DirecFormer: A Directed Attention in Transformer Approach to Robust Action Recognition

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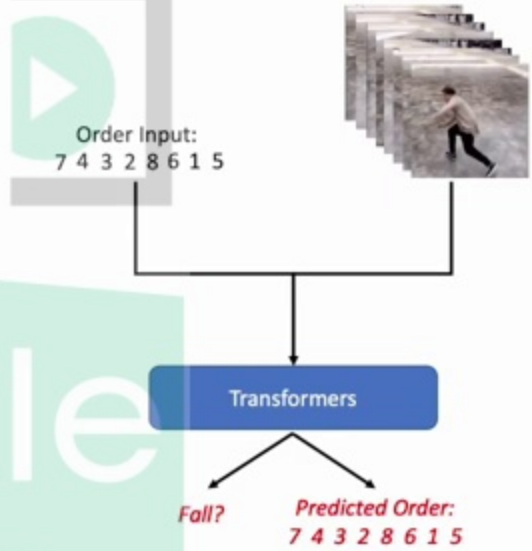
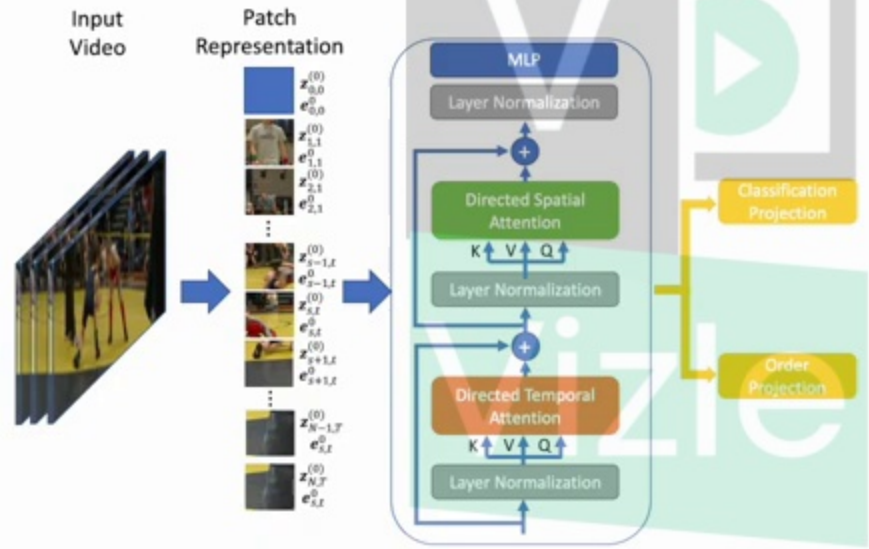
Motivation

- The goal of action recognition is to predict an action given a set of ***video frames in the correct order.***
- Given a set of ***video frames shuffled in a random order*** and different from the original one, will it be classified as ***the same label as the original recognition result?***
- Are action recognition models able to ***correct the incorrectly-ordered frames to the right ones*** and provide ***an accurate prediction?***



The Proposed Approach



Ablation Study

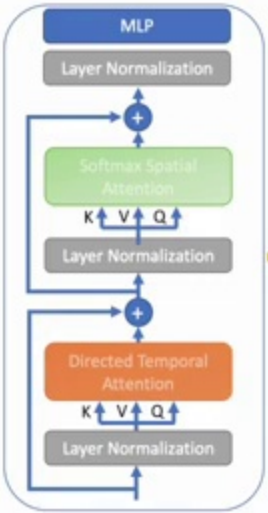


Table 1. **Ablation Study On Jester.** $X - Y$ denotes for the attention types of temporal and spatial dimension, respectively. X (and Y) could be either S: Softmax or C: Cosine.

Models	Attention Time-Space	$\mathcal{L}_{ord}$	$\mathcal{L}_{self}$	Top 1	Top 5
DirecFormer	$S - C$			94.52	99.26
DirecFormer	$S - C$	✓		94.65	99.25
DirecFormer	$C - S$			95.52	99.20

Experimental Results

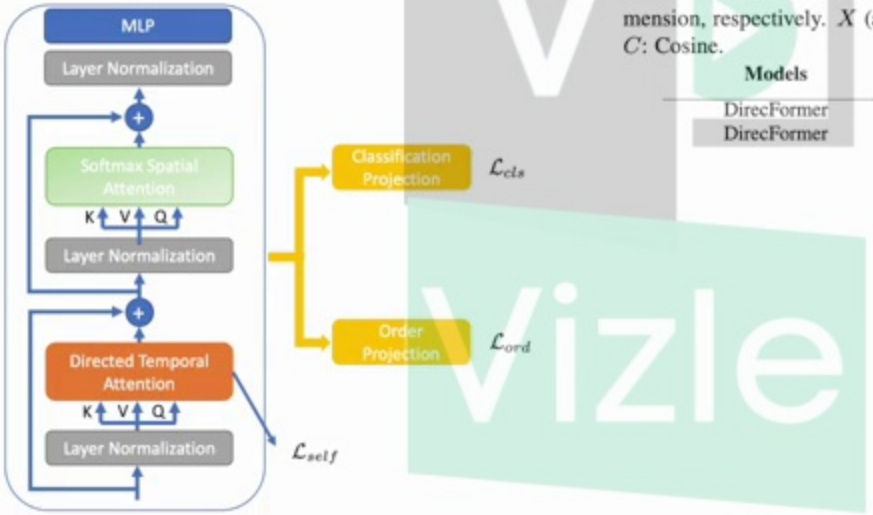


Table 4. **Comparison with the SOTA methods on Kinetics 400.** $X - Y$ denotes for the attention types of temporal and spatial dimension, respectively. X (and Y) could be either S: Softmax or C: Cosine.

Models	Attention Time-Space	Top 1	Top 5
DirecFormer	$S - C$	80.16	94.55
DirecFormer	$C - S$	81.69	94.62

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