

# Understanding (Arabic) Nonverbal Behavior

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MITRE Sponsored Research

# Problem

- **Nonverbal behavior analysis is critical to understanding others, but is under-utilized:**
  - **Current (limited) sponsor use largely intuition-based**
  - **Relevant scientific knowledge residing in islands of lab-based research, mostly on Western culture**
  - **No standards, little interoperability of nonverbal annotations or analyses**
  - **No clear routes to practical sponsor applications**

# Background

A variety of nonverbals can aid (or impede) understanding

**Pointing**  
(rude in some cultures)



[www.aljazeeraah.info/Islam/Gallery%20of%20news%20pictures/Dec%202002%20news\\_photos.htm](http://www.aljazeeraah.info/Islam/Gallery%20of%20news%20pictures/Dec%202002%20news_photos.htm)



[www.army.mil/operations/oif/images28.html](http://www.army.mil/operations/oif/images28.html)

**Gaze**

**Interpersonal space**  
(differs between cultures)



[www.carlisle.army.mil/usacs/mark](http://www.carlisle.army.mil/usacs/mark)



[www.slate.com/id/2080812](http://www.slate.com/id/2080812)



Right hand over heart is a sign of respect or thanks



Hand is Motionless

Right hand, palm up, fingers touching, means to slow down or be patient.



Quick upward head snap with tongue click means no.

[cryptome.org/iraq-culture.htm](http://cryptome.org/iraq-culture.htm)

**Emblems (cultural-specific meanings)**

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# Objective

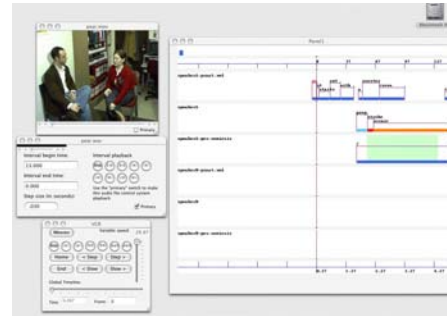
- Provide **enabling technology** for annotating, analyzing, and sharing nonverbal data
- Use the enabling technology to understand and utilize nonverbal behavior from **specific cultures**
  - Start with an Arabic-speaking culture
  - Create, annotate, analyze, and share data

# Activities

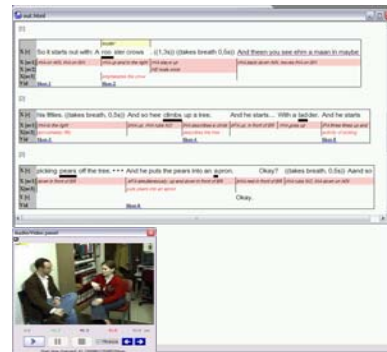
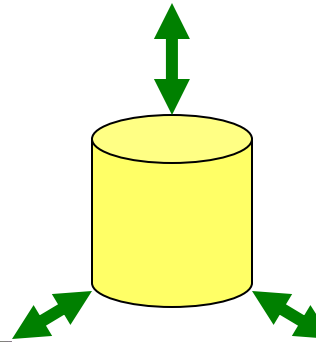
- **Creating interoperability tools and standards so (expensive) data sets can be shared**
- **Creating data sets (videotapes/annotations) of Arabic speakers with sponsor-relevant operational experience**
- **Analyzing research community data sets to glean new understandings (FY08)**
- **Exploring ways to apply findings to sponsor applications**

# Highlight

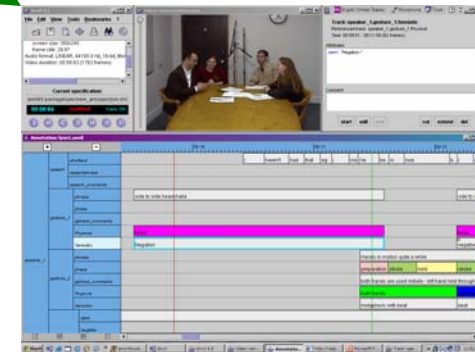
Analysis Tool 1



Interoperability of  
tools for nonverbal  
annotation/analysis



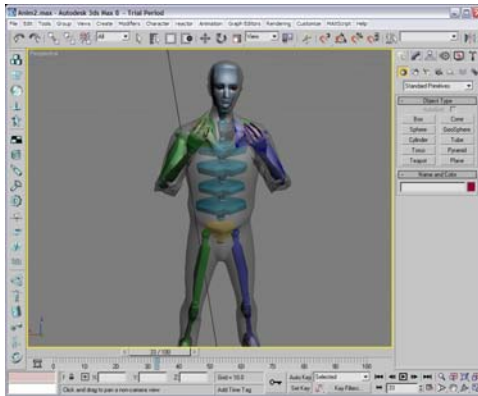
Analysis Tool 2



Analysis Tool 3

# Demonstration

**Social science data for interactive, 3D, context-based scenarios**



**1. 3D skeletal animation is created by hand or with aid of motion capture data**



**2. Textures are applied to provide cultural context**

**3. Game engine provides immersive, interactive environment for scenario-based training and evaluation**



Tactical Language Training LLC's Tactical Pashto

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# Impacts

- **Fill voids in nonverbal behavior research**
- **Catalyze, coordinate research community**
- **Address sponsor priorities for sociocultural data and analysis**
  - **Enable sponsors to go beyond intuition**

# Future Plans

## Automated animation from annotated input

*High-level  
description*



*Low-level  
description*



*Skeletal  
animation*



*Textured  
animation*

<Arabic-culture-slow-down-emblem>

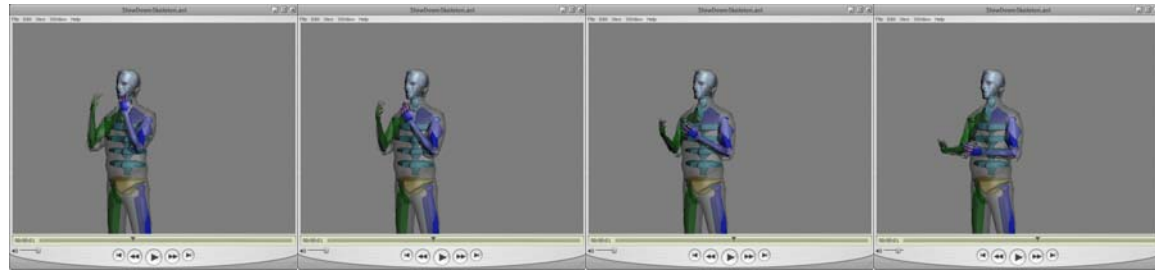
<hands above waist, slightly apart>

<elbows bent>

<fingers pursed>

<hands move down >

e.g. ISO-IEC-19774-HumanoidAnimation



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