

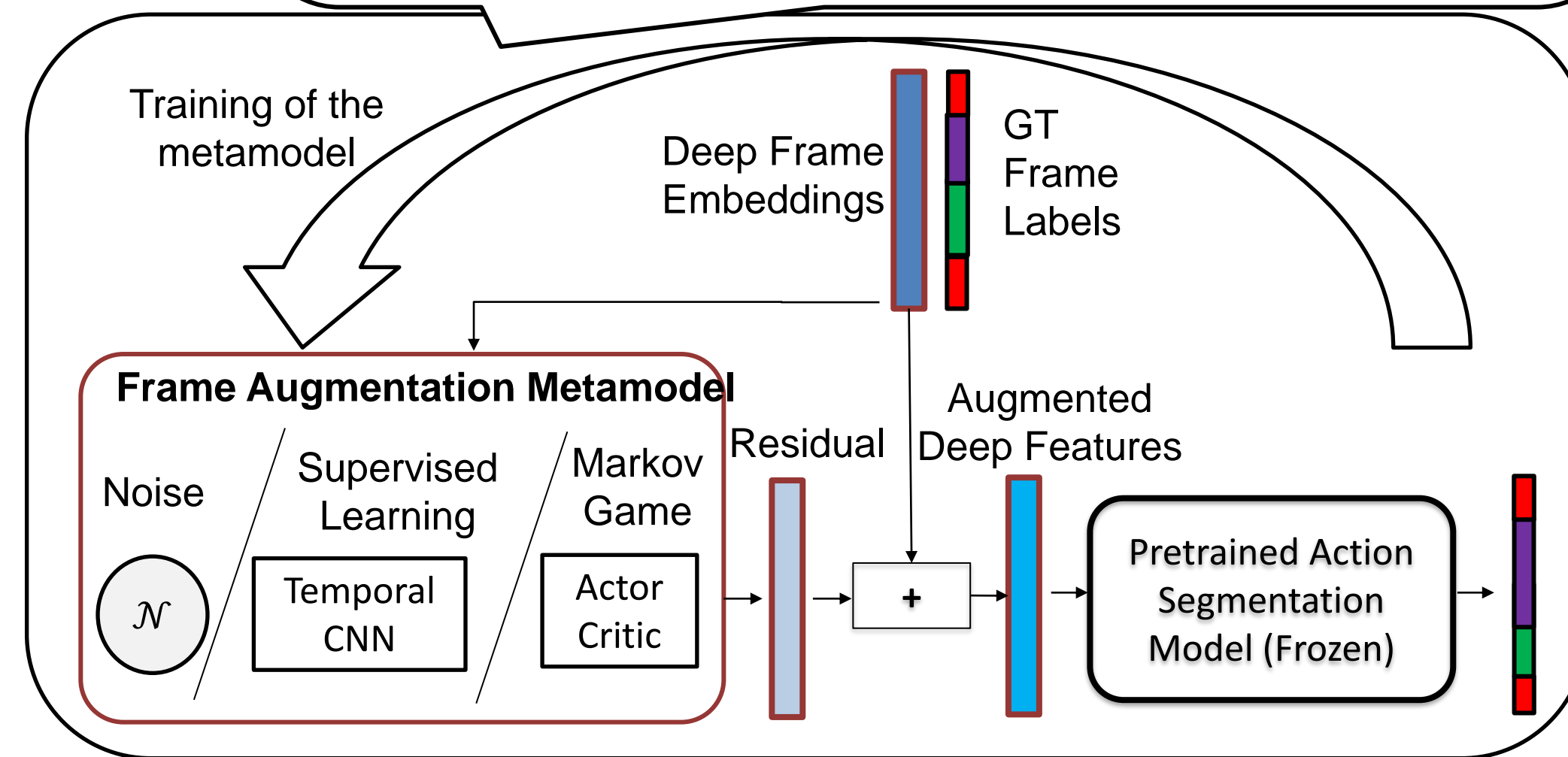
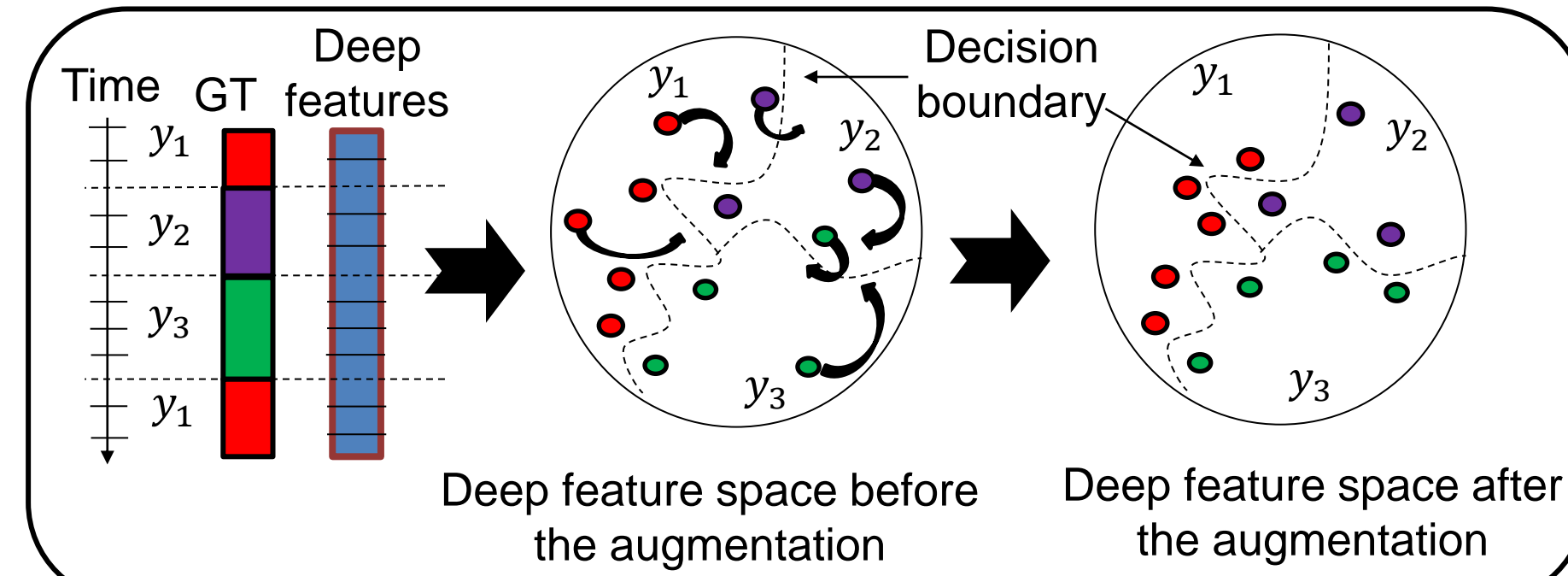
Problem Statement

Data augmentation for Action Segmentation of untrimmed videos

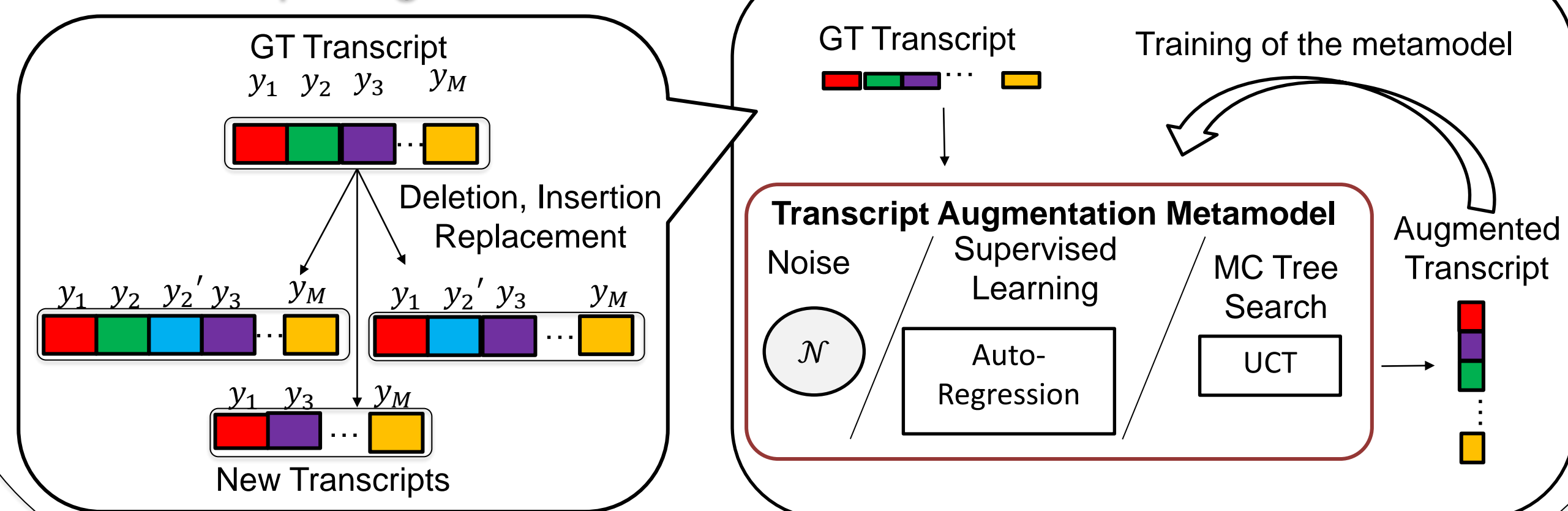
Contributions

Reinforcement Learning framework for:

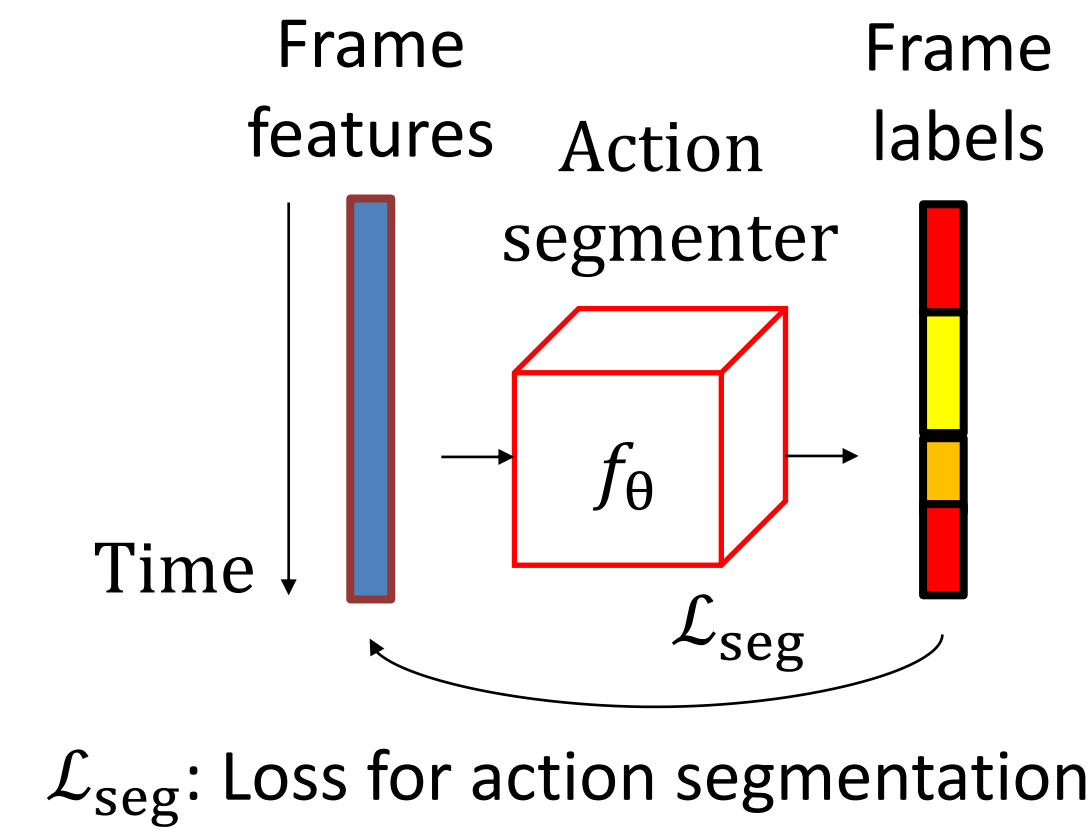
- Frame feature augmentation



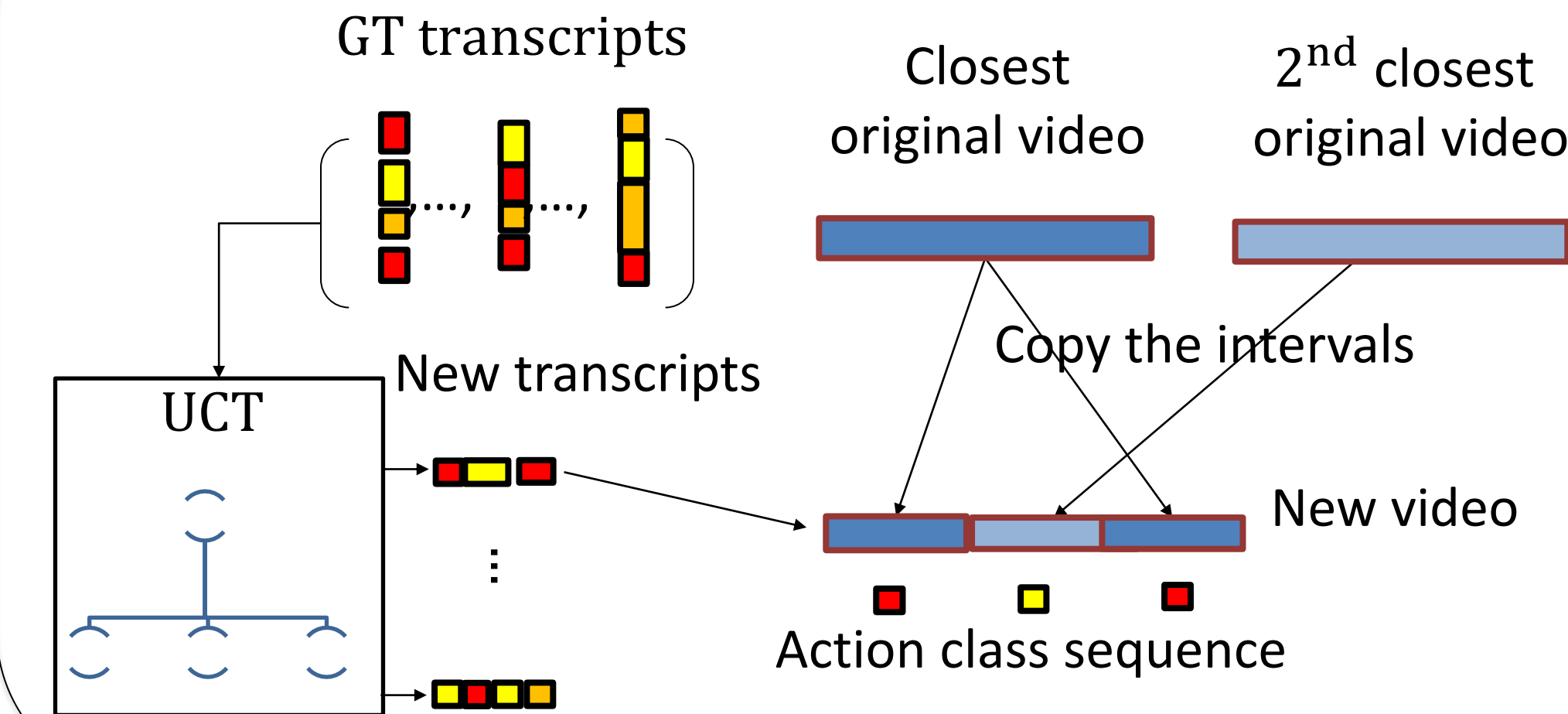
- Transcript augmentation



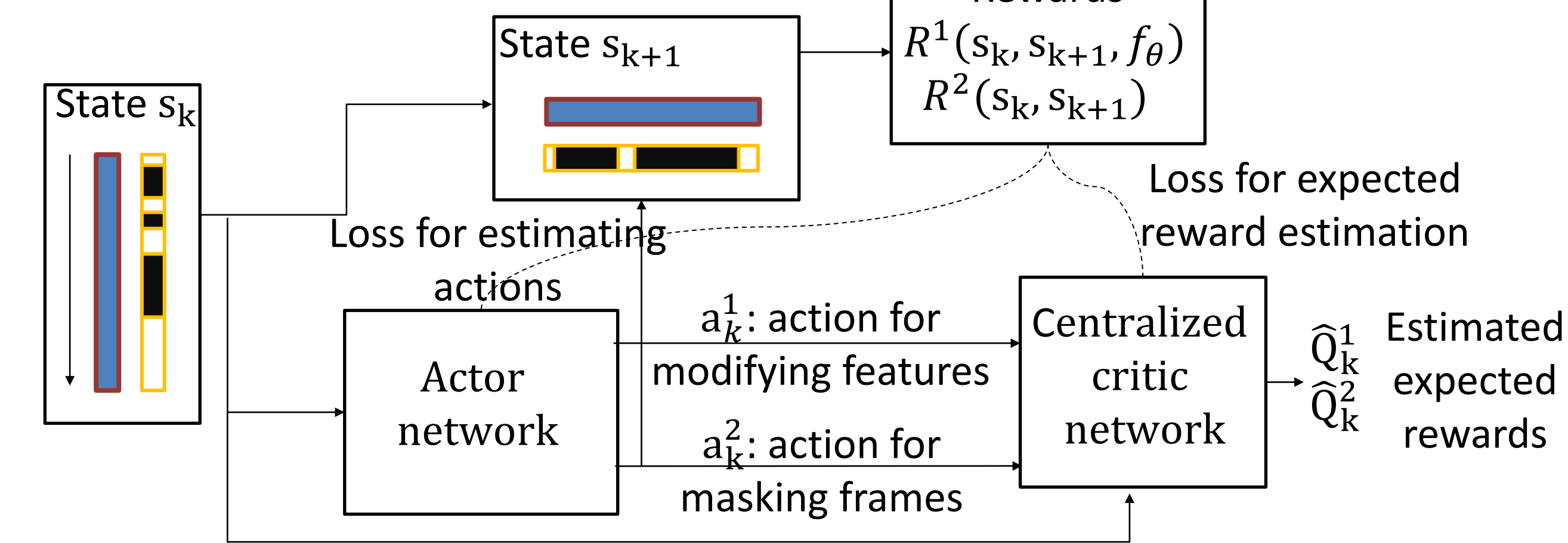
Step 1: Pretraining of the action segmenter



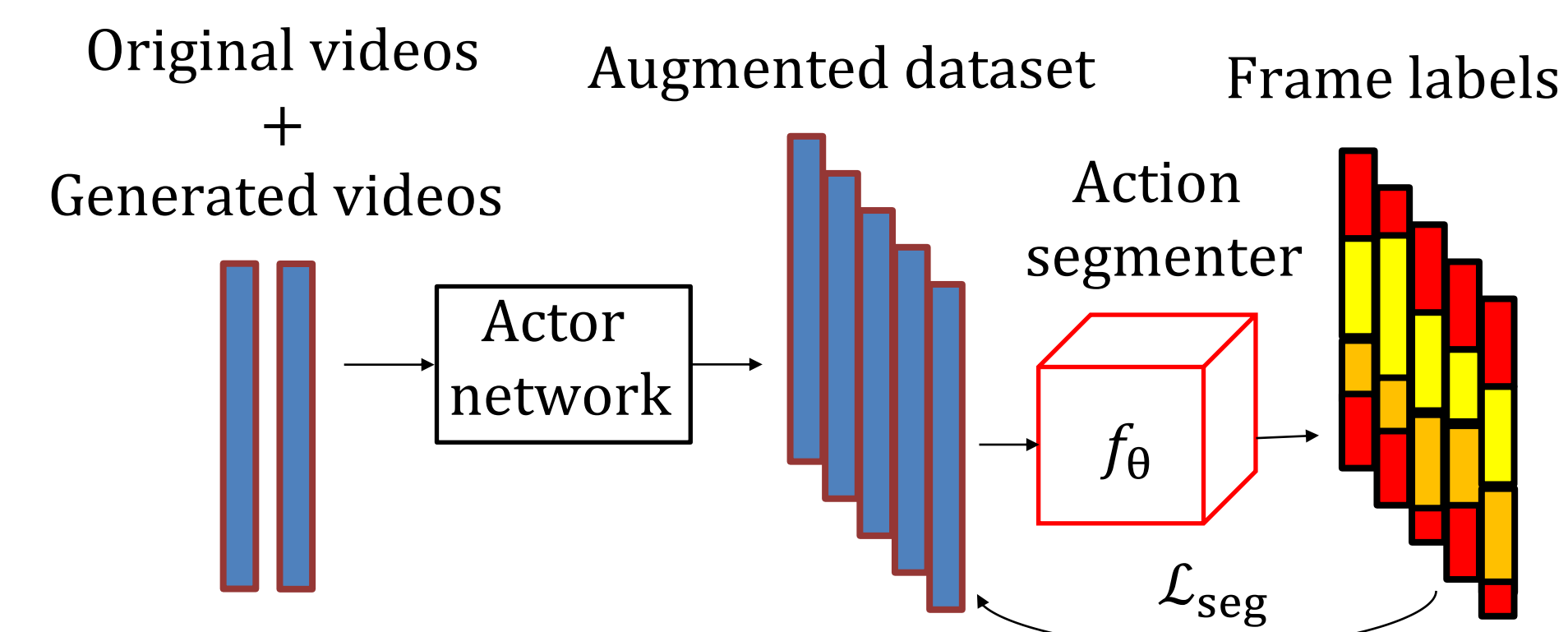
Step 2: Transcript and video generation



Step 3: Learning of feature augmentation



Step 4: Augmented training of the action segmenter



Comparison with other data augmentation methods for Action Segmentation

Dataset	Breakfast					GTEA					50Salads				
	Method		F1@10,25,50	Edit	MoF	F1@10,25,50	Edit	MoF	F1@10,25,50	Edit	MoF	F1@10,25,50	Edit	MoF	
MSTCN + C2F	58.2	55.0	47.8	62.9	66.5	86.2	83.5	78.1	78.8	76.5	77.3	74.2	65.5	67.3	80.8
MSTCN + Speed	55.0	52.7	41.9	60.1	65.9	84.8	80.8	66.1	78.8	75.7	77.3	75.9	67.8	68.8	81.2
MSTCN + MVGA	68.9	66.1	55.8	68.1	71.1	90.9	88.8	79.2	88.2	79.6	80.1	77.9	71.2	74.1	83.2
ASFormer + C2F	75.8	72.3	57.5	75.2	72.9	90.3	88.0	78.8	84.2	78.9	84.5	82.6	76.1	78.7	84.0
ASFormer + Speed	75.2	69.1	56.9	74.8	71.9	89.3	87.2	77.7	85.2	78.5	84.4	82.9	75.1	77.2	85.1
ASFormer + MVGA	75.6	72.1	59.7	76.8	74.2	91.3	90.5	79.3	86.4	80.3	86.3	84.9	78.7	81.3	86.0

Comparison with State-of-the-art for Action Segmentation

Dataset	Breakfast					GTEA					50Salads				
	Method		F1@10,25,50	Edit	MoF	F1@10,25,50	Edit	MoF	F1@10,25,50	Edit	MoF	F1@10,25,50	Edit	MoF	
MSTCN	52.6	48.1	37.9	61.7	66.3	85.8	83.4	69.8	79.0	76.3	76.3	74.0	64.5	67.9	80.7
MSTCN (Ours)	58.1	54.6	44.4	63.4	66.8	87.3	84.9	72.4	82.0	78.0	75.8	73.8	66.8	68.2	82.7
MSTCN + MVGA	68.9	66.1	55.8	68.1	71.1	90.9	88.8	79.2	88.2	79.6	80.1	77.9	71.2	74.1	83.2
BCN	68.7	65.5	55.0	66.2	70.4	88.5	87.1	77.3	84.4	79.8	82.3	81.3	74.0	74.3	84.4
BCN+MVGA	70.8	67.7	57.3	68.3	71.8	91.3	90.0	80.6	86.7	80.5	83.7	82.4	75.8	77.2	85.6
ASFormer	76.0	70.6	57.4	75.0	73.5	90.1	88.8	79.2	84.6	79.7	85.1	83.4	76.0	79.6	85.6
ASFormer + MVGA	75.6	72.1	59.7	76.8	74.2	91.3	90.5	79.3	86.4	80.3	86.3	84.9	78.7	81.3	86.0
Bridge-Prompt						94.1	92.0	83.0	91.6	81.2	89.2	87.8	81.3	83.8	88.1
Bridge-Prompt + MVGA						95.2	93.4	84.8	92.1	82.6	90.8	89.4	83.2	86.1	88.9