

Natural Interaction

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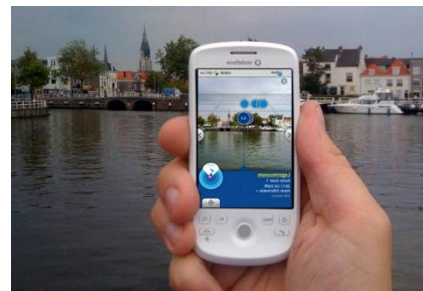
- **Controller-less interaction:
Kinect**



- **Initial brain-computer
interaction: Pong**



- **Mobile online:
Layar**



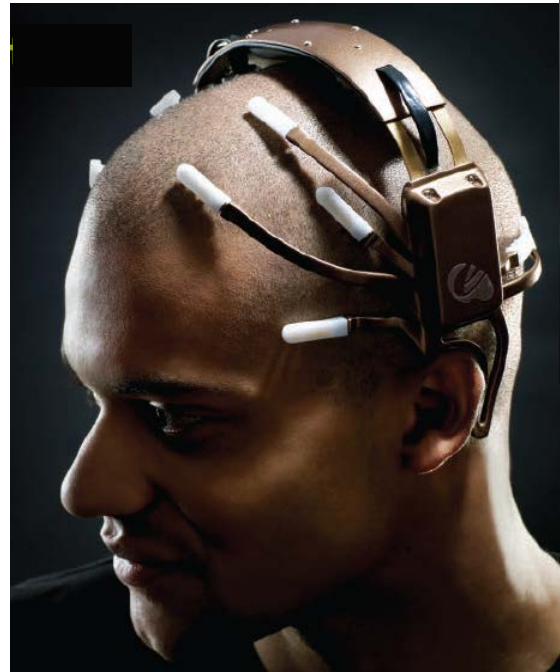
- **Interactive virtual characters:**



- Sensors available everywhere (environment, body, brain)
- Better understanding of perception, cognition, emotion, action

And as a result of this...

- Augmented movement
- Augmented mind
- Virtualizing oneself
- Personalization
- Come as you are



How does GATE fit in?

We have done research on:

- **New interactive character technologies (WP3.1)**
- **Recognizing what the user is doing (WP3.2)**
- **Brain-machine interaction (WP3.3)**

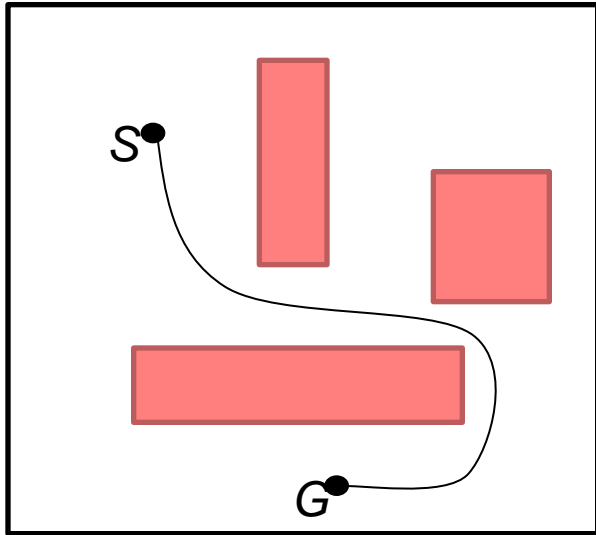
Knowledge transfer projects

- **MotionController** (physics-based character animation) – with Motek Medical
- **VidART** (automatic annotation of human behavior) – with Noldus
- **EIS** (EEG indicators of stress) – with Noldus



Controlling motion

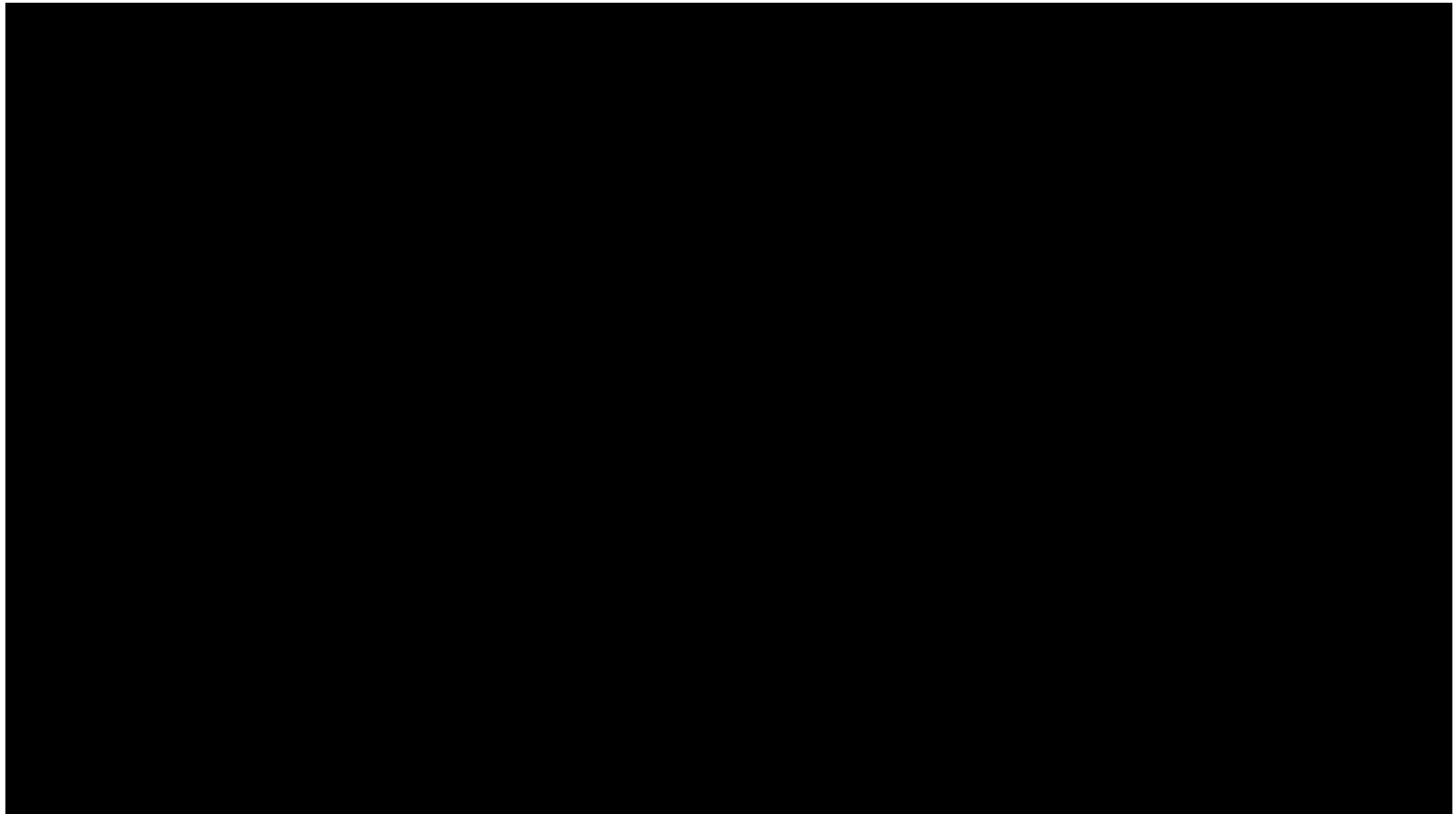
Calculating/planning everything versus using example data





Example 1: footstep-driven motion

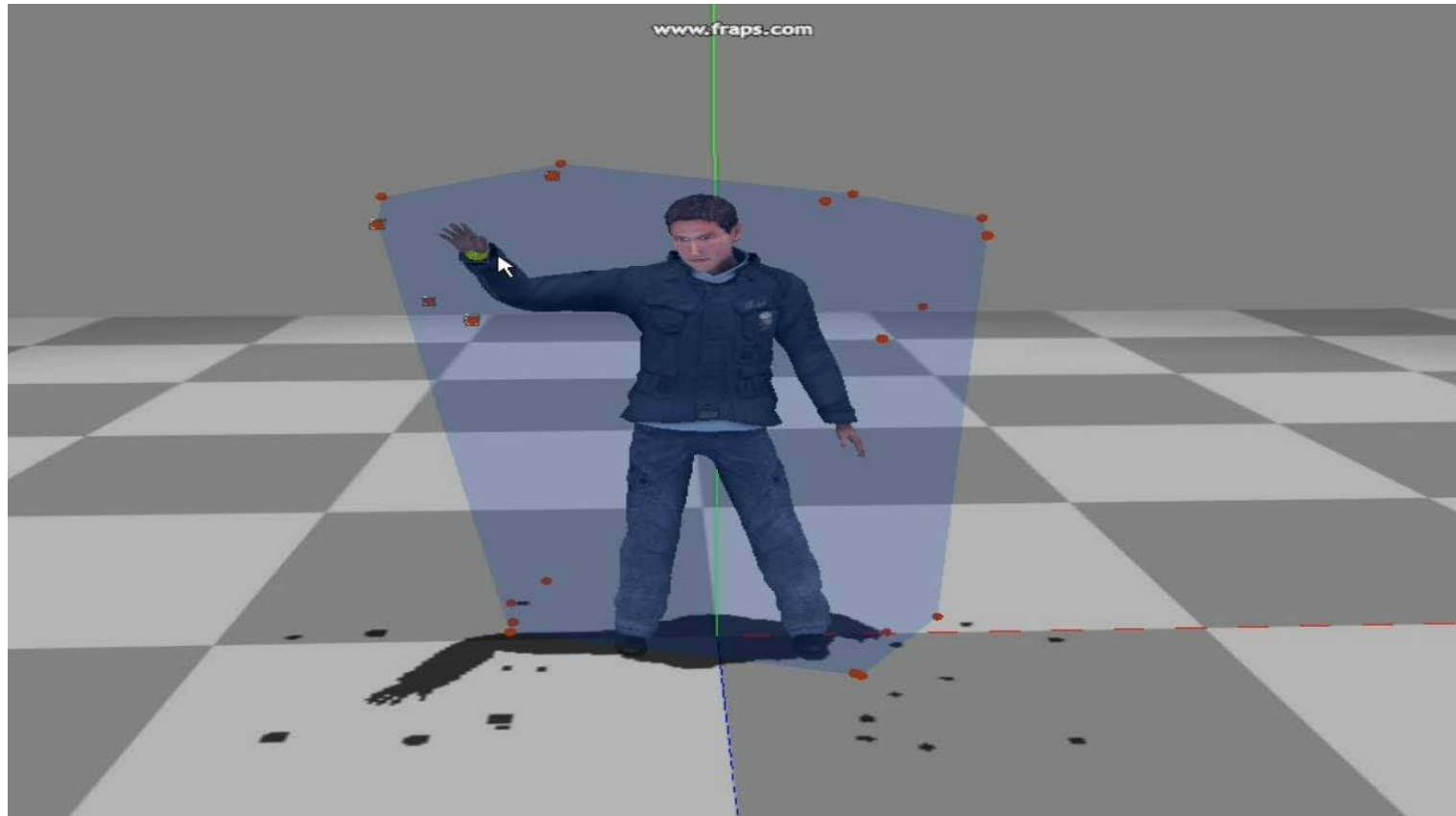
- Given the footstep locations, generate a motion of a character following these steps





Example 2: reaching motions

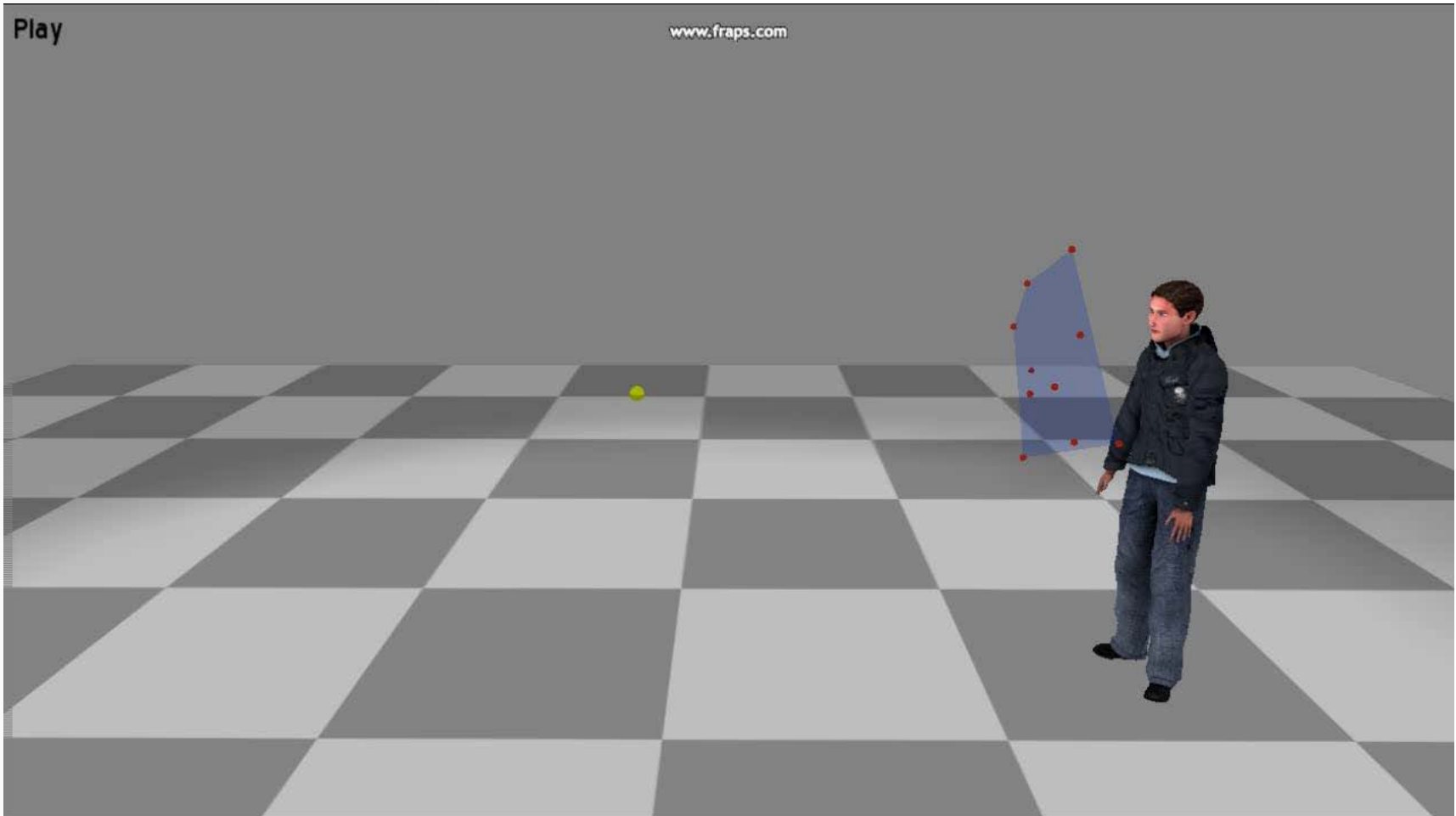
- Parameter is reach position in this case
- Record a few examples, span a parameter space





Combining reaching and walking

Challenge: mapping temporal and spatial information between upper and lower body motions



Challenge: recognize what people are doing!

- **New tracking algorithms**
- **WP3.2**

Goal: develop algorithms for recognizing people actions and interactions based on video data.

Setting: multiple persons, multiple cameras, indoor environment.

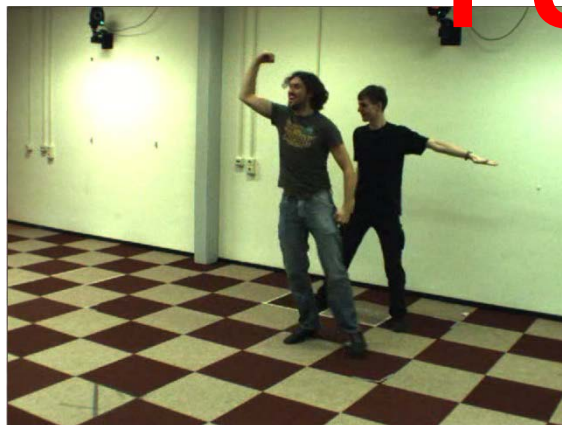
- **Markerless human pose estimation**

Input: Multi-view video sequences captured by calibrated cameras

Output: the person's pose parameters (positions, joint angles etc.)



Pose?



- Multi-person scenario: Intra-person or inter-person occlusions



- Solution:** Find the views see the person best

Example 1: recognizing interactions between people



Shaking hands



Introducing



Pointing



Punching



Waving



Pushing

Example 2: real-time multi-person full body tracking

