Initiative-Aware
Self-Supervised Learning
for
Knowledge-Grounded Conversations

Chuan Meng, Pengjie Ren, Zhumin Chen,
Zhaochun Ren, Tengxiao Xi, Maarten de Rijke
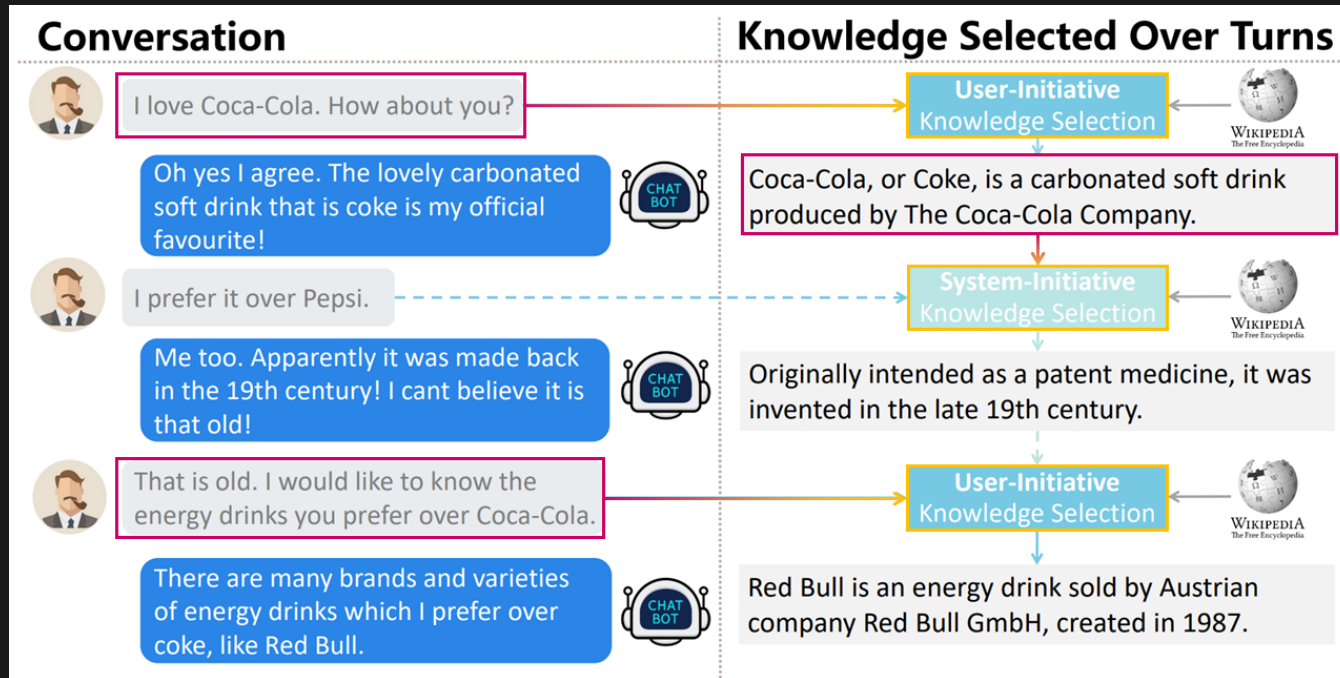
SIGIR 2021

Introduction

In Knowledge-Grounded Conversations (KGC) tasks, external knowledge is used to generate more informative responses.

The method of selecting the required knowledge is an important part of KGC.

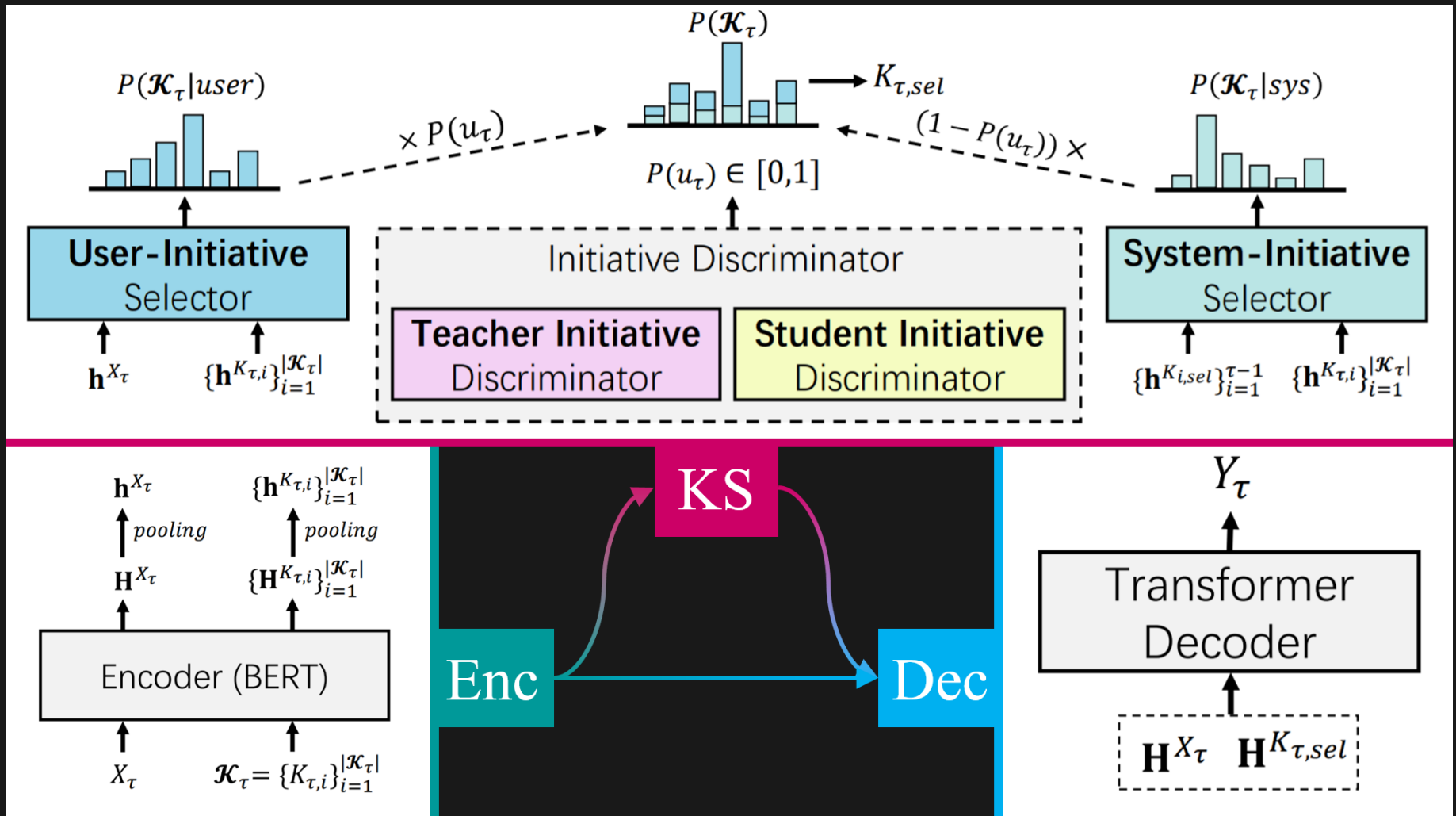The conversation may be driven by the user or the system.

Introduction(cont.)

Explicitly distinguishes between user-initiative and system-initiative knowledge selection.
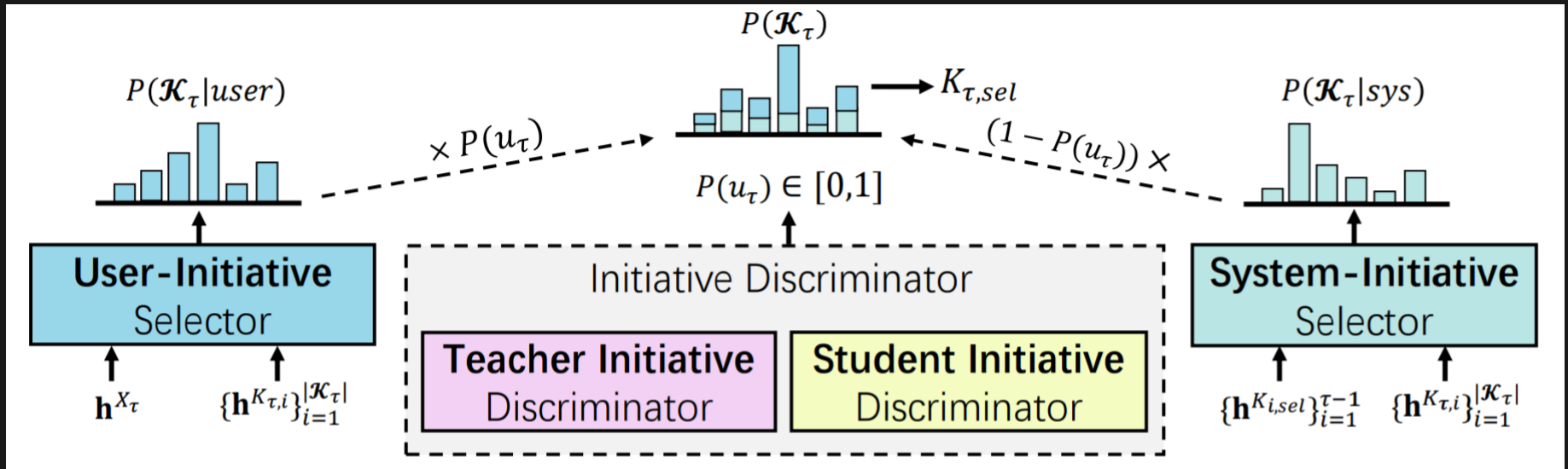
Introduction(cont.)

- User's Initiative
Based on **New Topics** or **Questions** posed by the user

- System's Initiative
Based on **The Previously Selected Knowledge**
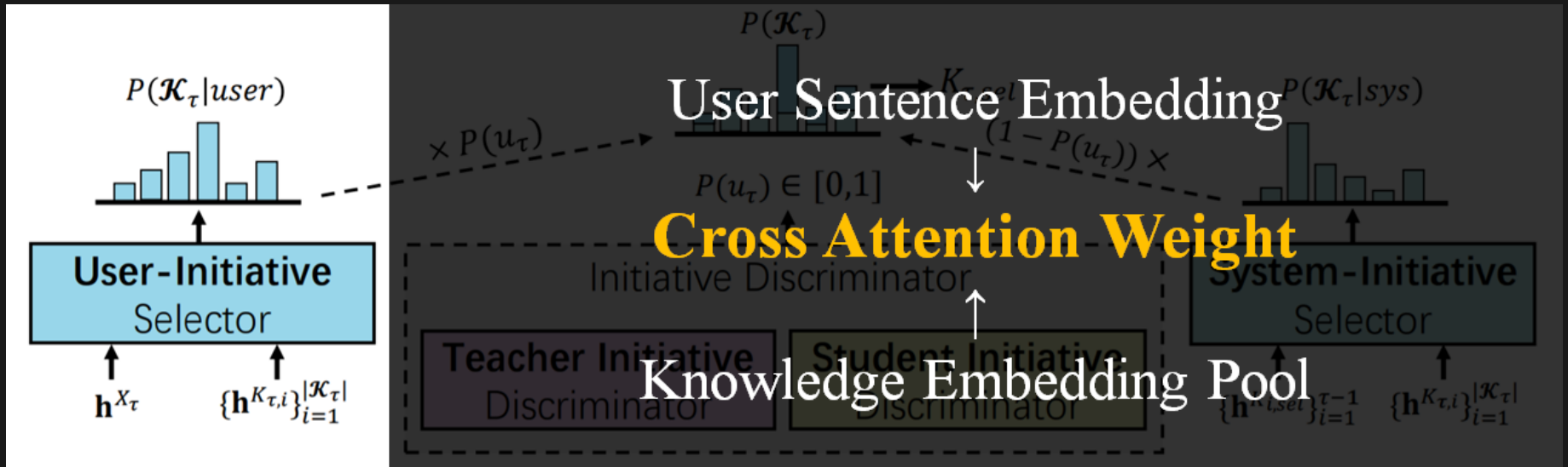
Architecture

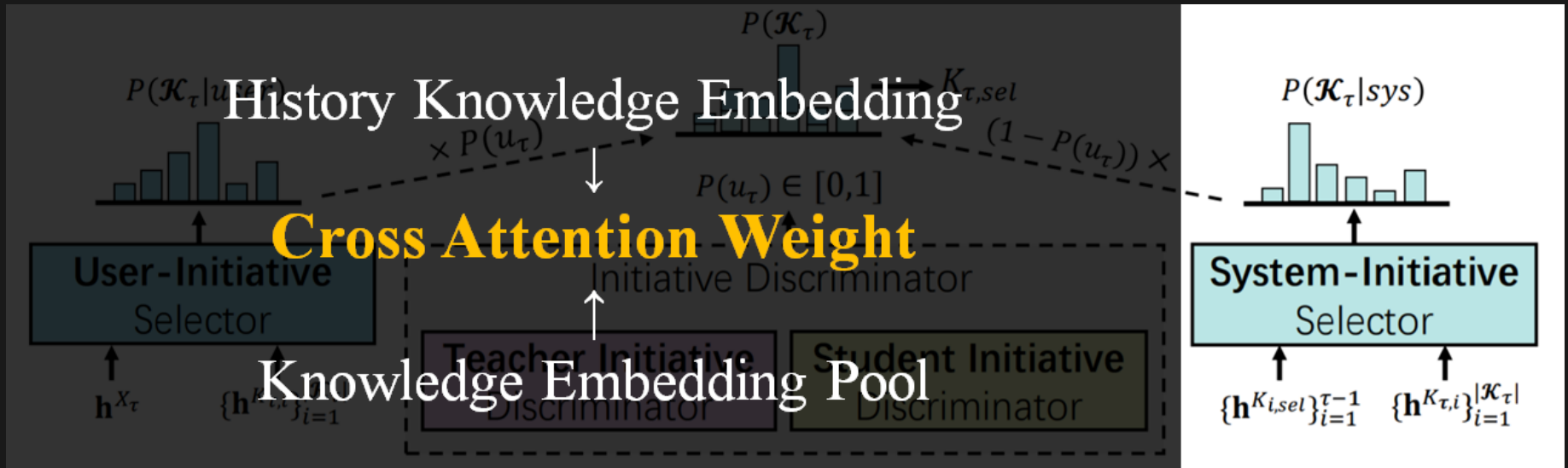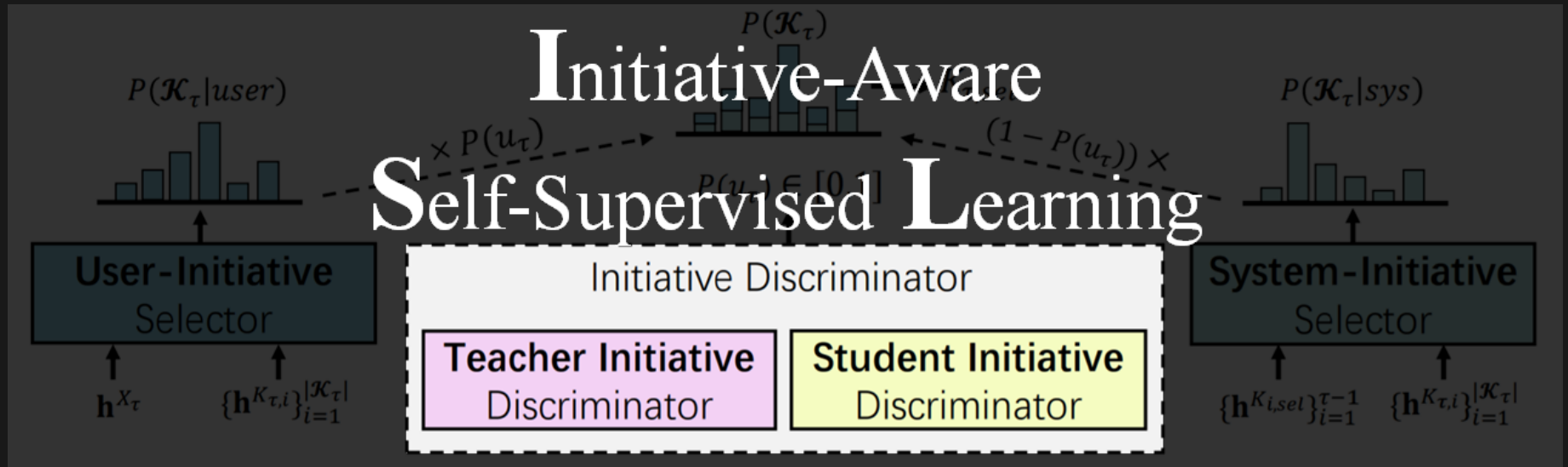# MIKe

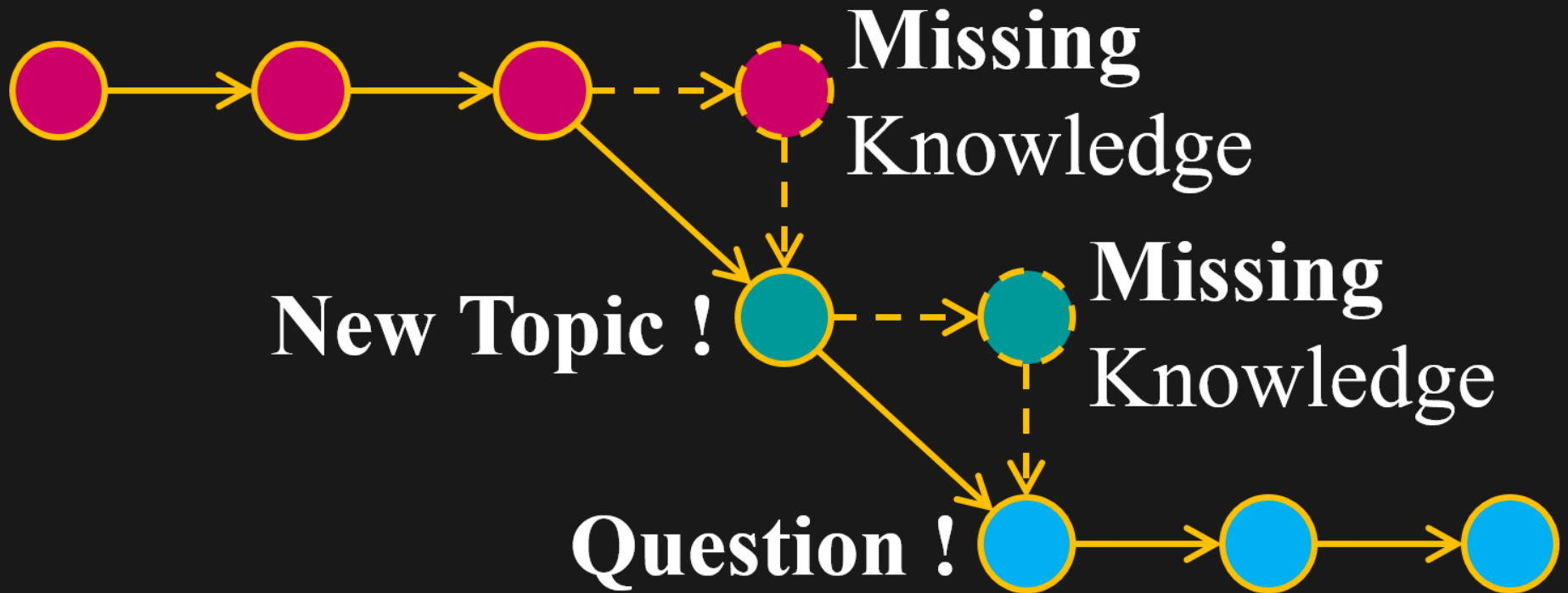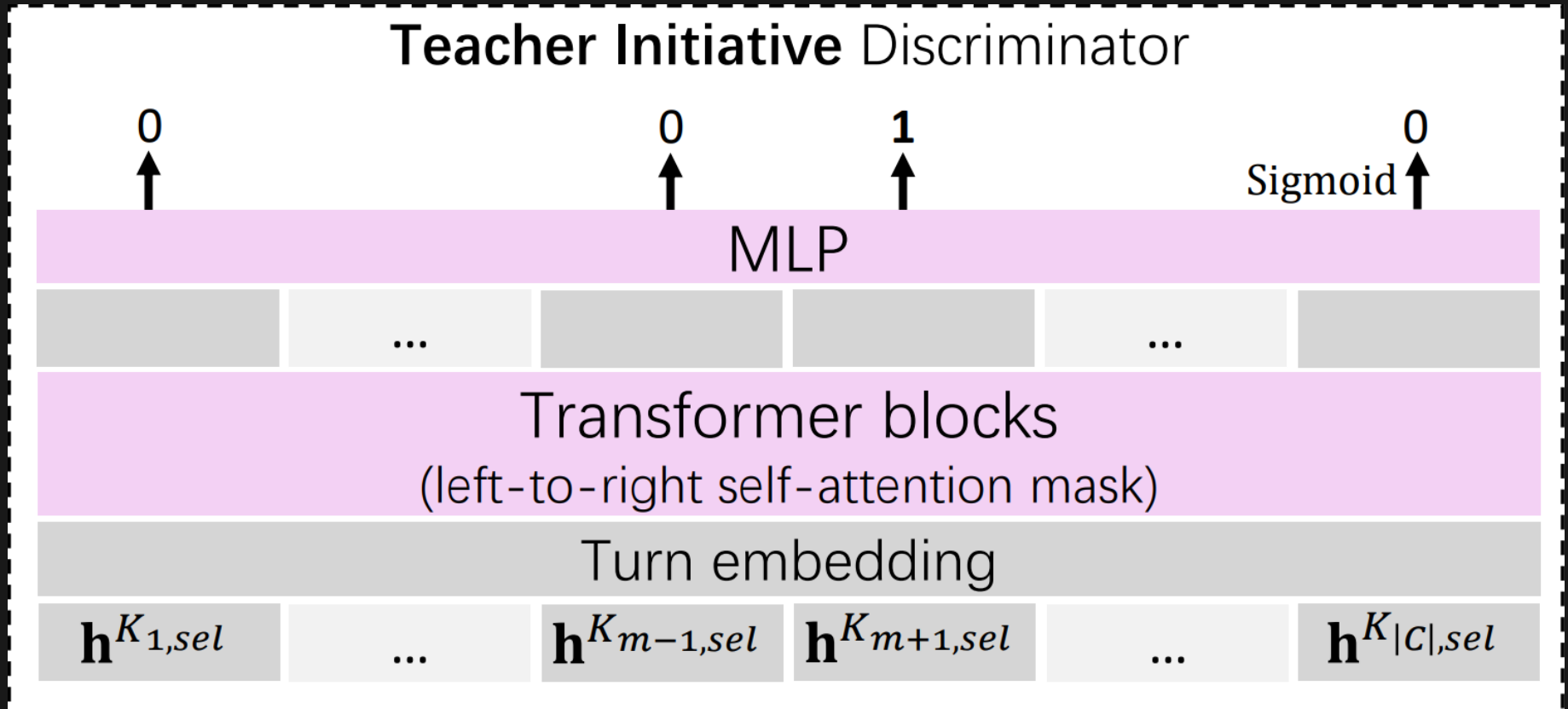## **M**ixed-**I**nitiative **K**nowledge Selection Method
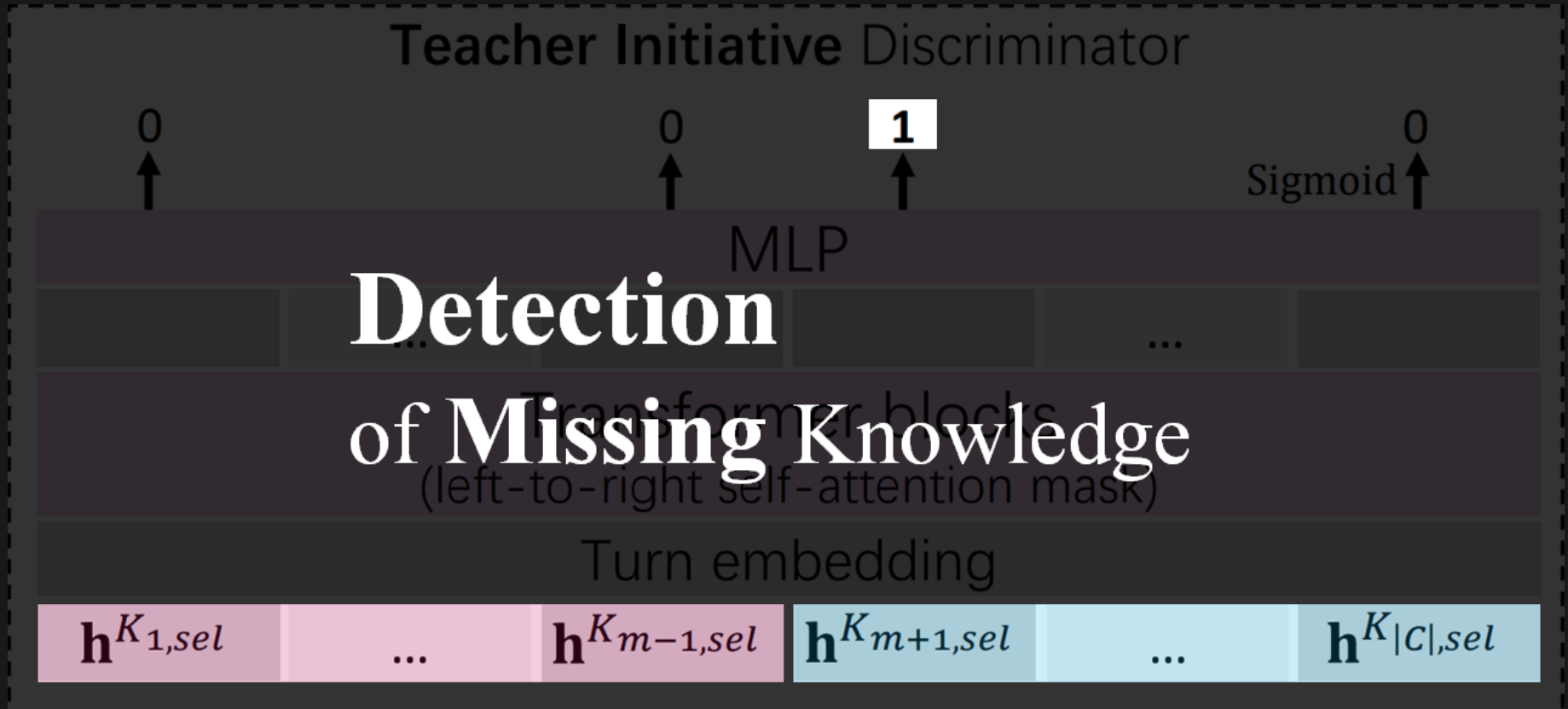
MIKe(cont.)

MIKe(cont.)

ISLe

ISLe(cont.)

ISLe(cont.)

ISLe(cont.)

Detection of Missing Knowledge
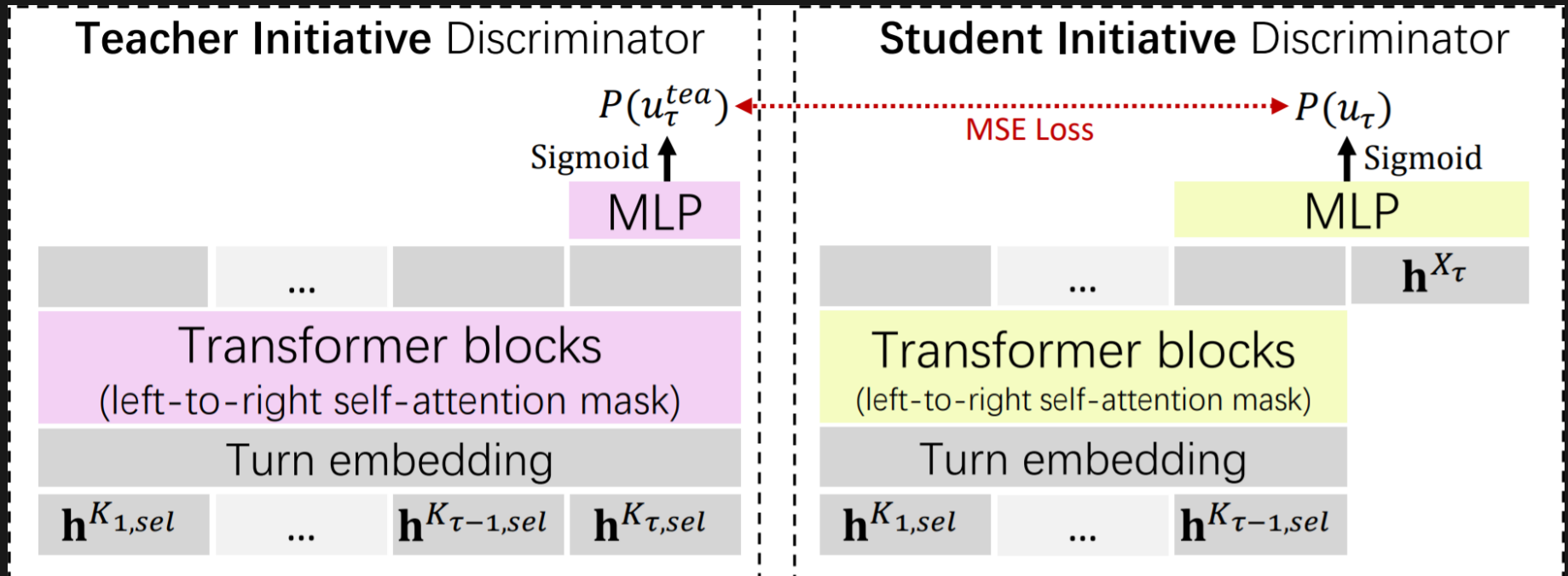
ISLe(cont.)

ISLe(cont.)
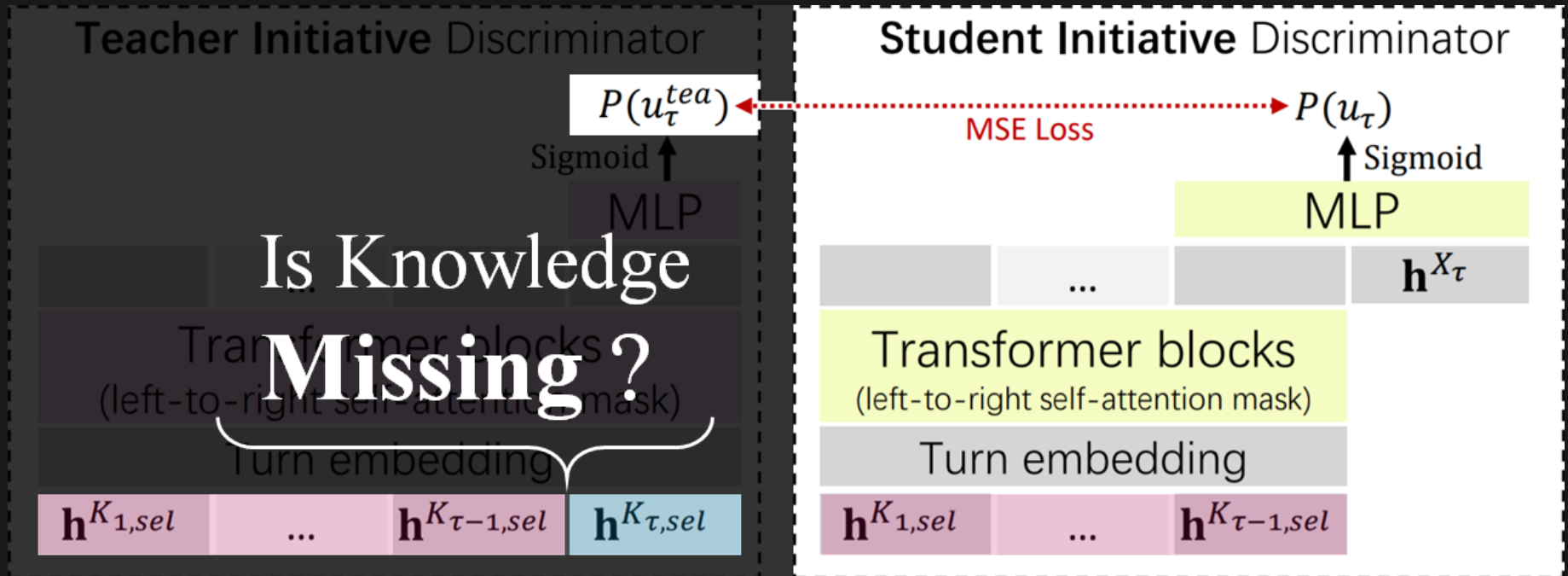
Architecture(review)
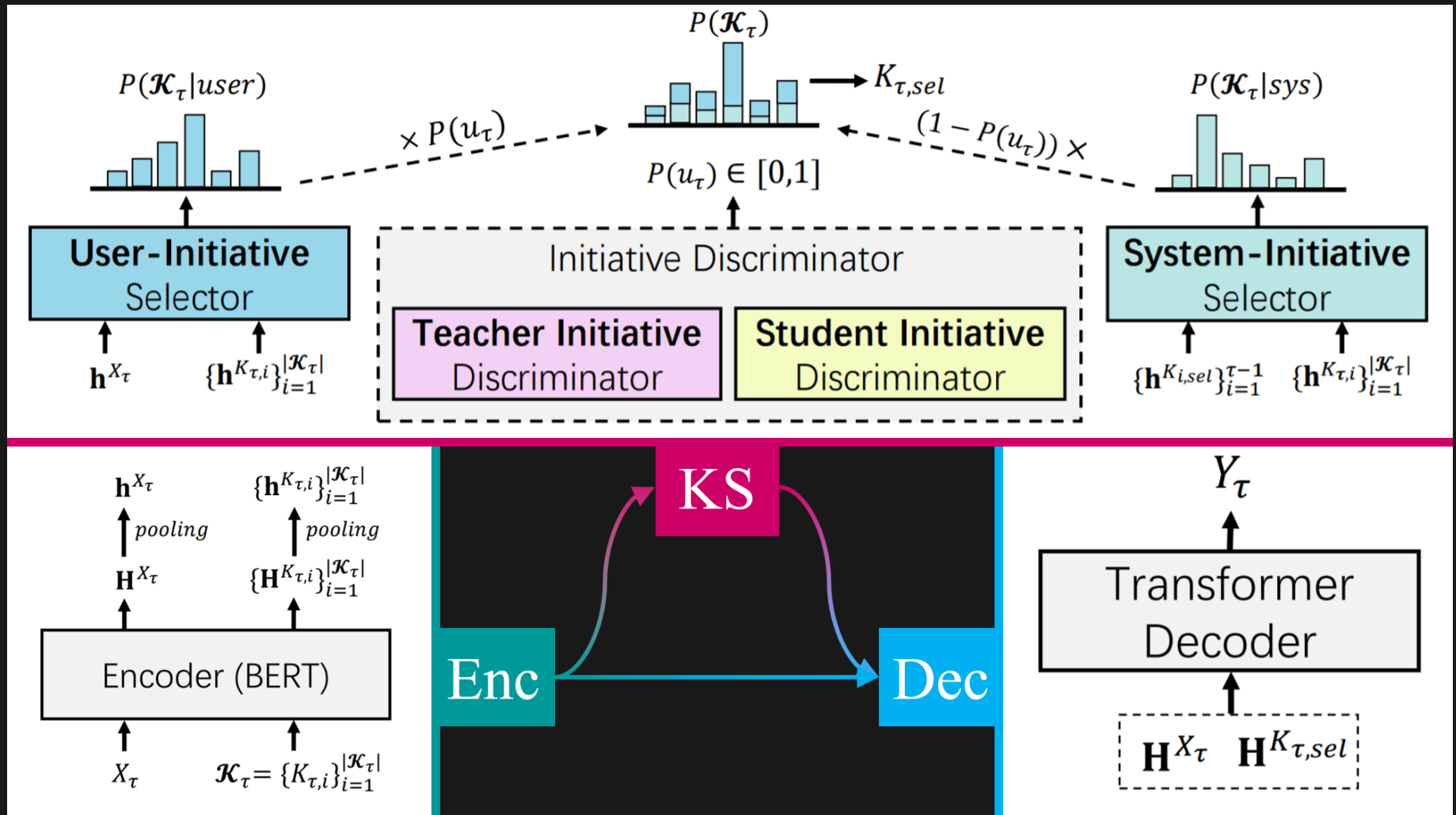
Evaluation
on the WoW dataset

Methods	Test Seen (%)					
	BLEU-4	METEOR	ROUGE-1	ROUGE-2	ROUGE-L	R@1
PostKS + BERT	0.77	14.16	22.68	4.27	16.59	4.83
TMemNet + BERT	1.61	15.47	24.12	4.98	17.00	23.86
SKT	1.76	16.04	24.61	5.24	17.61	25.36
DiffKS + BERT	2.22	16.82	24.75	6.27	17.90	25.62
DukeNet	2.43	17.09	25.17	6.81	18.52	26.38
SKT+PIPM+KDBTS	2.47	17.14	25.19	7.01	18.47	27.40
MIKe (ours)	**2.78**	**17.76**	**25.40**	**7.11**	**18.78**	**28.41**
MIKe-ISLe	2.63	17.22	25.15	6.97	18.67	27.52
MIKe-ISLe-ID	2.48	17.28	24.90	6.64	18.24	26.58
MIKe-ISLe-ID-UIS	1.70	15.88	24.37	5.17	17.33	23.95
MIKe-ISLe-ID-SIS	1.68	15.76	24.33	5.08	17.21	23.88

Evaluation(cont.)
on the WoW dataset

Methods	Test Unseen (%)					
	BLEU-4	METEOR	ROUGE-1	ROUGE-2	ROUGE-L	R@1
PostKS + BERT	0.39	12.59	20.82	2.73	15.25	4.39
TMemNet + BERT	0.60	13.05	21.74	3.63	15.60	16.33
SKT	1.05	13.74	22.84	4.40	16.05	18.19
DiffKS + BERT	1.69	14.69	23.62	5.05	16.82	20.11
DukeNet	1.68	15.06	23.34	5.29	17.06	19.57
SKT+PIPM+KDBTS	1.71	14.83	23.56	5.46	17.14	20.20
MIKe (ours)	**2.00**	**15.64**	**23.78**	**5.61**	**17.41**	**21.47**
MIKe-ISLe	1.67	15.38	23.42	5.28	17.04	20.44
MIKe-ISLe-ID	1.46	14.70	22.87	5.16	16.36	19.35
MIKe-ISLe-ID-UIS	0.89	13.68	22.17	4.09	15.98	16.67
MIKe-ISLe-ID-SIS	0.87	13.44	22.01	3.88	15.79	15.99

Initiative discrimination evaluation

Methods	Test Seen (%)			Test Unseen (%)		
	M-F1	U-F1	S-F1	M-F1	U-F1	S-F1
MIKe	**62.87**	**61.79**	**63.95**	**61.79**	**61.10**	**62.48**
MIKe-ISLe	51.04	60.59	41.49	47.29	60.89	33.69
Heuristic	51.74	48.16	55.31	52.69	49.52	55.86

Initiative discrimination evaluation(cont.)

Heuristic Method

- **User Initiative**
  The current user utterance contains a question mark or begins with a question word.
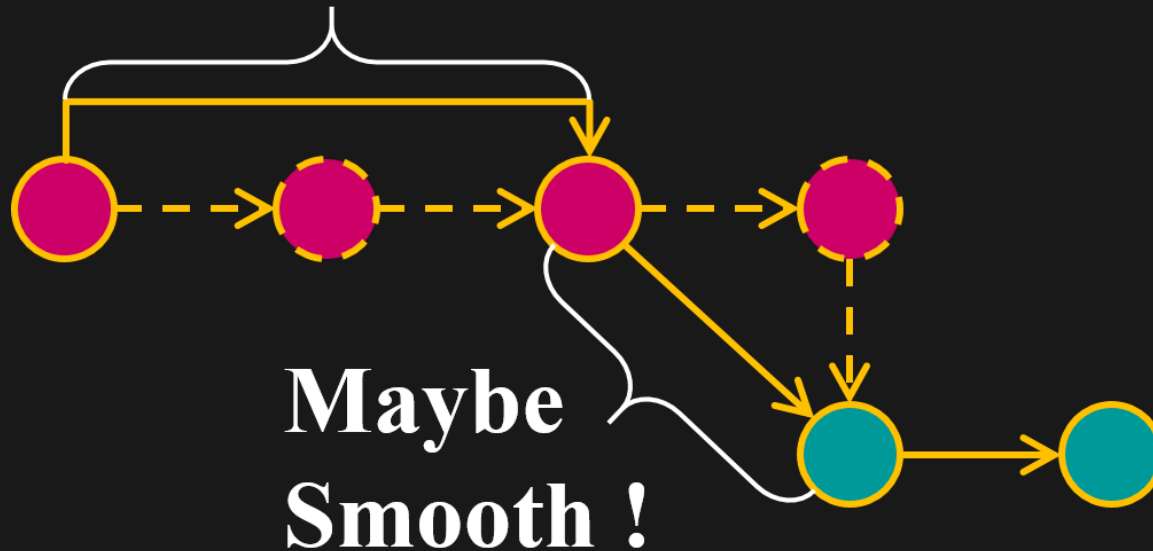
- **System Initiative**
  Other

Conclusion

- With the help of ISLe, the accuracy of KS has been significantly improved.

- There is still a large room for improvement in distinguishing initiative types.

Conclusion(cont.)

Unable to determine switching point.

Thanks for your attention.