Helping verbs: is, am, are, was*
- *Contractions: don't, won't, can't*

Focus on content words like subject, action, time, and object.

English	ASL Gloss
I don't like apples	ME NOT LIKE APPLE
The boy is running	BOY RUN
You are very smart	YOU VERY SMART

5. USE –Q FOR YES/NO QUESTIONS

Add **-Q** at the end of yes/no questions to indicate rising intonation or a questioning facial expression in signed ASL.

English	ASL Gloss
Do you like pizza?	YOU LIKE PIZZA -Q
Are you okay?	YOU OKAY -Q
Do you love three roses?	YOU LOVE 3 ROSES -Q

ASL GLOSS TO TEXT EXAMPLES

ASL Gloss	English
YESTERDAY ME EAT APPLE	I ate an apple yesterday.
YOU GO SCHOOL TOMORROW -Q	Are you going to school tomorrow?
FATHER COOK DINNER	My father is cooking dinner.
YOU LIKE DOG -Q	Do you like dogs?
MOTHER LOVE CHILD	The mother loves the child.
NIGHT ME GO DANCE	I'm going to dance tonight.
NOW WEATHER RAIN	It is raining now.
ME SISTER FINISH STUDY	My sister finishes her studies.
YESTERDAY FRIEND NOT COME	My friend didn't come yesterday.
YOU BUY BOOK WHERE	Where did you buy the book?
TOMORROW ME CLEAN ROOM	I will clean the room tomorrow.
YOUR PHONE WHERE	Where is your phone?
HE GO SCHOOL EVERYDAY	He goes to school every day.
MOTHER GO STORE MOTHER BUY MILK	My mother went to the store to buy milk.

ASL GLOSS-TEXT TRANSLATOR

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HUBERT UYBAAN