



# MixSignGraph: A Sign Sequence is Worth Mixed Graphs of Nodes

Shiwei Gan, Yafeng Yin\*, Zhiwei Jiang, Lei Xie, Sanglu Lu, Hongkai Wen ‡

State Key Laboratory for Novel Software Technology, Nanjing University, China

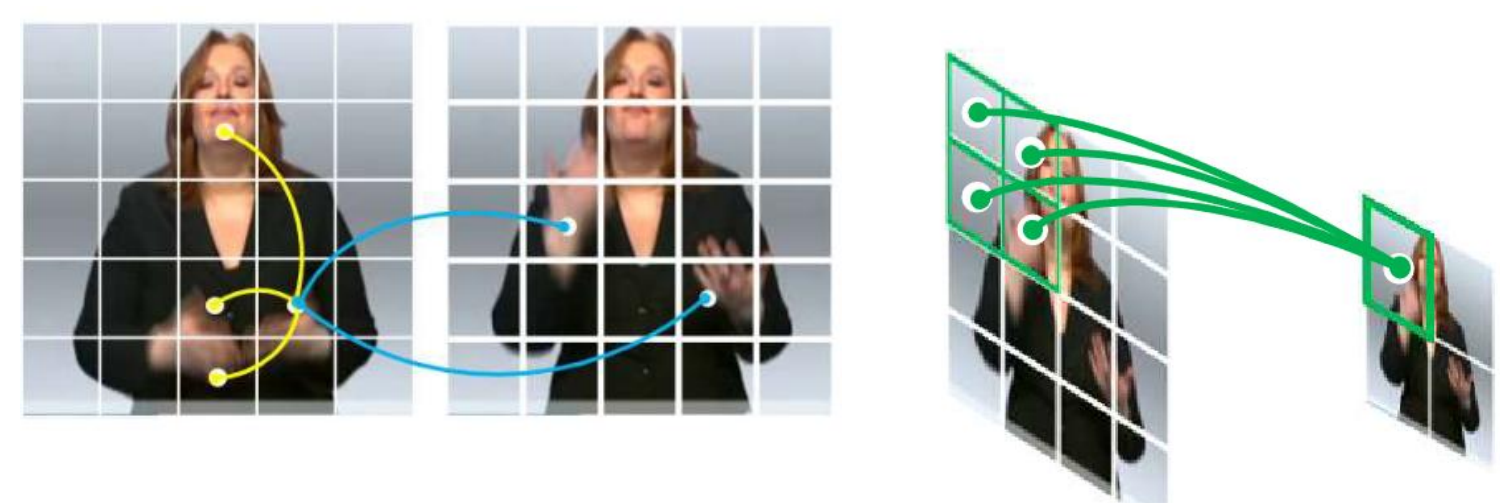
‡Department of Computer Science, The University of Warwick, UK

{sw, yafeng, jzw, lxie, sanglu}@nju.edu.cn hongkai.wen@warwick.ac.uk



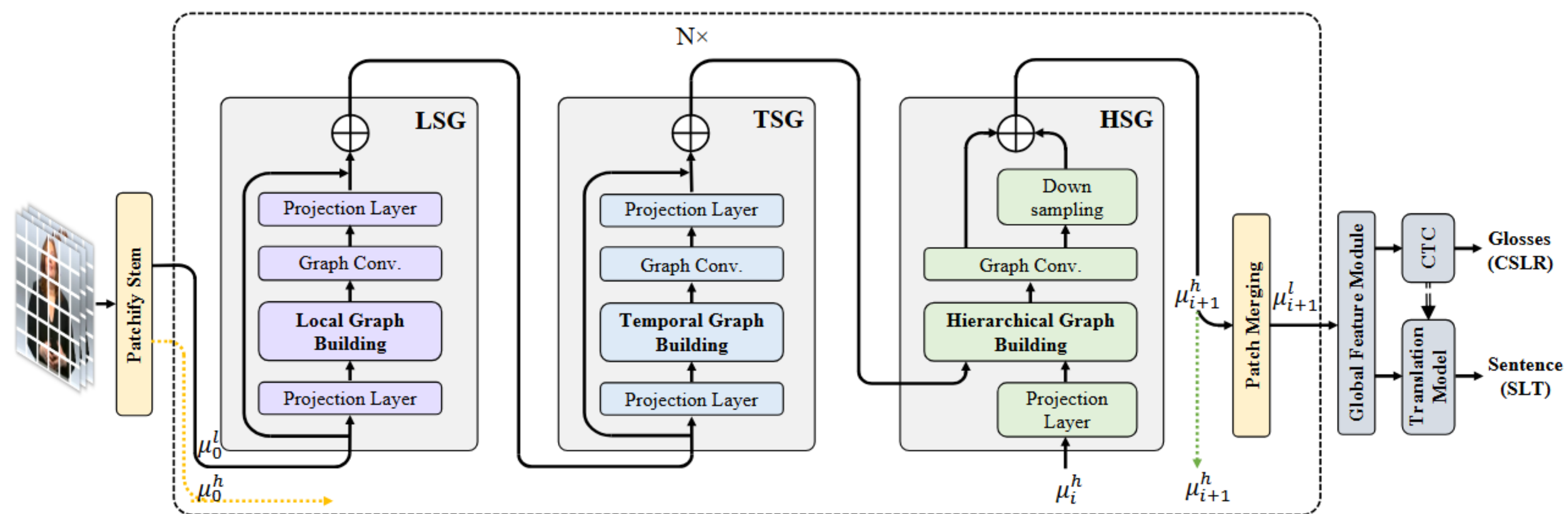
## Motivation

- Capturing cross-region dependencies can improve sign language performance, but it may degrade the representation quality of local regions

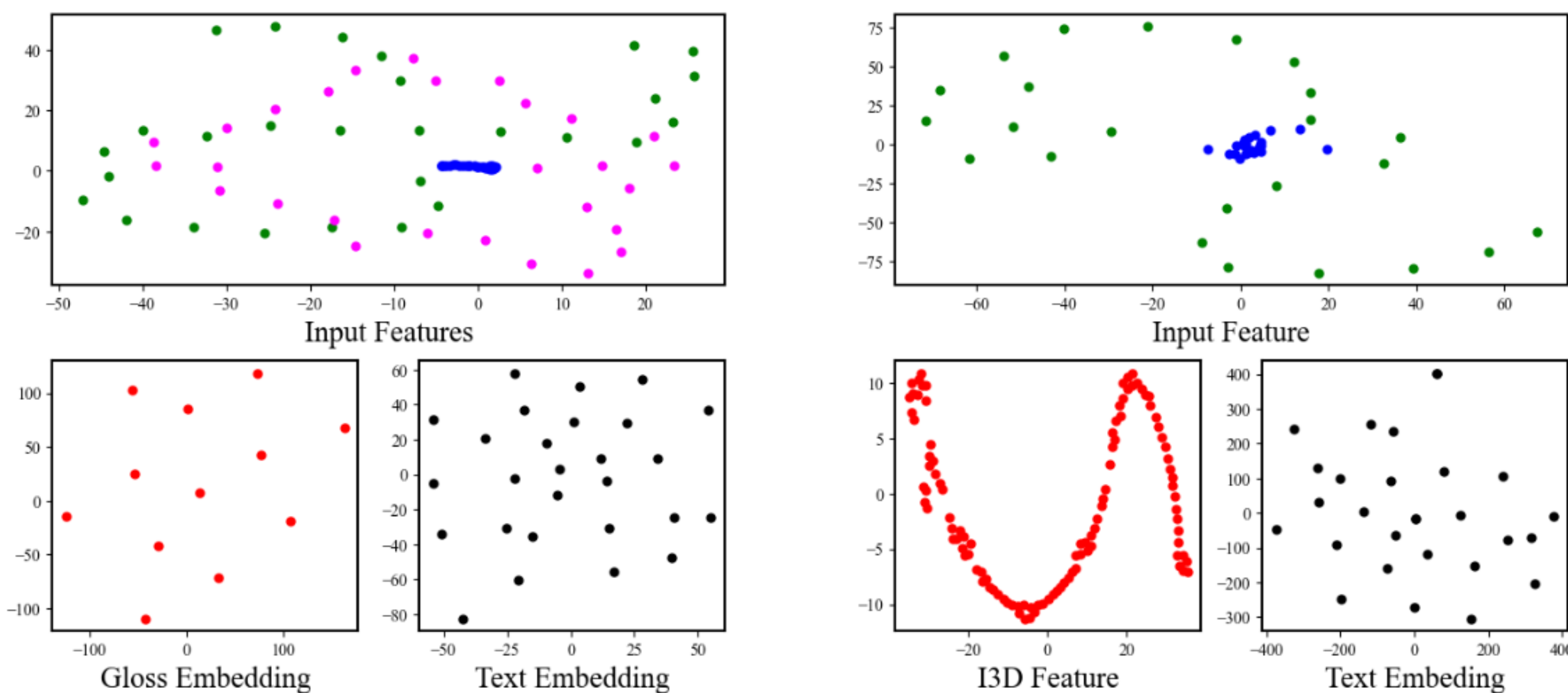


LSG/TSG: across regions in one or adjacent frames

Our HSG: the same regions across feature maps



## The proposed MixSignGraph architecture



## Visualization of TCTC

**Core principle of TCTC: Convert continuous sign language video features into discrete representations**

## Results

- CSLR performance without using any extra cues

CSLR	Extra cues		TEST	
	S	P	WER	del/ins
Joint-SLRT (30)		✓	32.0	9.6/4.1
TwoStream (7)	✓	✓*	25.3	-/-
TwoStream (7)		✓*	28.5	-/-
BN-TIN (14)		✓	33.1	13.5/3.0
CorrNet (31)		✓	30.1	-/-
Contrastive (6)			25.3	11.2/3.5
CoSign (34)	✓		27.2	-/-
SignGraph (4)		✓	26.4	7.8/2.1
MixSinGraph		✓	25.0	7.0/1.6

- GFSLT performance without using any extra cues

Sign2Gloss2Text	TEST				
	ROUGE	BLEU1	BLEU2	BLEU3	BLEU4
SL-Luong (5)	43.80	43.29	30.39	22.82	18.13
Joint-SLRT (30)	48.47	35.35	27.57	22.45	
SignBT (14)	49.35	48.55	36.13	28.47	23.51
STMC-Transf (35)	46.77	48.73	36.53	29.03	24.00
MMTLB (22)	49.59	49.94	37.28	29.67	24.60
RTG-Net (12)	50.04	50.87	37.95	29.74	25.87
TwoStream-SLT (7)	51.59	52.11	39.81	32.00	26.71
MixSignGraph	51.46	52.35	39.23	32.26	26.04

GlossFree-Sign2Text	TEST				
	ROUGE	BLEU1	BLEU2	BLEU3	BLEU4
SL-Luong (5)	31.80	32.24	19.03	12.83	9.58
TSPNet (36)	34.96	36.10	23.12	16.88	13.41
GASLT (16)	39.86	39.07	26.74	21.86	15.74
CSGCR (37)	38.85	36.71	25.40	18.86	15.18
GFSLT (16)	40.70	41.39	31.00	24.20	19.66
GFSLT-VLP (16)	42.49	43.71	33.18	26.11	21.44
Sign2GPT (38)	48.90	49.54	35.96	28.83	22.52
MixSignGraph	51.14	50.01	38.04	29.95	24.02

## Ablation study

- Effects of proposed HSG

$LSG_1$ $TSG_1$ $HSG_1$ $LSG_2$ $TSG_2$ $HSG_2$						Dev	
						WER	Del/Ins
×	×	×	×	×	×	22.3	8.4/2.5
✓						19.2	5.6/2.2
	✓					19.6	5.6/2.1
		✓				19.9	6.7/2.1
			✓			19.3	5.3/2.1
				✓		19.5	6.6/1.7
					✓	19.4	6.2/2.9
✓						18.7	5.1/2.3
	✓					18.6	4.3/1.8
		✓				17.8	6.1/2.3
✓	✓					17.1	5.3/2.0
			✓			17.4	5.7/2.1
✓	✓		✓			16.7	4.9/2.1



GitHub Link