

GUANGDONG AND HONG KONG UNIVERSITIES

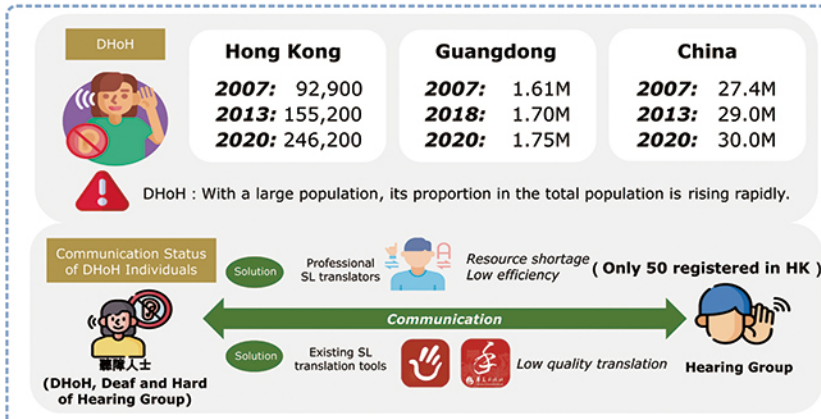
“1+1+1” Joint Research Collaboration Scheme

粵港高校「1+1+1」聯合資助計劃

- AI for Social Good -

Sign Language Translation and Production 手語識別與生成關鍵技術與示範應用

Yupeng Li¹ (PI) Donglong Chen² (PI)
Bu Zhong¹ (Dean) Wei Jiang¹ Liang Lan¹ Xiaowen Bi² Xuan Ning²
¹Hong Kong Baptist University ²Beijing-Normal Hong Kong Baptist University



Sign Language Recognition



- Accurate
- Real-time
- Privacy-preserving

Sign Language Production



Significance and Challenges of SLT

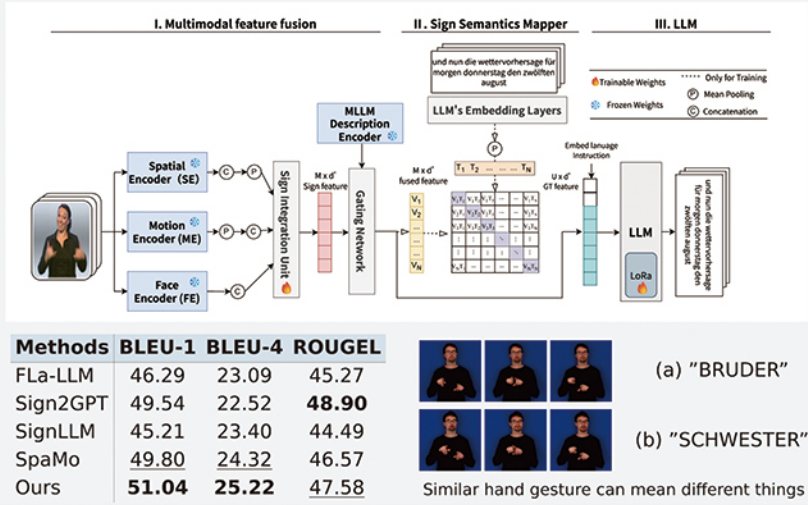
Significance: The hearing-impaired population is large and **growing** rapidly, yet communication barriers remain pervasive.

Challenges: SL is highly **individual** in style, inherently **multimodal** (manual signs + facial expressions), and strongly **region-dependent** (e.g., HK SL ≠ Mainland SL), making cross-regional transfer difficult.

Highlight #1: Face-Augmented Multimodal Semantics for Gloss-Free Sign Language Translation with LLMs

Challenges: 1) Only whole-frame visual encoding; 2) Ignore non-manual signals (facial/mouthing); 3) High MLLM cost sampling misses semantics.

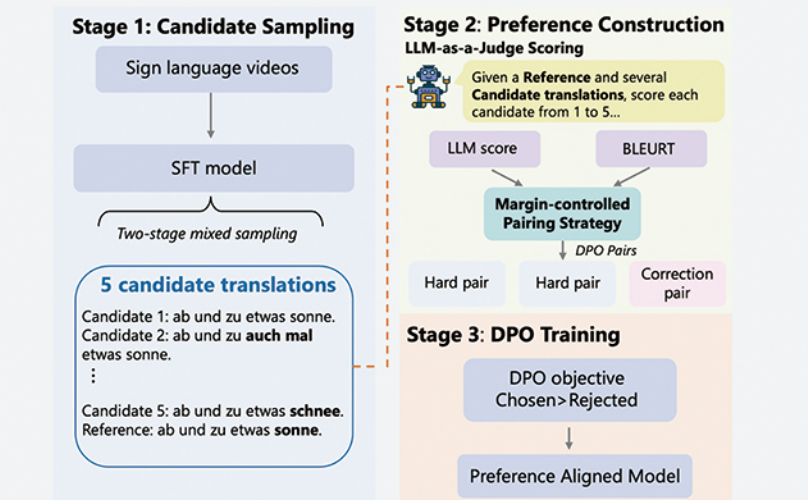
Contribution: Proposed a face-augmented multimodal LLM for gloss-free SLT that separately models hand gestures and facial cues, improving disambiguation and achieving new SOTA BLEU-1-4 results (BLEU-4 = 25.22). Some baselines' LLM priors yield longer, richer outputs, boosting ROUGE but not always translation quality.



Highlight #2: Direct Preference Optimization (DPO) for Gloss-Free Sign Language Translation (SLT)

Challenges: 1) SFT is token-level imitation → fluent but inaccurate translations; 2) SFT ignores sentence-level semantic fidelity.

DPO Core Mechanism: Reformulates SLT as **preference learning** over candidate outputs, widening the likelihood gap between high/low-quality translations to capture accuracy-critical differences ignored by token-level SFT.



Contribution: 1) Proposed an SLT+DPO framework that corrected semantic reversal errors and significantly enhanced translation faithfulness. 2) Using SpaMo as the baseline, our framework outperformed the standard SLT baseline with 25.51 BLEU-4, 59.16 BLEURT, and 47.27 ROUGE-L.

Mission and Vision

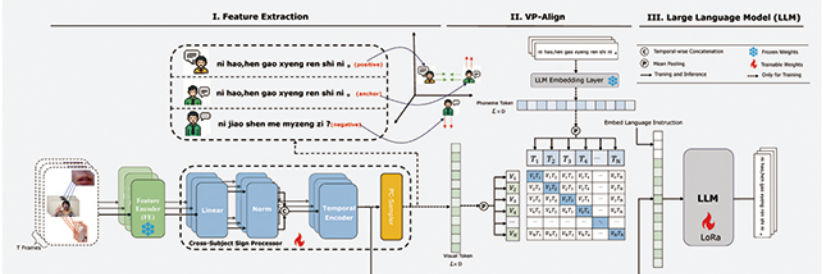
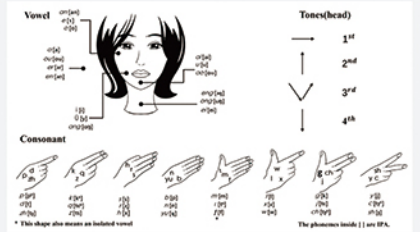
Mission: Automate Sign Language Translation (SLT) using AI to deliver accurate, real-time, and privacy-preserving communication, **making Sign Language (SL) accessible to everyone.**

Vision: Build secure SLT systems **enabling barrier-free interaction across the Greater Bay Area**, and will extend to other countries and languages.

Highlight #3: Fine-tuning-Free Visual Encoding for Generalizable CCS Recognition with LLMs

Mandarin Chinese Cued Speech (MCCS) is a visual communication system for the Deaf and Hard of Hearing Group (DHOH).

Challenges: Inter-cue heterogeneity and cross-modal asynchrony hinder generalization and increase cost.



Contribution:

- First fine-tuning-free generalized Automatic Cued Speech Recognition (ACSR), established a new CSR paradigm;
- Proposed FNA-CSR: CSSP+VP-Align (no visual encoder fine-tuning) → aligned features → LLM+LoRA for phoneme generation;
- SOTA on multi-cue datasets: MCCSD (6-H) 2.72% CER / 4.74% WER; MHI-MCCSD (8-HI) 10.81% CER / 19.26% WER.

Methods	MCCSD (6-H)		MHI-MCCSD (8-HI)		Note: "H" and "HI" denote hearing and hearing-impaired; "CER" and "WER" denote character and word error rate.
	CER	WER	CER	WER	
EcoCued	29.75	67.83	50.52	90.13	
STF-ACSR	<u>8.34</u>	21.06	10.96	<u>25.67</u>	
Cued-Agent	9.05	<u>20.54</u>	<u>12.67</u>	29.86	
FNA-CSR	2.72	4.74	10.81	19.26	

Quality Research Output (2025-2026)

CCF-A / TH-CPL-A papers: 7

- WWW x2 (2026, CCF-A/TH-CPL-A)
- AAAI (2026, CCF-A/TH-CPL-A)
- IEEE Trans. Comput. (2025, CCF-A/TH-CPL-A, SCI-Q1)
- ACM/IEEE Trans. Networking (2026, CCF-A/TH-CPL-A)
- INFOCOM (2026, CCF-A/TH-CPL-A)
- KSEM (2025, CCF-C)

SCI Q1 papers: 6

- IEEE Trans. Signal Process. (2025, SCI-Q1)
- IEEE Trans. Mobile Comput. x2 (2026, CCF-A/TH-CPL-A, SCI-Q1)
- ICASSP (2026, CCF-B)
- Trans. Network Sci. Eng. (2026, SCI-Q1)
- IEEE Trans. Consumer Electron. (2026, SCI-Q1)

Intl. Conference Organization: Participated in organizing **International Conference on Social Computing (ICSC'25)** - **interdisciplinary research in AI and social sciences**. PIs (Yupeng Li and Donglong Chen) served as core team members.

