FoGMesh: 3D Human Mesh Recovery in Videos with Focal Transformer and GRU

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Introduction

➢ **Motivation:**

- High-precision 3D human body recovery in the wild is a challenging task, especially in high-speed motion scenes.
- The attention weight of small-scale body parts is small in the reconstruction process, resulting in large deviation of the recovery results.

➢ **Contributions:**

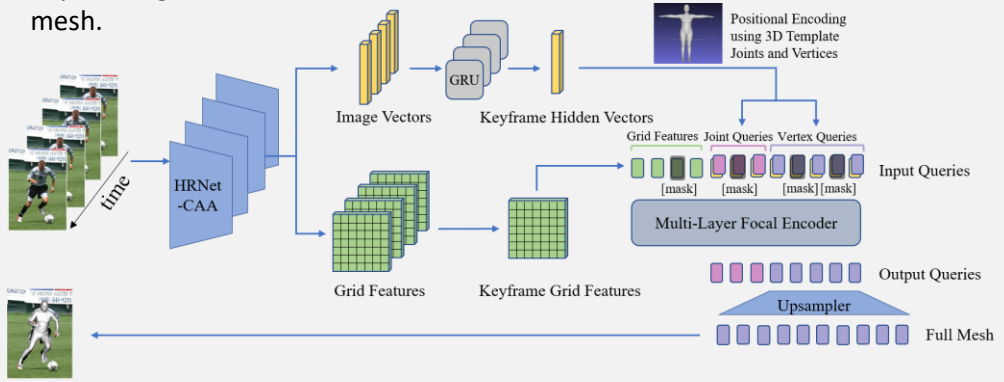
- A new method, FoGMesh, taking the advantage of the focal attention mechanism to model both local and global interactions for 3D human mesh recovery.
- We propose the CAA module that merges multi-scale features and effectively amplifies the attention weights of small-scale body parts.

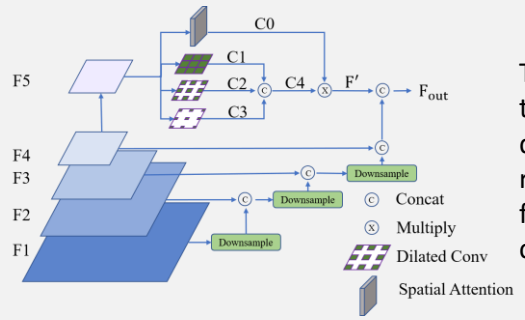
Our Results on 3DPW

Method	3DPW		
	MPVE↓	MPJPE↓	PA-MPJPE↓
HMR	-	-	81.3
SPIN	116.4	-	59.2
RSC-Net	-	96.4	59.0
Pose2Mesh	-	89.2	58.9
VIBE	99.1	82.0	51.9
METRO	88.2	77.1	47.9
Graphormer	87.7	74.7	45.6
Ours	**85.2**	**74.1**	**45.5**

The Proposed Method

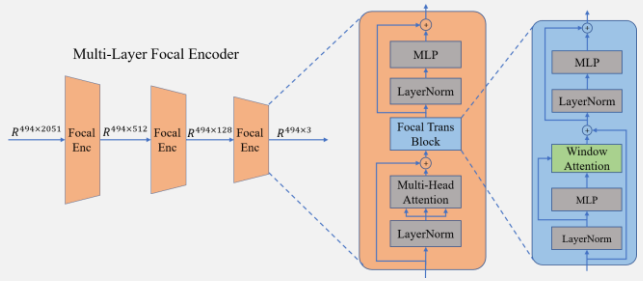
Our framework takes a temporal sequence as input to obtain grid features and global feature vectors using a CNN. The global vectors are fed into the GRU encoder to obtain keyframe hidden vectors. The keyframe grid features and keyframe global vectors are tokenized and fed into the MFE for 3D human mesh.



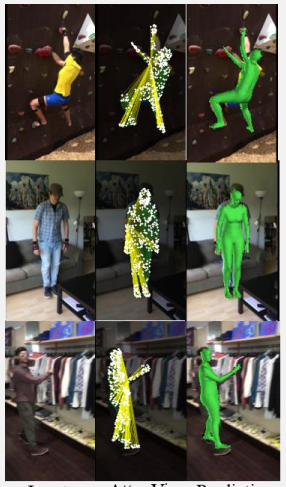


The feature map F5 is processed by the spatial attention module and the dilated convolution with different rates. Multi-scale feature maps are fused through downsampling and concatenating.

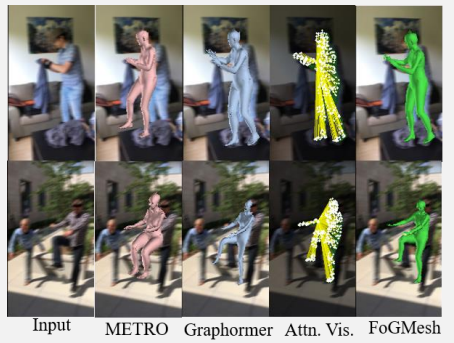
The MFE consists of three focal encoder blocks with the same number of input tokens. We combine fine-grained local and coarse-grained global interaction with the proposed MFE encoder module.



Reconstruction Results



↑ Prediction results on the clear original images



↑ Comparison of prediction results on high-speed motion blurred images

Acknowledgements

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References

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