

Single-Person and Multi-Party 3D Visualizations for Nonverbal Communication Analysis



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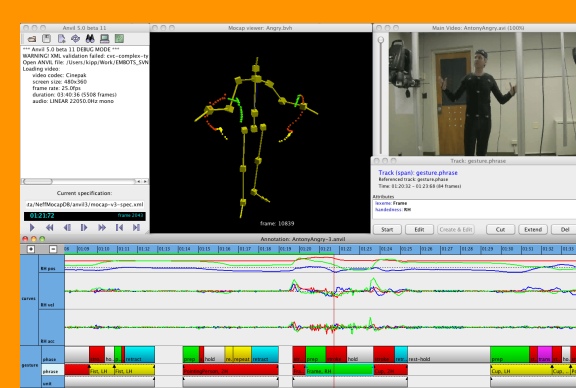
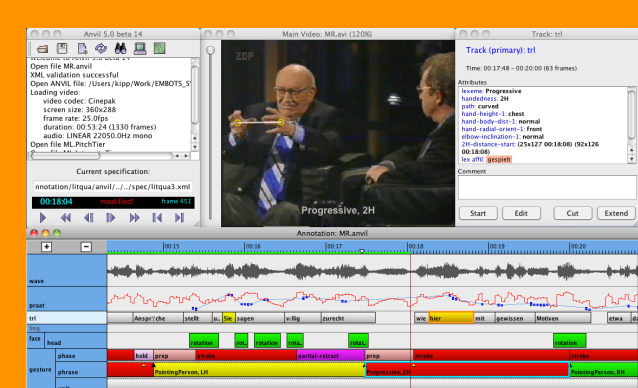
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Introduction

ANVIL is a **free** video annotation research tool

Annotation of events (gestures, words, movements ...) on time-aligned tracks

Visualization of human motion recordings (motion capture) with a **3D viewer**



Goals

Increase **readability** of human motion and multi-party relations in 3D

Make coding more **reliable**

Enhance **qualitative analysis** for

- gesture research
- multimodality research
- sign language research
- social sciences

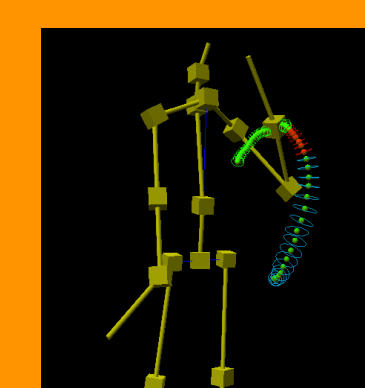
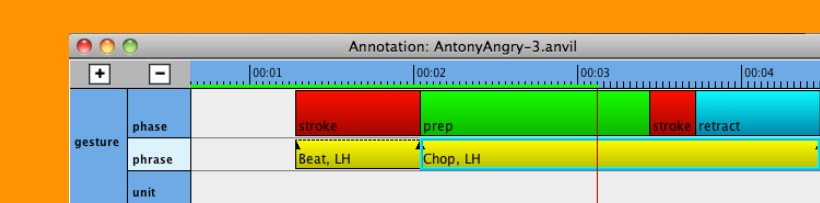
Means

Supportive **3D visualizations**

Correspondence with conventional annotations (color coding)

Objective **numerical measures** (e.g. hand-to-hand distance)

Automatic coding



Single Person

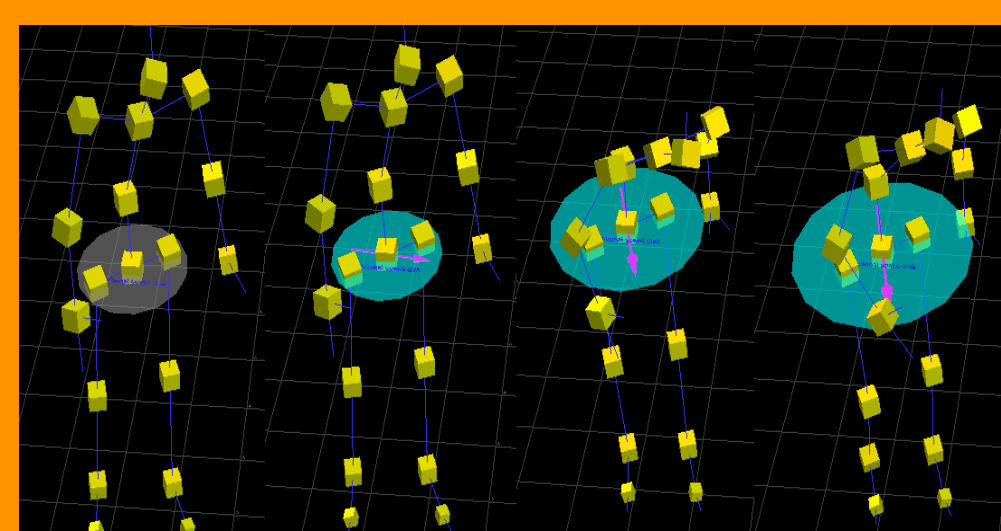
Body Movement

Hip movement

Direction arrow

Speed ~ disc radius

Thresholding / grey = no motion

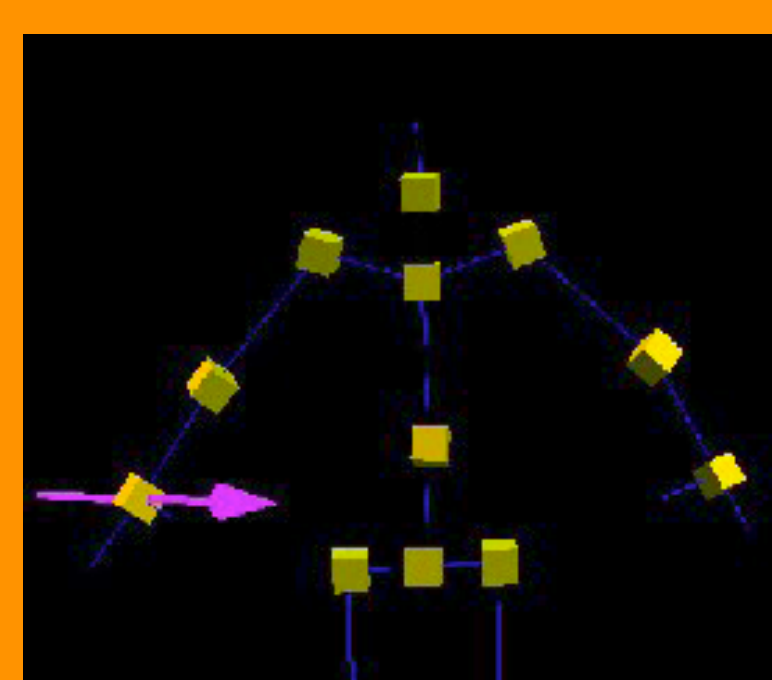


Hand Movement

Hand movement (wrist)

Direction arrow

Speed ~ arrow length



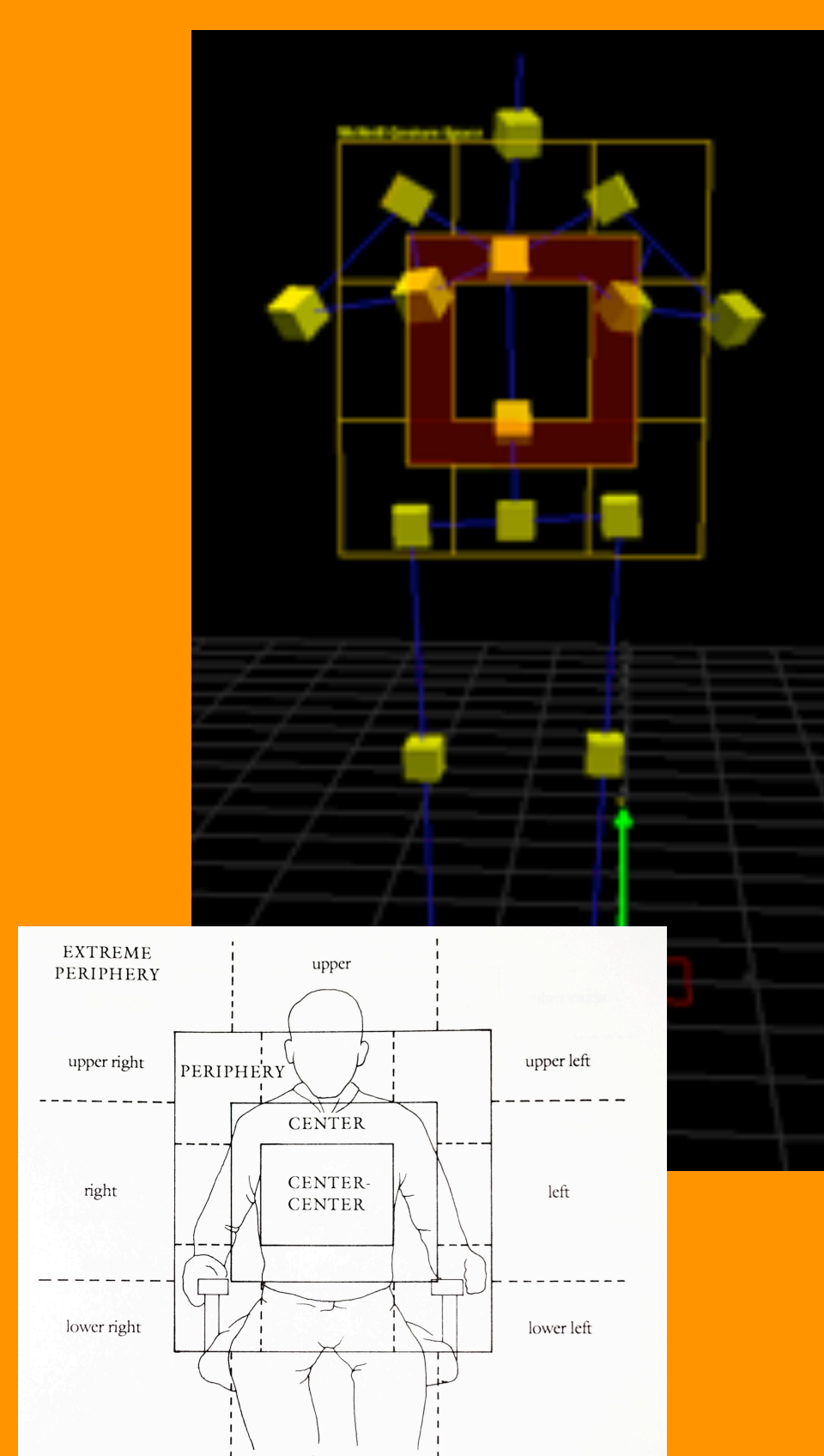
Gesture Space

McNeill's (1992) gesture space (18 sectors in the frontal plane)

Hand(s) in sector => highlighted (RH: yellow, LH: green, 2H: red)

Gesture space follows body

Upper body tilt is ignored



Multi-Party

Distance

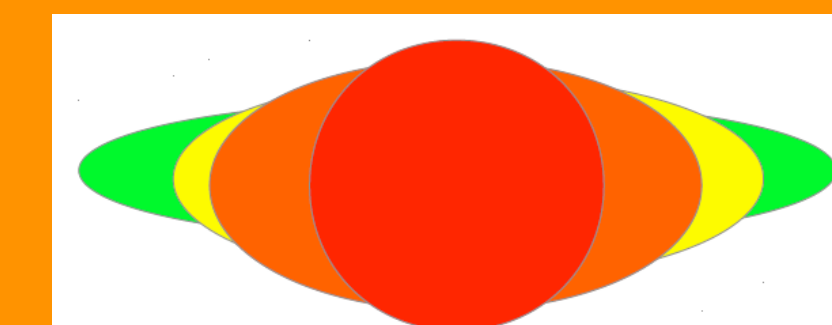
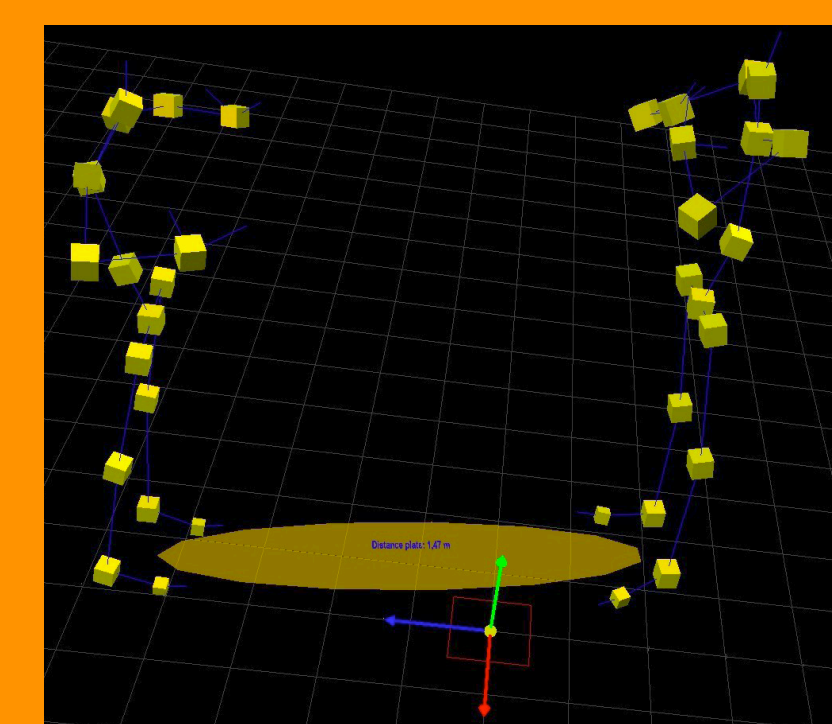
Proxemics: Interpersonal space, defined by distance, is meaningful (Hall, 1966)

Configurable zones (intimate, personal, social, public)

Depicted with an ellipse

ellipse thickness ~ distance

zones color-coded

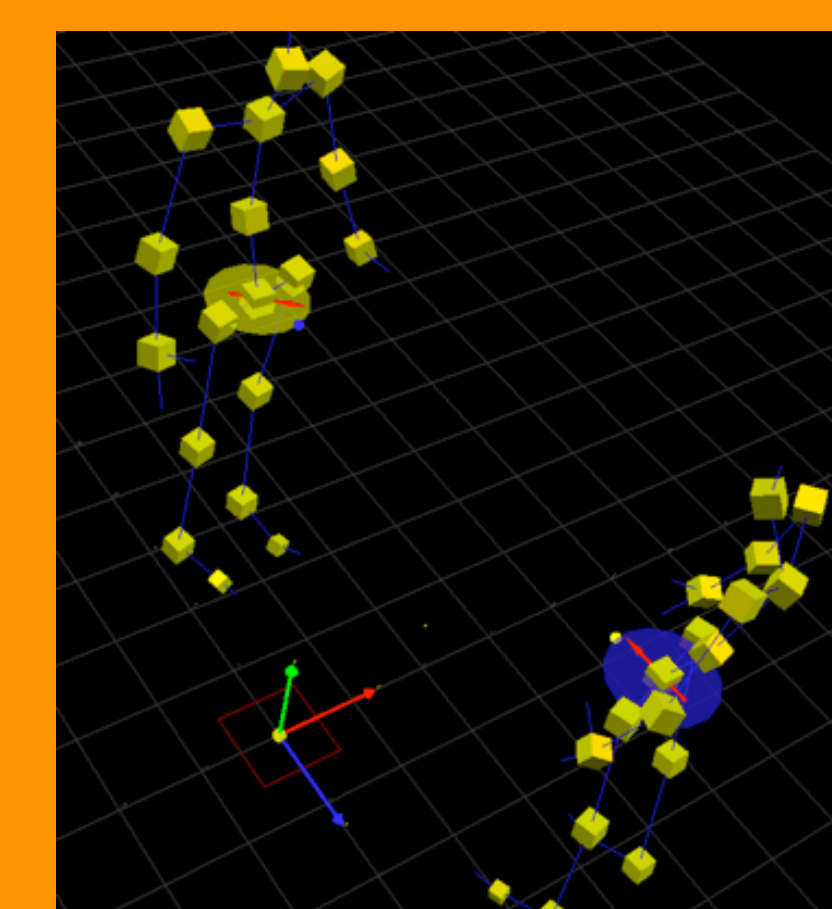


Relative Movement

Is A approaching B, retreating or moving sideways?

Reuse single-person movement visualization (disc & arrow)

Interlocutor's position shown as small dot on disc (like a radar)

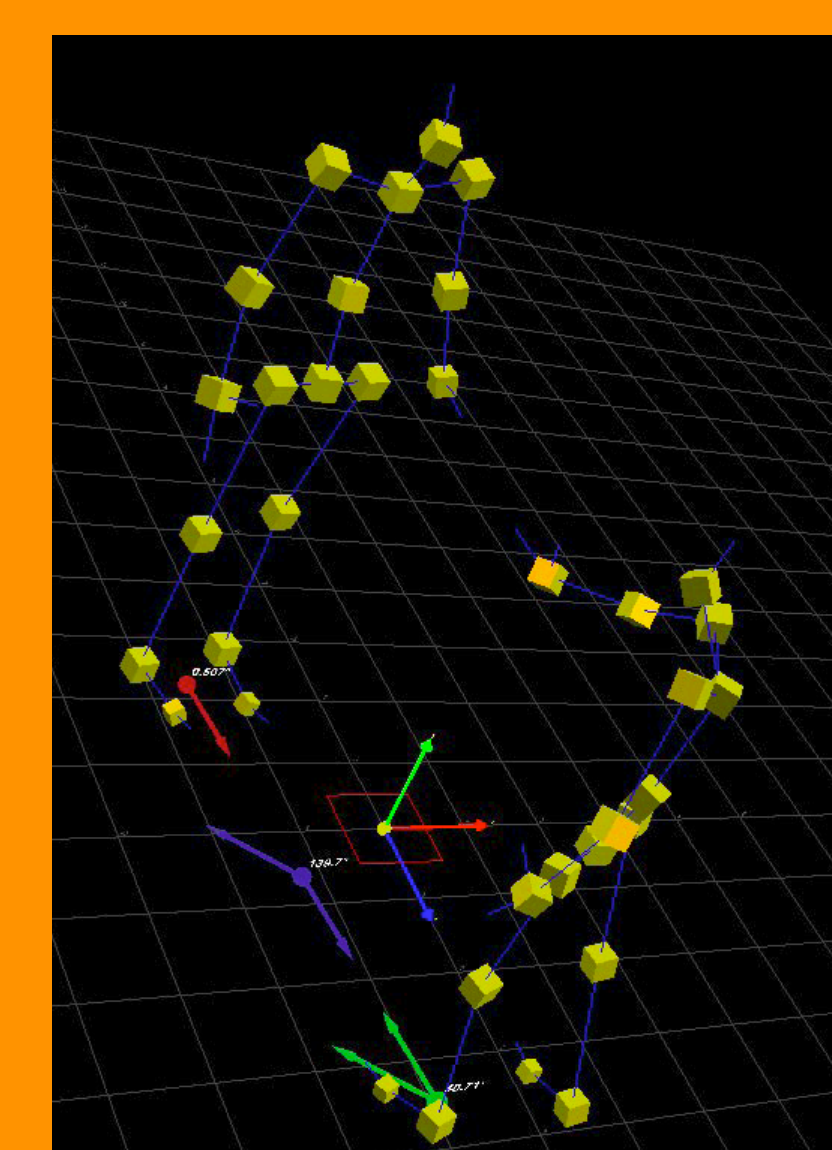


Orientation

People interact in F-formations, defined by orientation (Kendon, 1990)

(1) Individual orientation as divergence from face-to-face direction (at feet)

(2) Common angle between two torso directions (between figures)



Future Work

Evaluation: Do 3D visualizations make coding more reliable?

Versatile video player (VLC, JavaFX)

Automatic Annotation

Modernize GUI technology (JavaFX, 3D, mobile)

References

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