

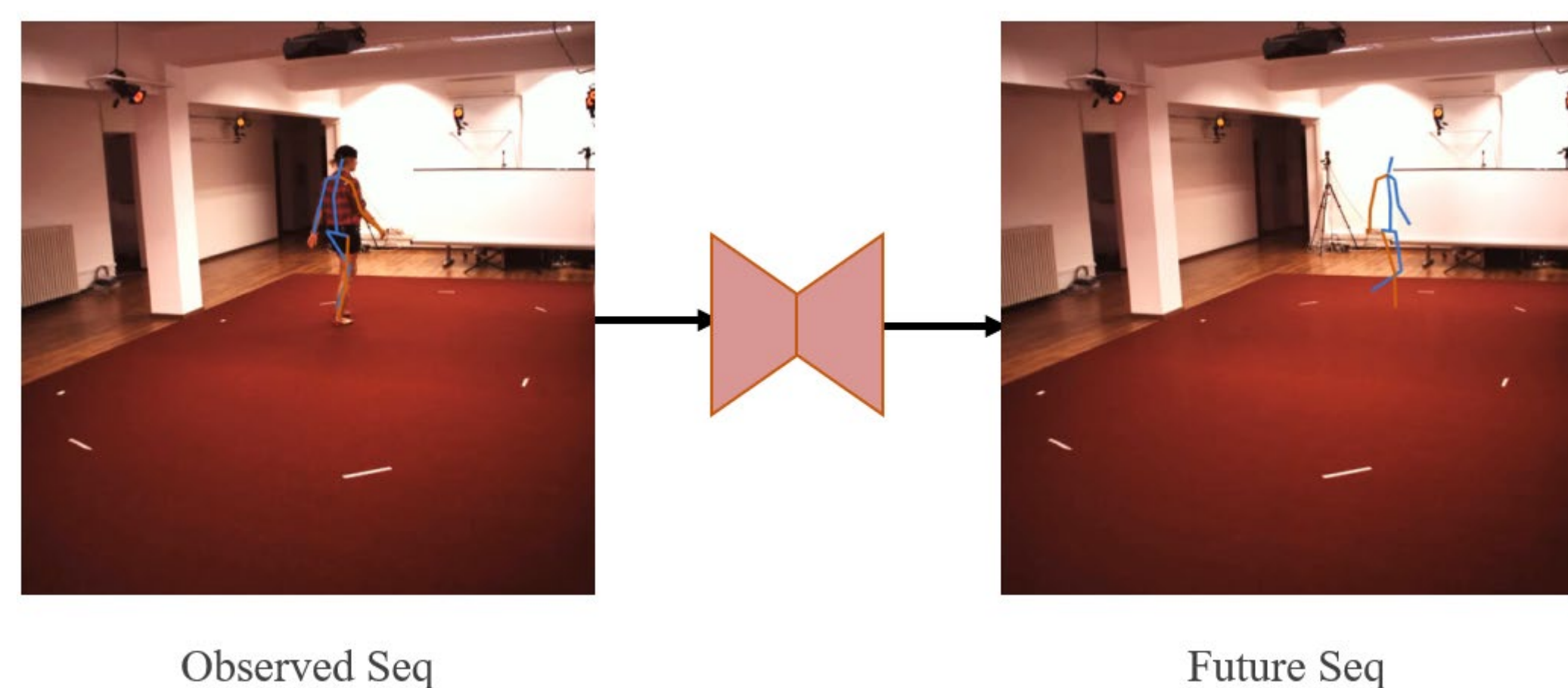
MSR-GCN: Multi-Scale Residual Graph Convolution Networks for Human Motion Prediction

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Background & Motivation

- Human motion prediction is challenging for the **stochasticity** and **aperiodicity** of future poses.
- Graph Convolution Networks (GCNs) is suitable for non-grid graph-structured data like skeleton-based pose sequences.
- One can **stabilize** the motion pattern by gradually **abstracting** body parts in a fine-to-coarse manner.



Contributions

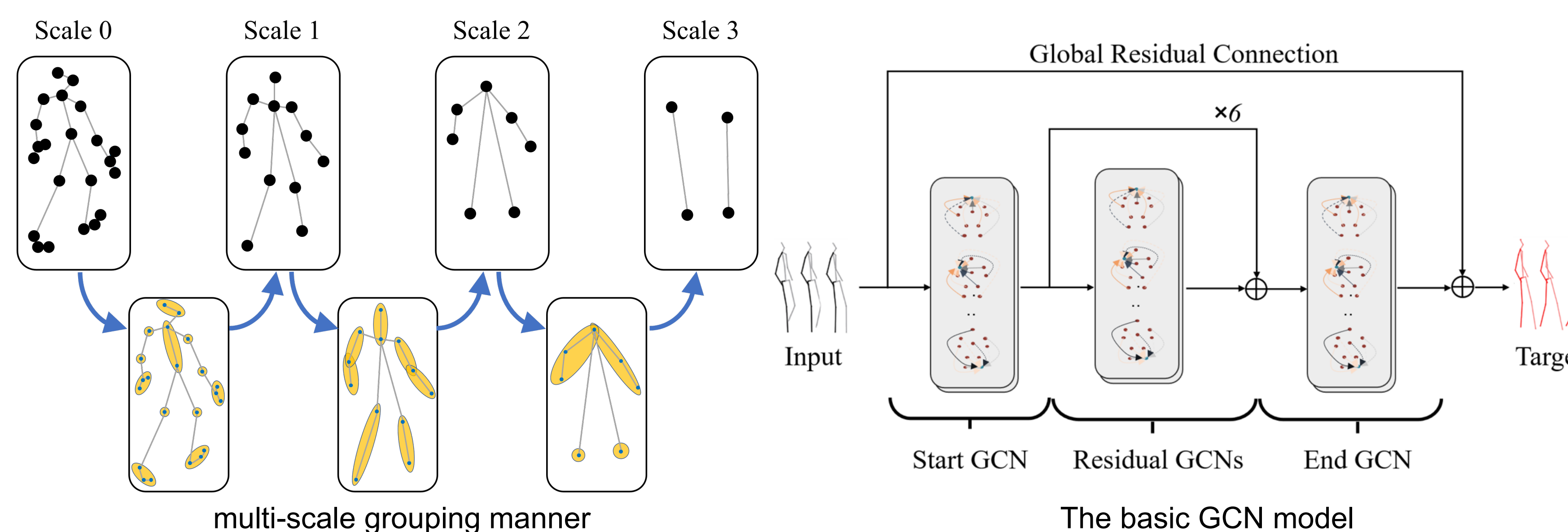
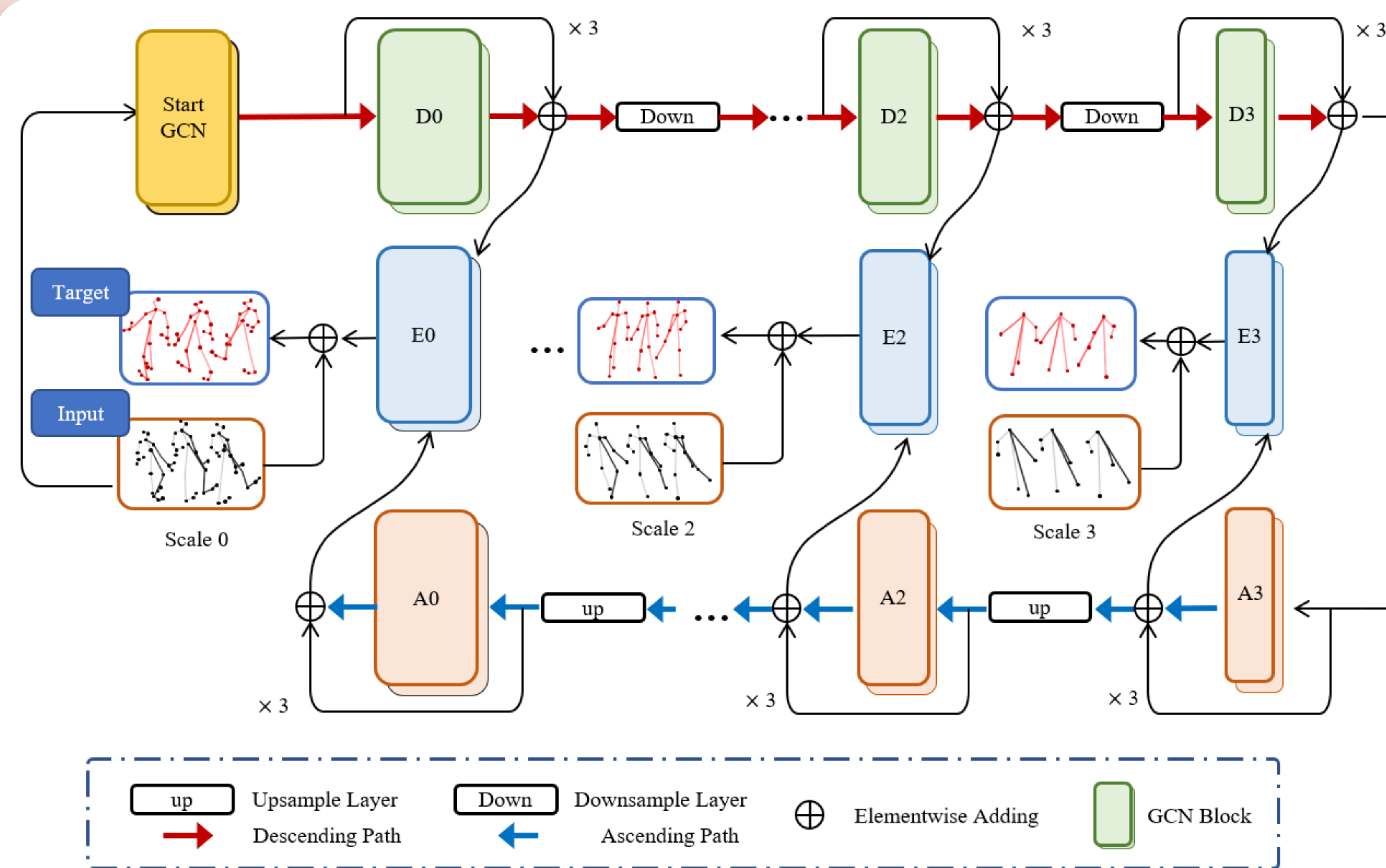
- A novel **multi-scale residual graph convolution network**.
- The **descending** and **ascending** GCN blocks can extract features in both **fine-to-coarse** and **coarse-to-fine** manners.
- The **intermediate supervision** benefiting high-quality future prediction.

Datasets & Metric & Project

- Datasets: Human3.6M, CMU Mocap Dataset
- Metric: Mean Per Joint Position Error (MPJPE)
- Project: <https://github.com/Droliven/MSRGCN>



Proposed Approach



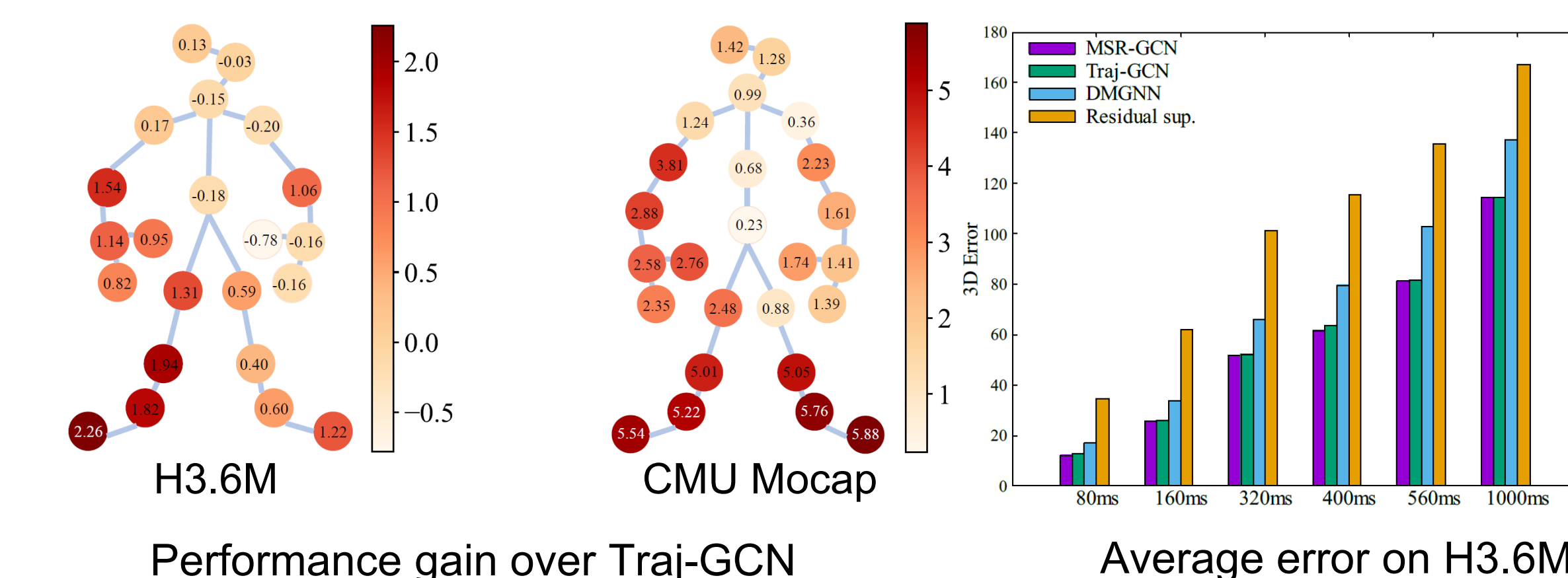
Quantitative Results

Short-term errors on H3.6M

scenarios	walking				eating				smoking				discussion			
	80	160	320	400	80	160	320	400	80	160	320	400	80	160	320	400
Residual sup. [34]	29.36	50.82	76.03	81.51	16.84	30.60	56.92	68.65	22.96	42.64	70.14	82.68	32.94	61.18	90.92	96.19
DMGNN [27]	17.32	30.67	54.56	65.20	10.96	21.39	36.18	43.58	8.97	17.62	32.05	40.30	17.33	34.78	61.03	69.80
Traj-GCN [33]	12.29	23.03	39.77	46.12	8.26	16.90	33.19	40.70	7.94	16.24	31.90	38.90	12.50	27.40	58.51	71.68
MSR-GCN	12.16	22.65	38.64	45.24	8.39	17.05	33.03	40.43	8.02	16.27	31.32	38.15	11.98	26.76	57.08	69.74

Short-term errors on CMU Mocap

scenarios	basketball				basketball signal				directing traffic				jumping			
	80	160	320	400	80	160	320	400	80	160	320	400	80	160	320	400
Residual sup. [34]	15.45	26.88	43.51	49.23	20.17	32.98	42.75	44.65	20.52	40.58	75.38	90.36	26.85	48.07	93.50	108.90
DMGNN [27]	15.57	28.72	50.01	73.05	5.03	9.28	20.21	26.23	10.21	20.90	41.55	52.28	31.97	54.32	96.66	119.92
Traj-GCN [33]	11.68	21.26	40.99	50.78	3.33	6.25	13.58	17.98	6.92	13.69	30.30	39.97	17.18	32.37	60.12	72.55
MSR-GCN	10.28	18.94	37.68	47.03	3.03	5.68	12.35	16.26	5.92	12.09	28.36	38.04	14.99	28.66	55.86	69.05



Qualitative Results

