

NANYANG
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Markerless Motion Capture of Human Based on Monocular Camera

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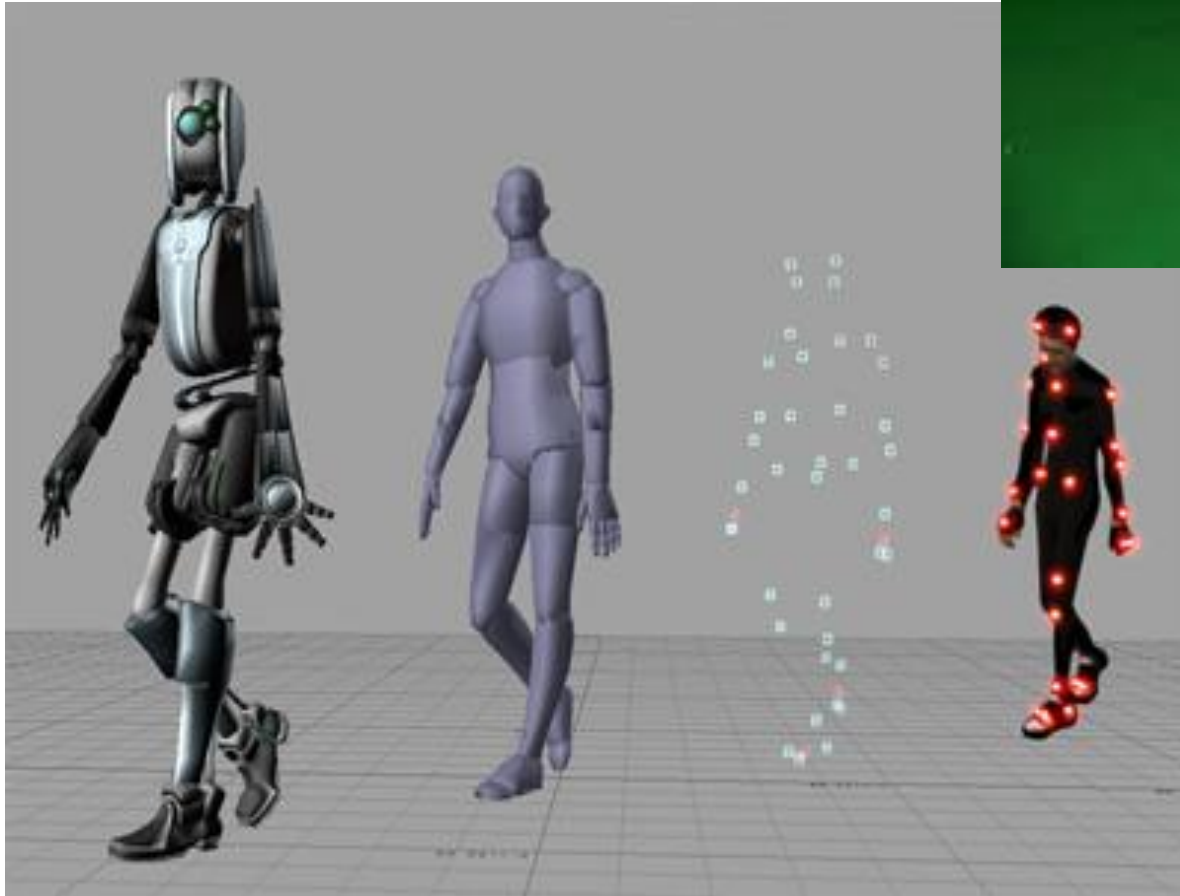
Outline

1. Introduction
2. Motivation
3. Related Works
4. Research Gap
5. Future Plan

Introduction

- Motion capture (MoCap), or motion tracking means the process of translating something (such as human) movement on to some digital representation.

Introduction



Body motion capture

Introduction



Facial motion capture



Hand motion capture

Introduction



Cloth motion capture

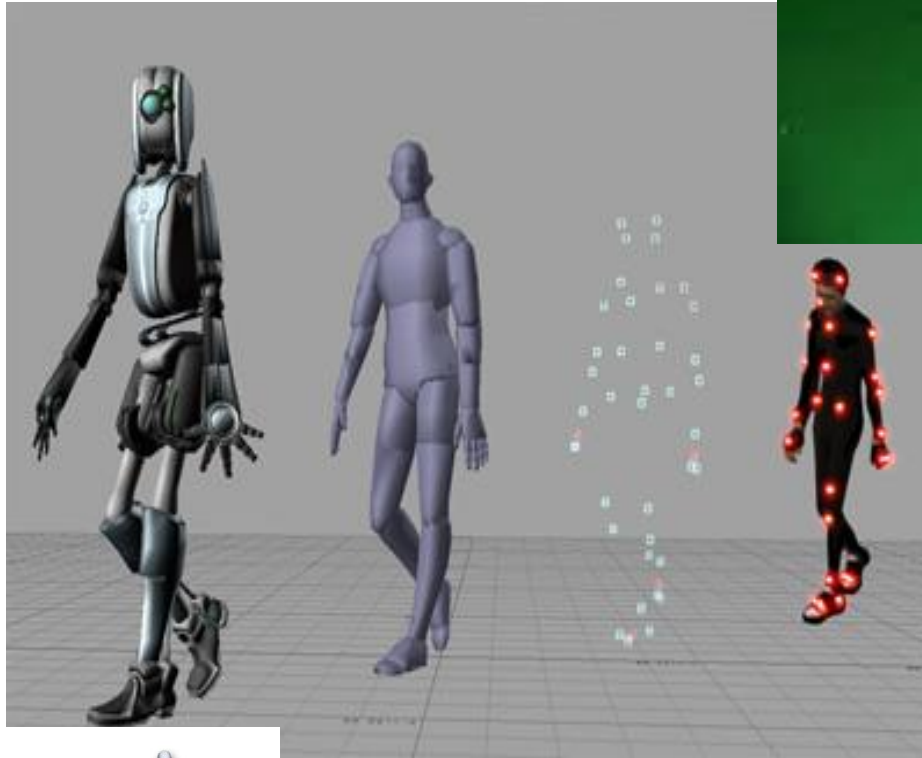


Animal motion capture

Motivation

- Motion capture is used in many application areas, including----
 1. Military
 2. [Film maker](#)
 3. [Entertainment](#)
 4. Human–Computer Interaction (HCI)
 5. Validation of computer vision
- Etc...

Related Works



- Marker-based
- Expensive
- Obtrusive





5 minutes of setup



Performance capture

- Color-based
- ✓ Cheaper
- ✗ Only upper-body
- ✗ Accuracy



Stereo pair with estimated 3D pose

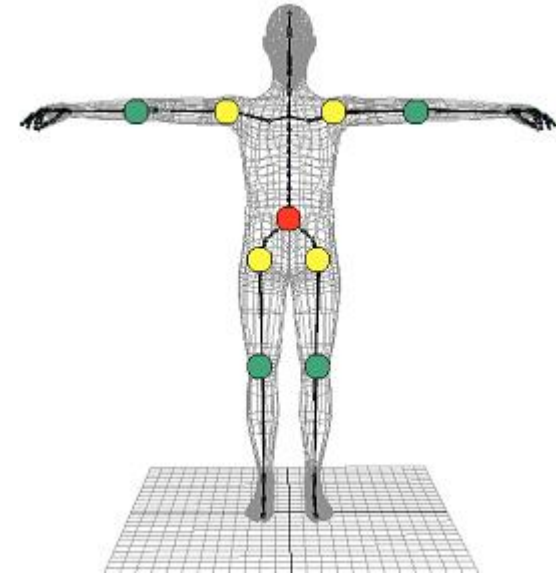
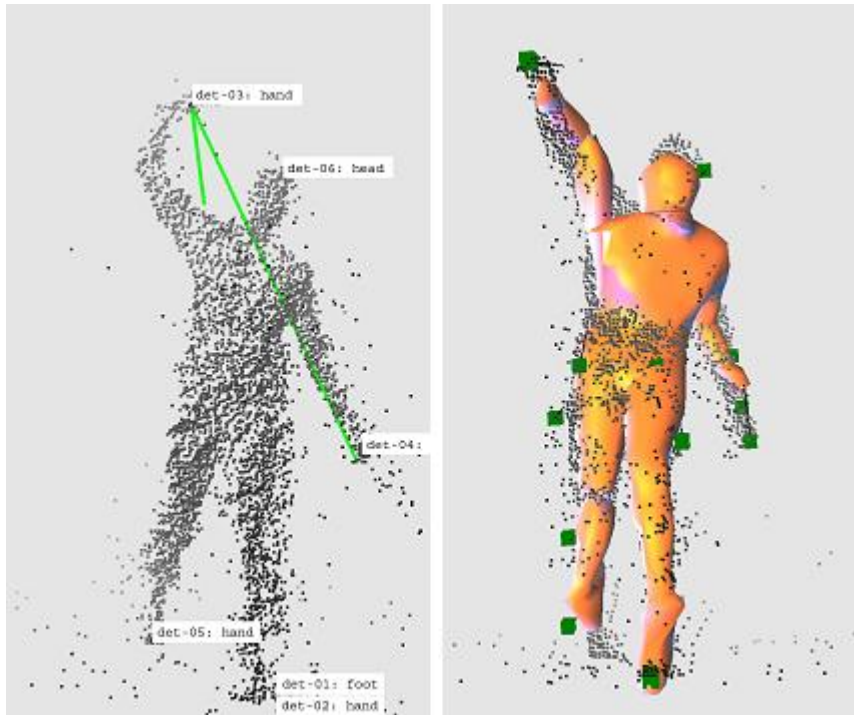
Practical Color-Based Motion Capture

Robert Y. Wang, Sylvain Paris, and Jovan Popović

ACM/Eurographics Symposium on Computer Animation (SCA), 2011



Related Works

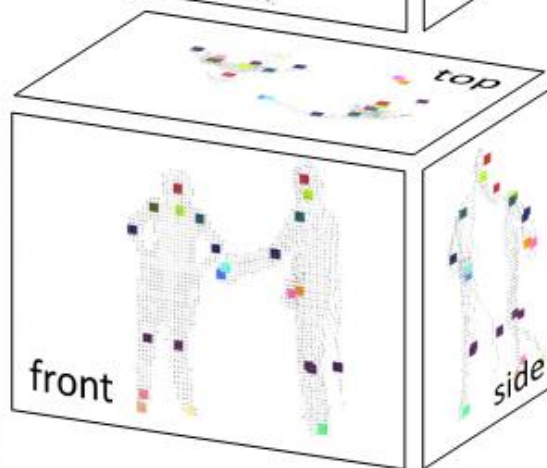
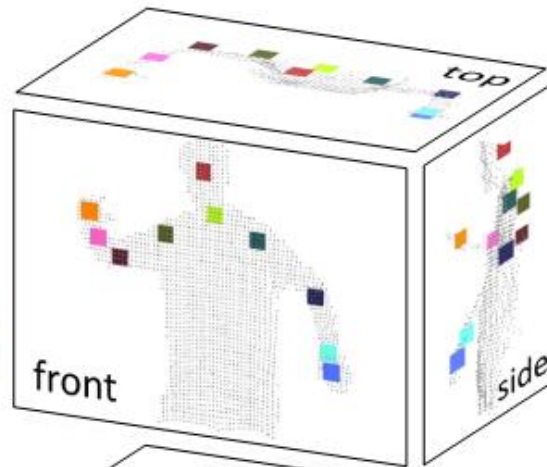
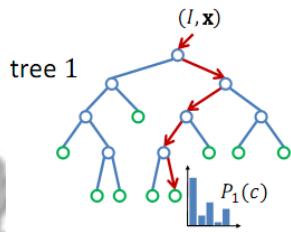


- Model-based
- Slow

Real Time Motion Capture Using a Single Time-Of-Flight Camera

Varun Ganapathi, Christian Plagemann, Daphne Koller and Sebastian Thrun
CVPR 2010.

Related Works



depth image → body parts → 3D joint proposals



KINECT
for  XBOX 360.

- Modeless
- Fast
- Accuracy ~ model-based

Real-Time Human Pose Recognition in Parts from a Single Depth Image

Jamie Shotton, Andrew Fitzgibbon, Mat Cook, Toby Sharp, Mark Finocchio, Richard Moore, Alex Kipman, and Andrew Blake

CVPR, June 2011



Research Gap

- **Speed**

<10 frames per second

- **Accuracy**

error > 5cm

- **Robustness**

- **Cost**

Vicon Marker-based system >SG\$10,000,

Kinect SG\$220,

webcam SG\$10

Future Plan

- **Based on monocular depth camera**

- **Improve accuracy**

improve the accuracy of motion by temporal smoothness and kinematic model.

joint error distance $< 4\text{cm}$

more details about face and hands

- **Improve robustness**

initialization and recovery per-frame

