An Overview of ViSiCAST

Virtual Signing: Capture, Animation, Storage and Transmission

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ViSiCAST Aims

- Improved access for deaf citizens
- ... information and services
- ... preferred medium is sign language

- Builds on SignAnim and Tessa
ViSiCAST Project

- Extend applications of virtual signing
- Target to natural sign languages
  - BSL (British Sign Language) rather than SSE (Sign-Supported English)
- Improve animation technology
  - increasingly natural avatars
  - easier but more accurate sign capture
ViSiCAST Partners

- ITC, UK: Project coordination
- IRT, Germany: Broadcast technology
- TeleVirtual, UK: Virtual humans
- IDGS, Hamburg, Germany: Sign language notation
- UEA, Norwich, UK: Language processing, Speech, and Image
ViSiCAST Partners

- INT, Paris, France: Animation standards
- IvD, Netherlands: Multimedia content creation
- Post Office, UK: Interactive dialogue systems
- RNID, UK: Monitoring and evaluation
ViSiCAST Structure

- Applications
  - WWW
  - Transactions
  - Broadcast
  - Language
  - Animation

- Enabling Technologies
Multimedia and WWW Applications

- Adding signing services to multimedia
  - improves access to information
  - enhances communication for deaf people

- Browser plugin
  - accurate signing of prepared content
  - simplistic translation of general text
  - Gesture Markup Language (GML)
Face-to-Face Transactions

- Post Office, Advice Services, Shops
- More flexible speech recognition
  - "Do you want first or second class postage?"
  - "First or second?"
- Dialogue between customer and clerk
  - recognition of a very few signs
  - translation to text or speech for clerk
Television and Broadcast

- Developing transmission technology
  - virtual signer in set-top boxes
  - transmission of signing through GML

- Incorporation in emerging standards
  - Multimedia Home Platform (MHP) in DVB
  - face and body animation through MPEG-4
  - GML within Multimedia Content Description Interface of MPEG-7
Language and Notation

- UEA, Norwich and IDGS, Hamburg
- Translate English text to European sign language
  - BSL, DGS, SLN
- Define Gesture Markup Language
  - an XML-compliant notation for gestures
English to Signing

- Translation via DRS
  - Discourse Representation Structure

Diagram:
- English
- DRS
- BSL (UK)
- DGS (Germany)
- SLN (Netherlands)
English to Signing

- Morphology: "phonemes" for signs
  - hand shape
  - hand orientation
  - position in "signing space"
  - movement

- Directional Verbs
  - I give X to you
  - You give X to him
GML Notation for Signing

- Hamburg Notation System
  - HamNoSys
  - Code for hand shape and orientation, location, and movement

- Gesture Markup Language
  - XML Compliant (W3C standards)
  - Builds on HamNoSys
GML Notation for Signing

- **Gloss level**
  - GIVE_BOOK_I_YOU
  - code for a complete sign
  - similar to SignAnim and Tessa approach

- **HamNoSys level**
  - encodes sign “phonemes” as in HamNoSys

- **Articulation level**
  - represents captured or synthesised motion
  - encodes arbitrary gestures
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<!DOCTYPE gml SYSTEM "gml.dtd" >
<gml>
  <avatar url="Tessa.ava" id="A" alt="Tessa" />
  <sign gloss="TO-AND-FRO">
    <hamnosys>
      <righthandgesture>
        <handshape form="fist" thumb="across" />
        <handlocation where="shoulder" offset="rightOf"/>
        <handorientation extfinger="upN" palm="down"/>
        <movement direction="horW" repetitions="repeat1" repeatmode="fromstart" />
      </righthandgesture>
    </hamnosys>
  </sign>
</gml>
Animation & Modeling

Overview of the ViSiCAST Project

Sanja Rankov
Mark Wells
Motion Capture, Calibration and Display System

Computer System

“care for”
Motion Capture, Calibration and Display System

Computer System

Weather Forecast
Motion Capture, Calibration and Display System

Computer System

Weather Forecast
Post-processing

- Motion data decomposed into individual recorded signs
- Signs are blended and played back through an avatar that can sign a sentence

Improvements for GML driven player

- Identification of basic physical avatar features
- Development of methods for generation of realistic gestures
ViSiCAST: Conclusion

- Ambitious three-year project
- Novel computational linguistics work to generate and represent signing
- Advanced avatar technology for signing virtual humans
- Access to services for deaf citizens