A Synthetic Data Creation Platform for Daily Activity Recognition of Elderly People

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Introduction

- Increasing the need to develop human-care robot to provide customized services for elderly people

- Increasing the necessity of securing high-capacity data for elderly people in human-care robot learning that understands the information and behavior of the elderly people

  - Due to various constraints, actual data acquisition through elderly people is limited
  - Simulate real environment Increase efficiency of large-scale virtual learning data generation that can cope with various environment/body/motion change by creating virtual environments
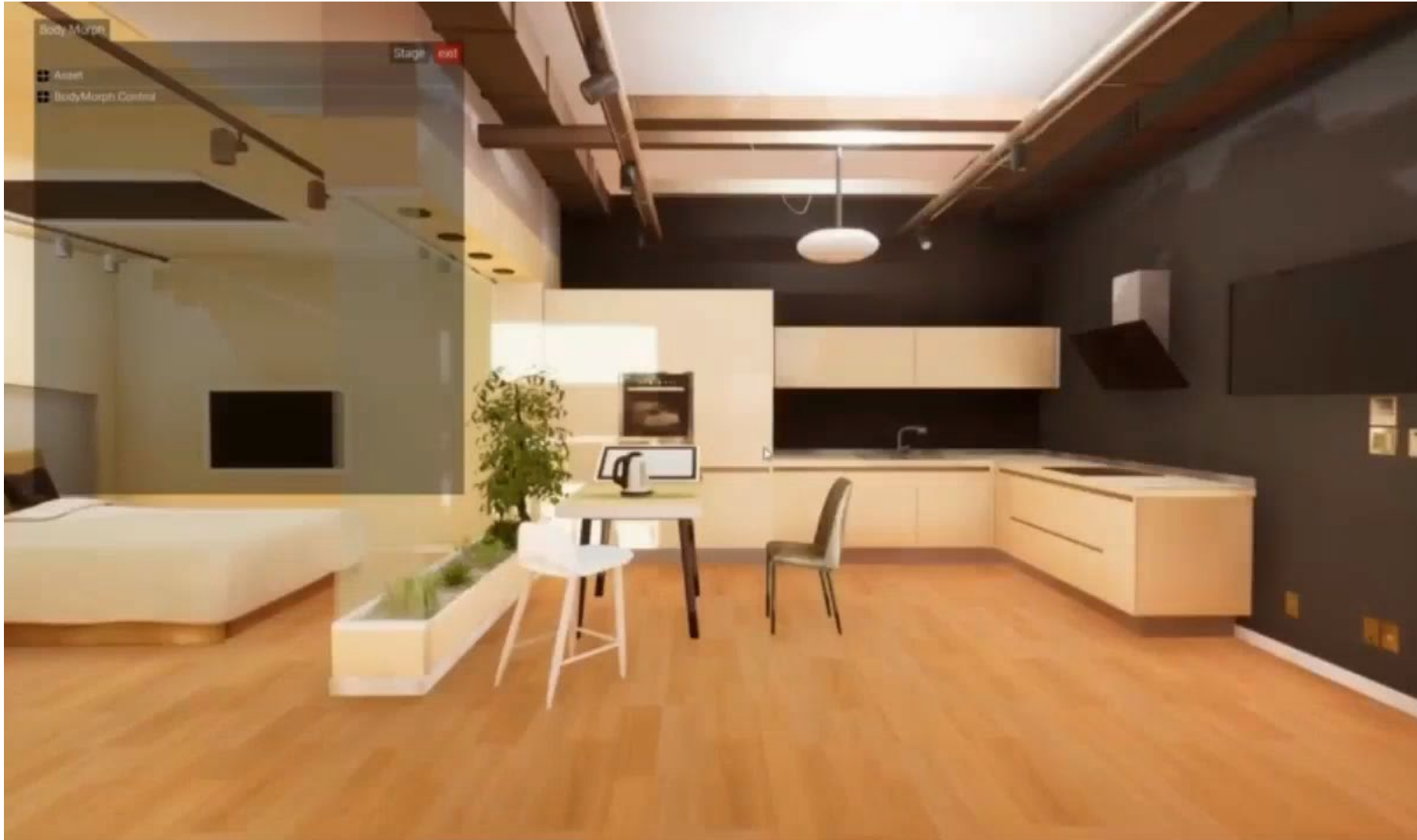
The framework of creating synthetic training data

- Creation customized virtual learning data for motion aware learning
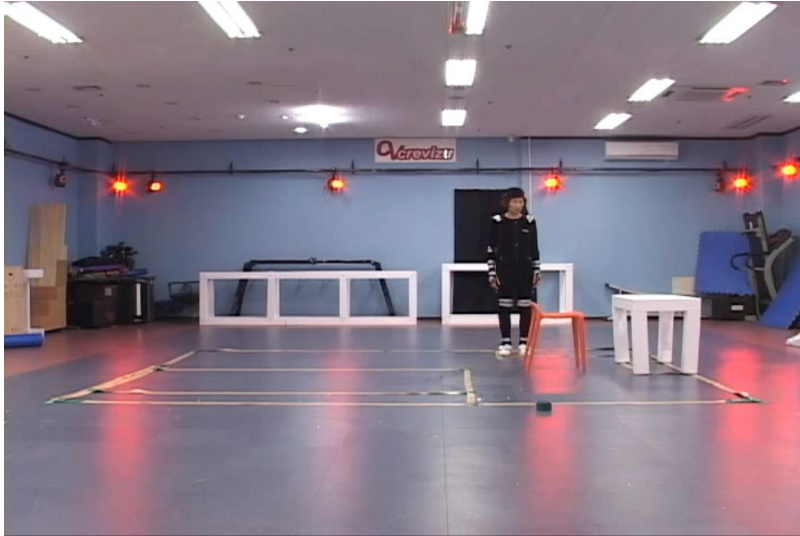- 3D Graphics implementation for lighting, body, and motion changes
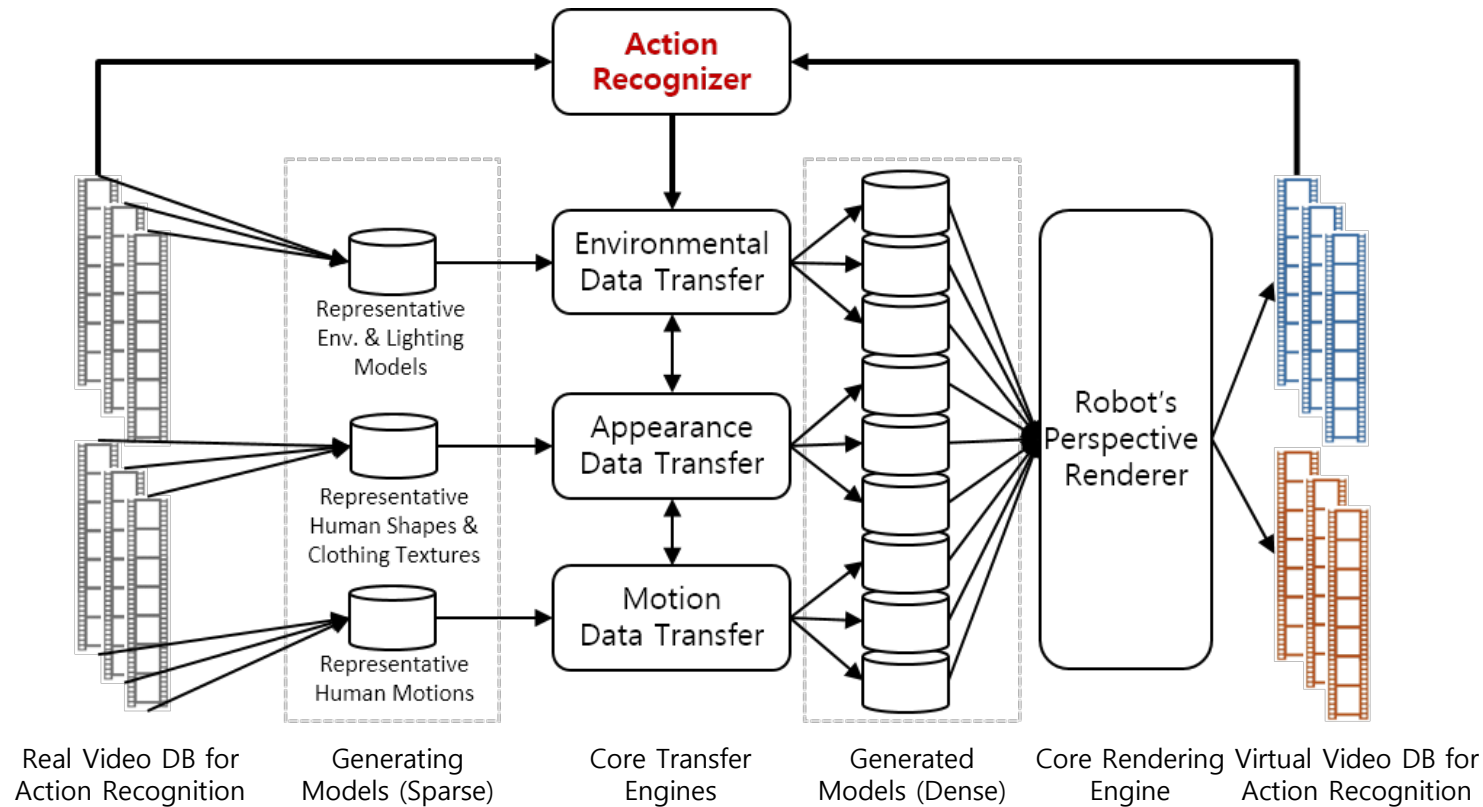
Virtual Environment with Realistic Lights
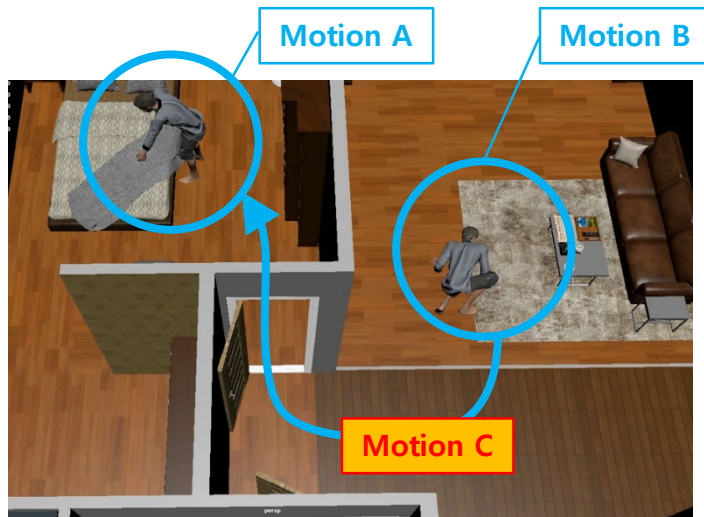
- Virtual Environment Modeling

Motion Capture and Motion Synthesis

- Compare the motion capture data with the data applied to Unreal Engine4

Motion Capture and Motion Synthesis

- Implement motion processing technology (motion blending)
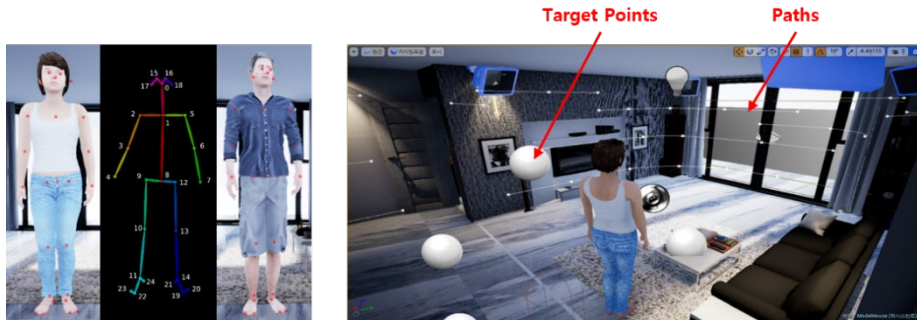

Motion Blending

Body Morphing and Randomized Output

- Body Morphing Implementation

Body Morphing and Randomized Output

- Randomized virtual learning data output

A configuration of joints and randomized views

Experimental Results

Index	Label (18)
1	eat meal/snack
4	drink water
10	brushing teeth
16	brushing hair
18	wear jacket
19	take off jacket
21	wear on glasses
32	reading
34	writing
35	make a phone call/answer phone
36	playing with phone/tablet
39	clapping
40	wipe face
44	nod head/bow
46	handshaking
47	hugging other person
49	hand waving
51	pointing to something with finger

Motion List of experiments using NUT-RGB+D

Table 1: Experimental Results

Model	NTU RGB+D	NTU RGB+D + Synthetic Data
Accuracy	55.6	57.9