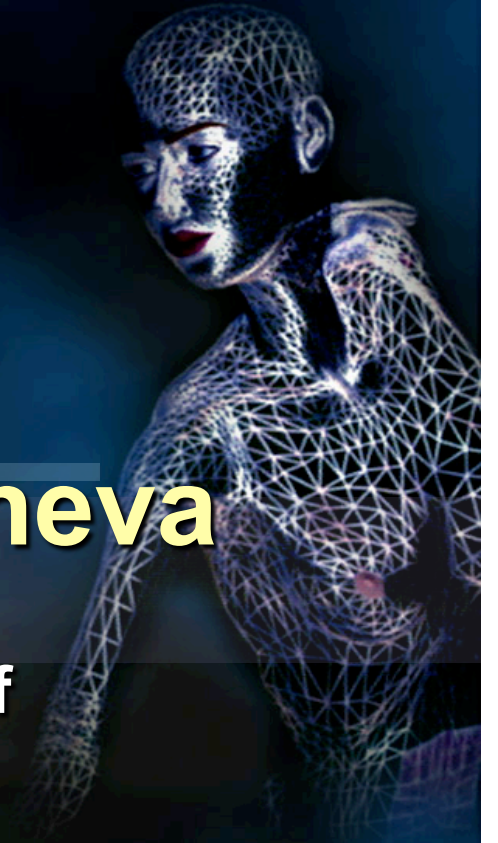


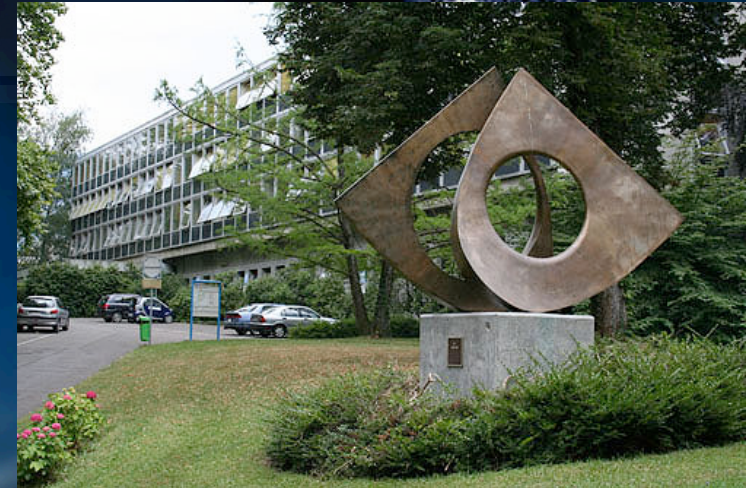
MIRALab, University of Geneva

Presentation at the ERCIM e-Mobility Kick-Off



MIRALab

- Founded in 1989
at the University of Geneva
- Director:
 - Prof. Nadia Magnenat-Thalmann
thalmann@miralab.unige.ch
- Team of
 - 6 post doc and senior researchers
 - ~30 researchers and PhD students
 - ~20 MSc students



- A pluridisciplinary lab working on virtual human simulation and virtual worlds



Collaborative virtual environments

Facial animation

Medical simulation Mixed realities

Motion capture

Virtual clothing

Graphics standardization

Virtual heritage

Hair simulation

Web 3D

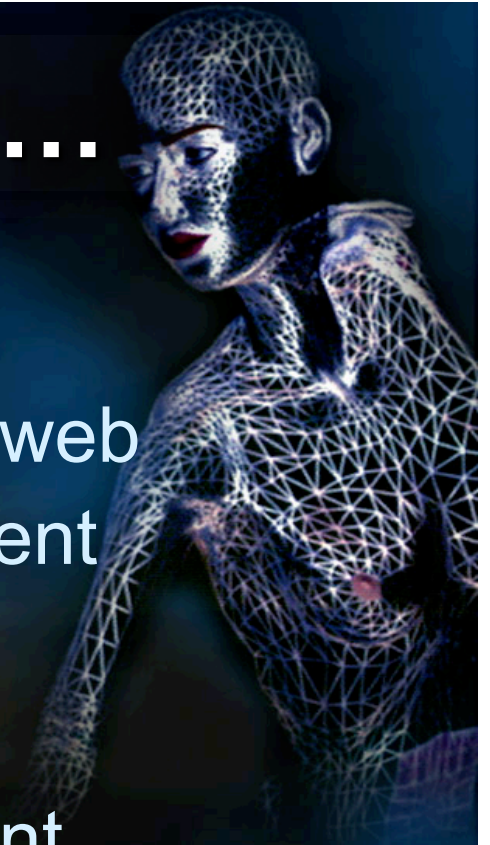
Body animation

Personality and emotion simulation

Multidevices platform (PDAs & cellphones)

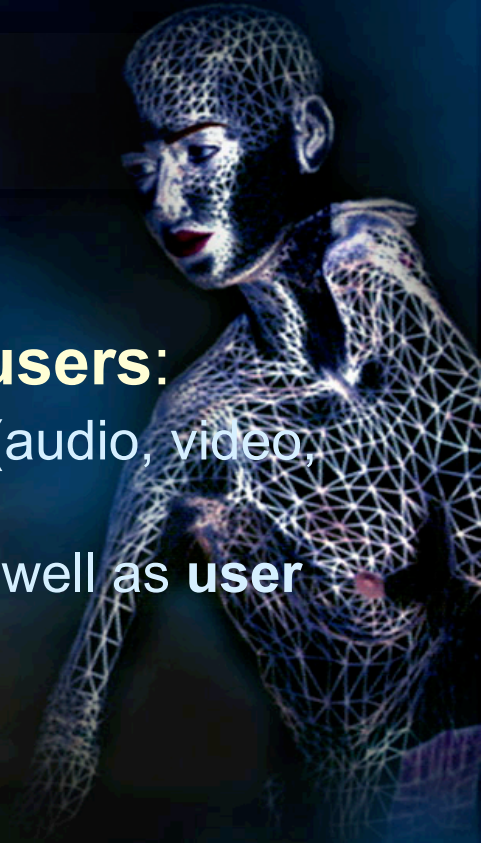
Some EU research projects...

- On content for networked scenarii
 - InterFace → facial animation for the web
 - SoNG → automatic streamable content production
- On mobile applications
 - ISIS → intelligent scalability of content
 - **DANAE** → dynamic and distributed adaptation of content
 - Coordination of **INTERMEDIA** → dynamic networking, wearable interfaces, and scalable multimedia content



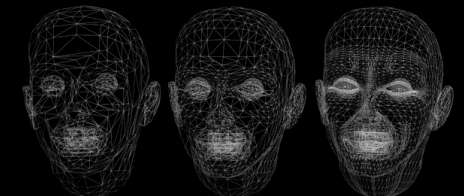
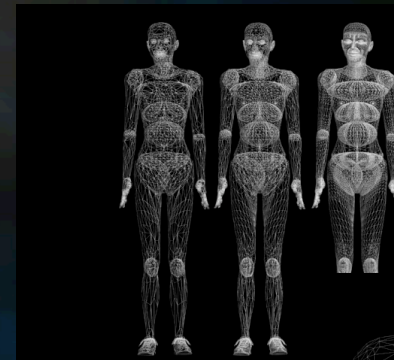
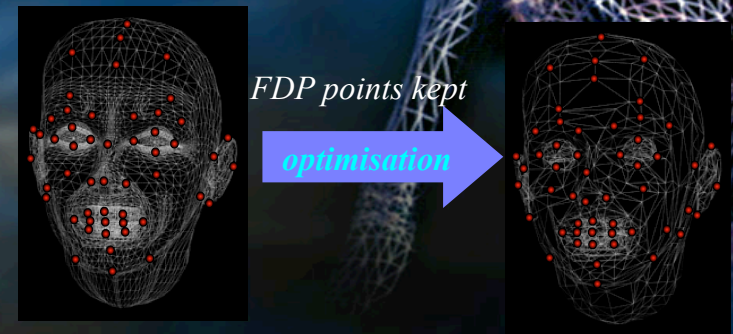
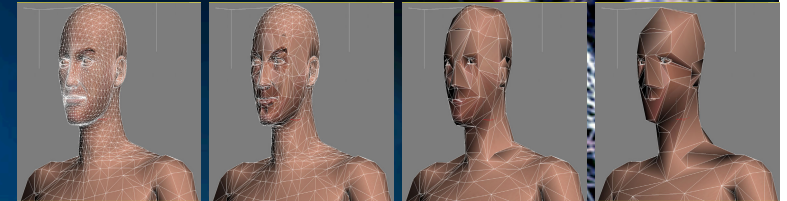
DANAE Project

- **Offering dynamically and automatically to users:**
 - **Optimum quality regarding** the nature of media (audio, video, graphics, virtual characters)
 - Under **any network** and **terminal constraints** as well as **user preferences**.
- **Research innovations**
 - Scalable 3D modeling
 - Scalable 3D and 2D facial animation
 - Scalable 3D body animation
- **Technical achievements**
 - Network and MPEG platform integration
 - Implementation of new plugins and tools
 - Specific content design and authoring



DANAE innovations

- Multi resolution representation
 - Ready to be adapted meshes
 - Clustered representation
 - Low-cost adaptation
 - Easy for hardware acceleration
 - Reduced amount of data
 - Scalable procedural textures
- Key feature preservation
 - For animation of low resolution
 - Control points for facial animation
 - Near-joint vertices for body animation

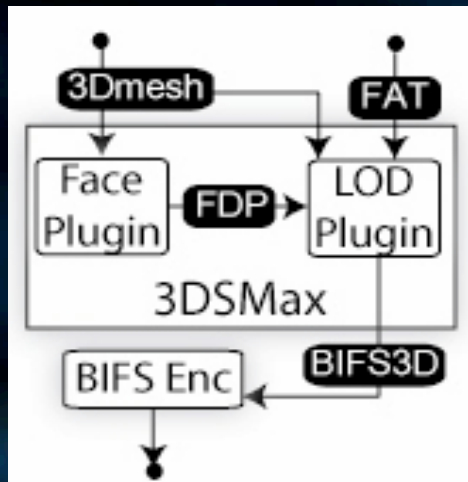


DANAE innovations



- 3D animated human on PDA

- Statically adapted mesh and body animation



- Additional media (audio, images, slideshow)

Danae

MIRALab
Where research means creativity

3D Statically Adapted Body on PDA



DANAE innovations

■ Facial Animation

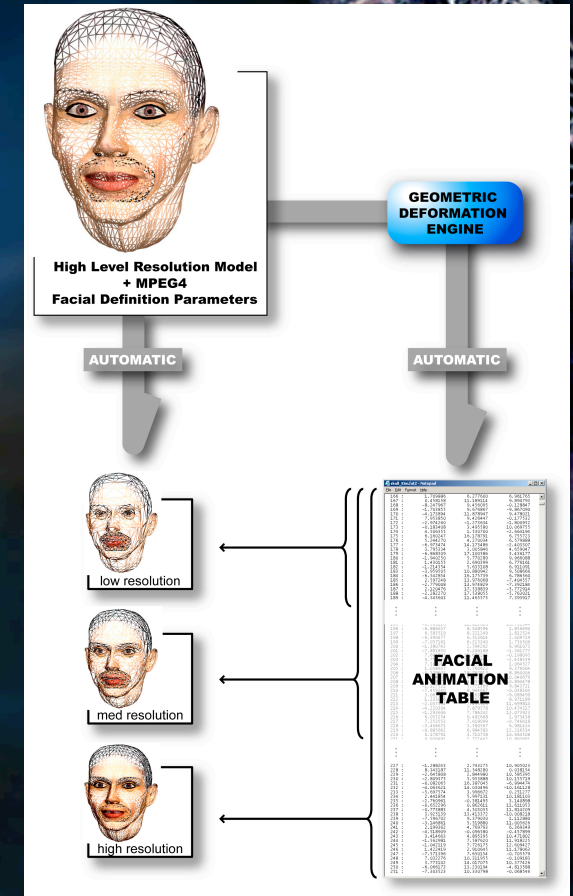
▫ Generation of multi-modal speech

- Multiple languages (english, dutch)
- Coupled with Text-To-Speech and/or SpeechRecognizer

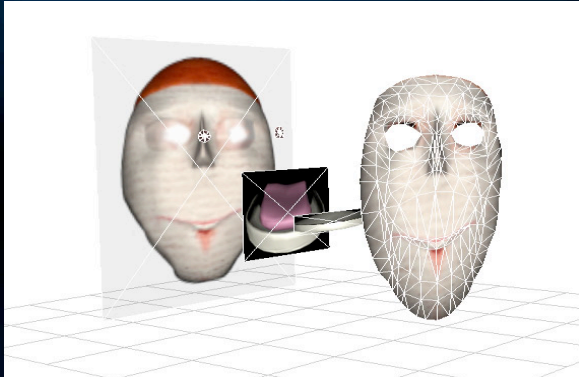
▫ Scalability mechanisms

- Adaptive Deformation Tables
- Scalable FAP
- FATInterpreter

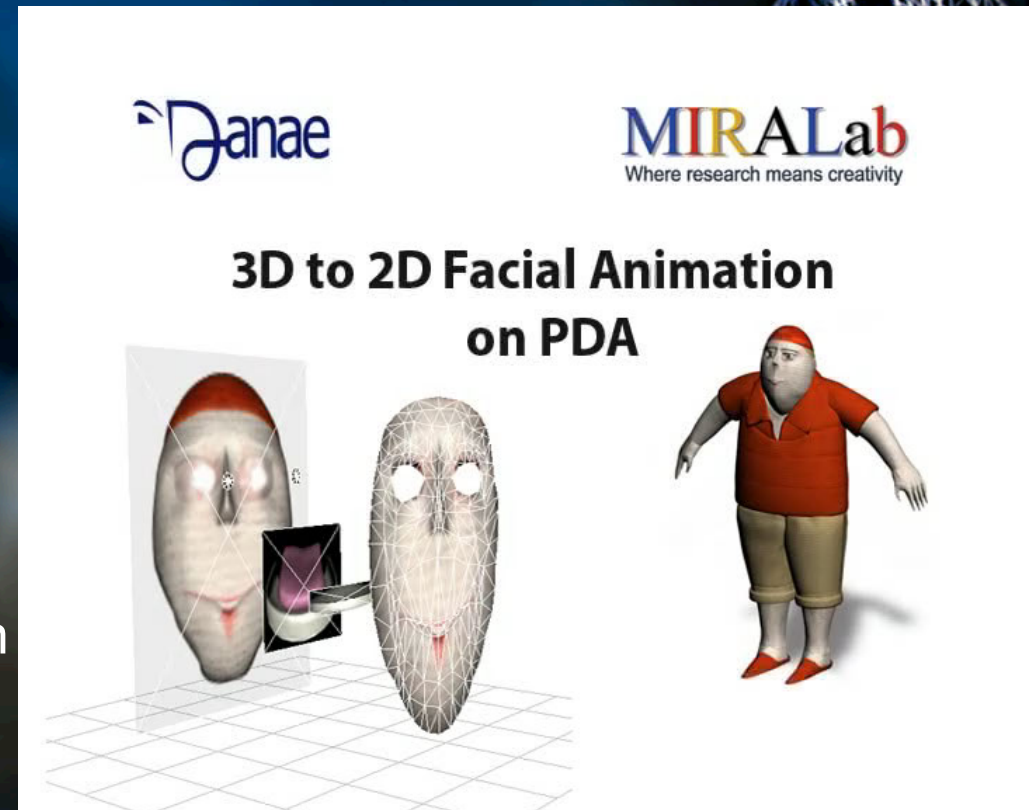
- including the possibility to use 3D FAP for 2D FDP



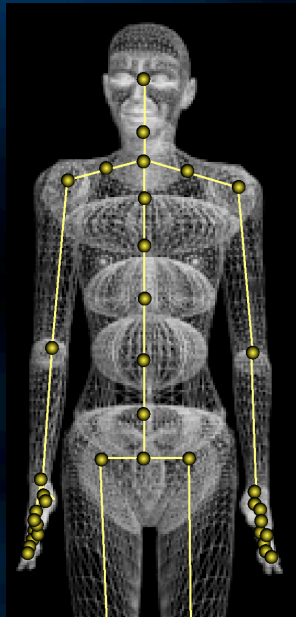
DANAE innovations



- 3D to 2D transformation
 - With deformable 2D mesh
 - 2D FDP from initial 3D mesh
 - Adapted deformation tables
 - FATInterpreter
 - Usage of 3D FAP for 2D face

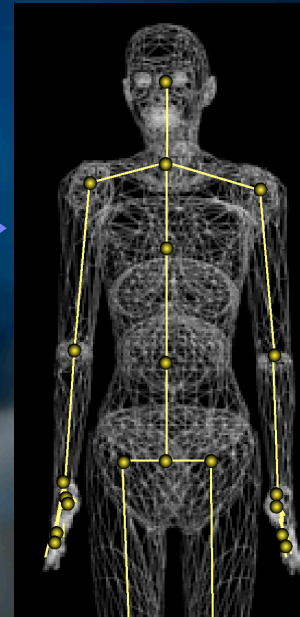


DANAE innovations



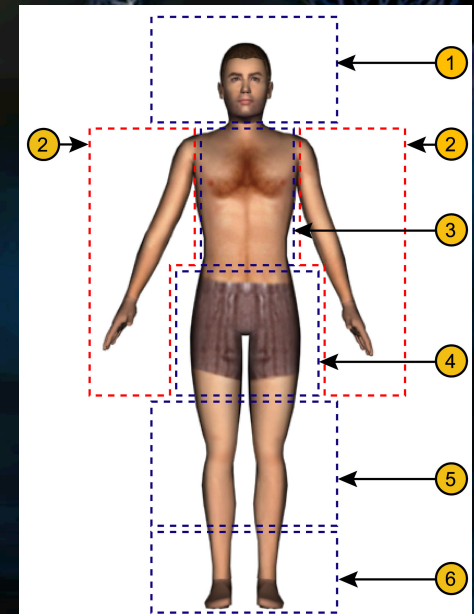
Control number of joints

- Optimize data
- Reduce computations



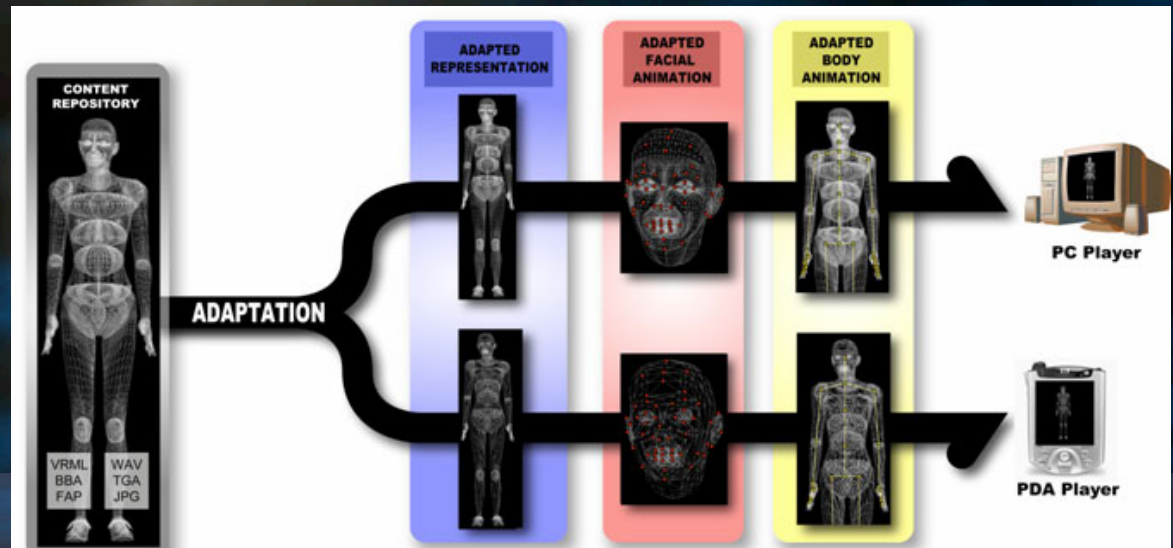
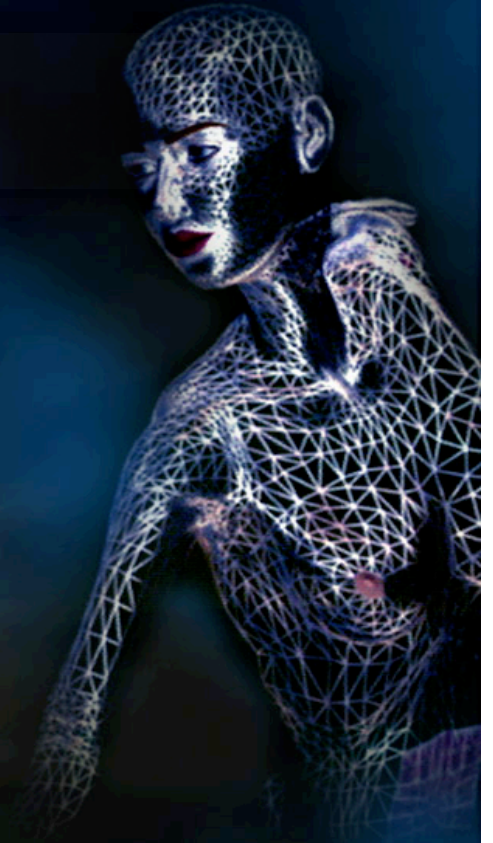
■ Adaptive body animation

- Multi-resolution hierarchical animation
 - Levels of articulation to adapt the hierarchy
 - Regions of interest to select subset of joints
 - Context-based decision (terminal, network)



DANAE innovations

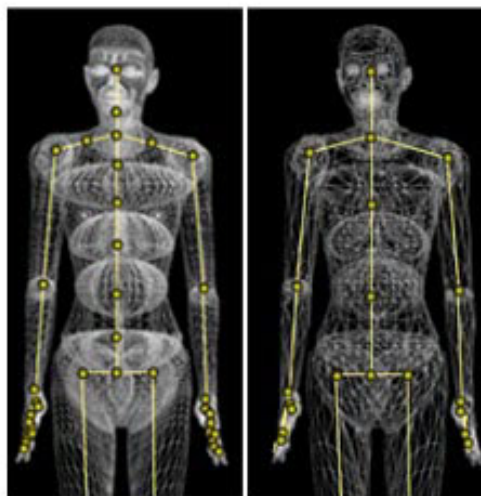
- Dynamic adaptation of animation
 - Driven by bandwidth in next demo
 - Rotation updates fixed
 - Animation for museum looped for visualization
- Integrated in networked chain
 - Stream graphics and animation data
 - Monitoring events and control slider



DANAE innovations



3D Dynamically Adapted Streamed Animation



DANAE achievements

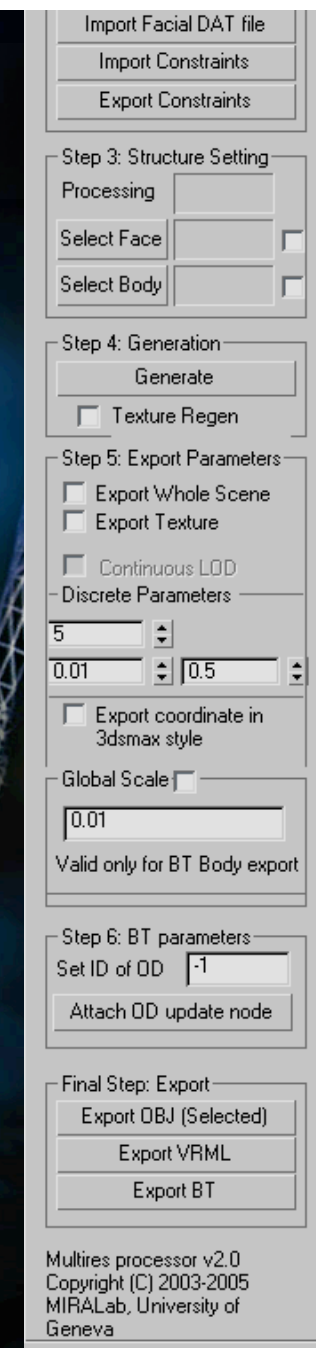
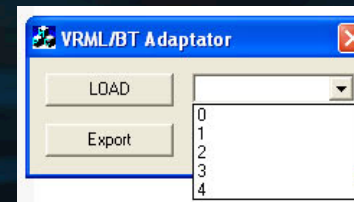
network & MPEG

- MPEG-4 compliant file generation
 - MP4Box tool
 - Extension to support face and body nodes in BT syntax
 - Multiplex, synchronize and compress elementary streams
 - BT (scene), BBA, FAP, AAC (audio), JPG and PNG (images)
- MPEG-21 streamable and adaptive content
 - DIGenerator (python script)
 - Generate DID (item description)
 - Extract packet units for server
 - Generate SDP for client (item configuration)
 - BSDLink (xml file)
 - Information on the stream structure (gBSD)
 - Mapping of the context (AQoS)
 - Transformation of the gBSD (XSLT)



DANAE achievements tools & plugins 1..3

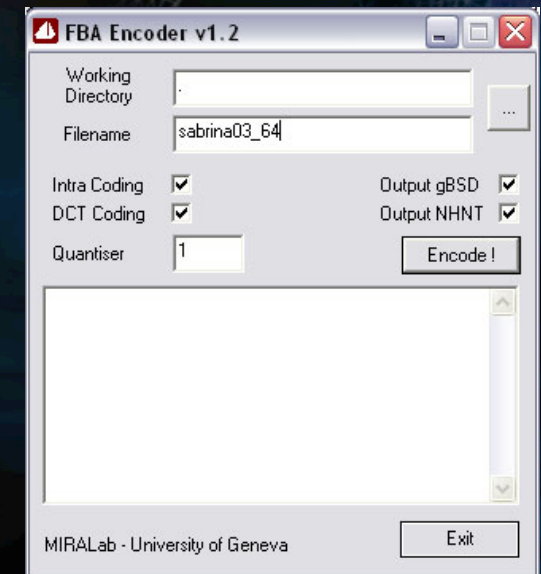
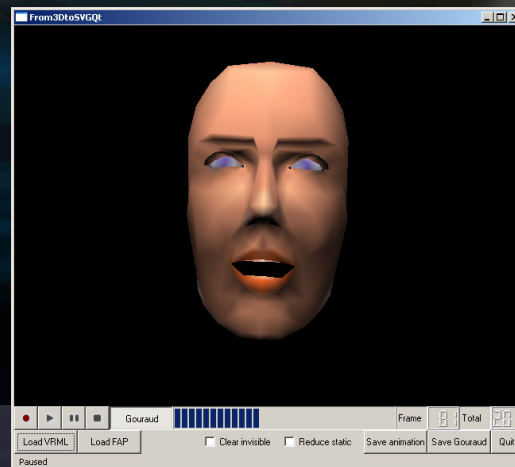
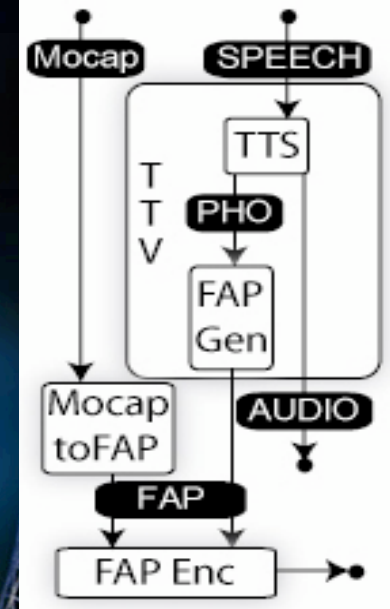
- 3DSMax plugins for geometry
 - LODGen
 - generate different mesh resolutions
 - BiFSExport
 - export .bt scalable geometry and texture file
 - JointFill
 - fill in multi-mesh for rigid animation
- Stand-alone tool for geometry
 - Level-Of-Adaptation selection



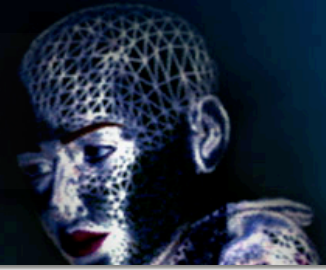
DANAE achievements tools & plugins 2..3

■ Tools for facial animation

- Text-to-Visual generator
 - .txt to .fap
- FAPMixer
 - blend different FAP files
- FATInterpreter
 - supporting 3D FAP for 2D face
- 3DtoSVG
 - generate SVG gouraud-shaded facial animation

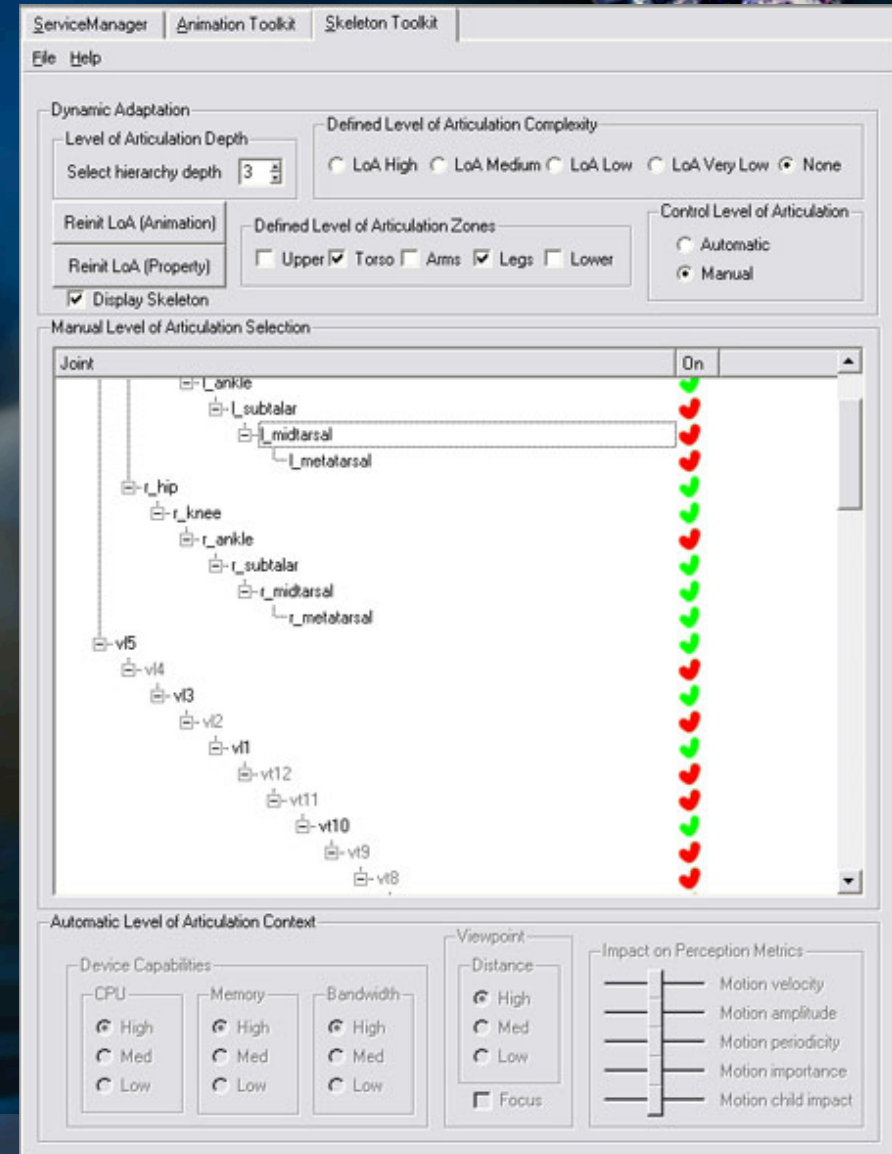
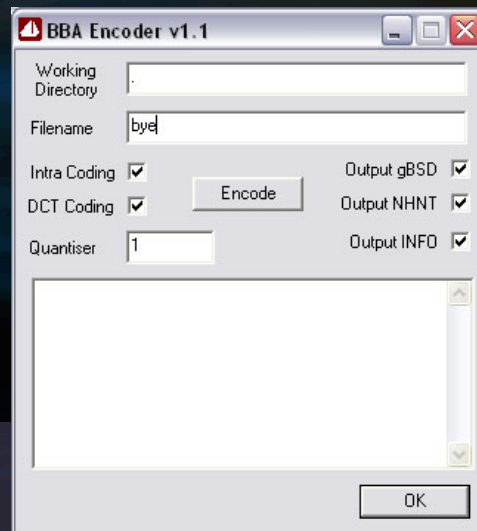


DANAE achievements tools & plugins 3..3



■ Tools for body animation

- wrk2bba converter
 - Standalone or integrated in VHD++
 - Support .bba and .mp4
- BBAGen
 - generate adapted body animations
- BBAEncoder
 - compress .bba
 - generate metadata



INTERMEDIA Project



■ Partners

- MIRALab, Switzerland
- IBBT, Belgium
- ISI, Greece
- RWTH, Germany
- UNIGE, Italy
- FHG-FIT, Germany
- UNIKLU, Austria
- EPFL, Switzerland
- GET-ENST, France
- ICU, South Korea
- ICOM, Greece
- OFFIS, Germany
- CNR, Italy
- TELEFONICA, Spain
- CU, Canada



INTERMEDIA vision

- *The User as Multimedia Central*
- *Be naturally automatically connected with any information device*
- **Today:** we have several devices that do not recognize each other and are different multimedia centrals themselves ((phone, pda), ipod, tv, radio)
- **In the future:** Intermedia will create a user-centric mobile device (like a jacket) that is aware of these other devices and user-friendly.
 - Our information data are always with us
 - Connection with no human intervention

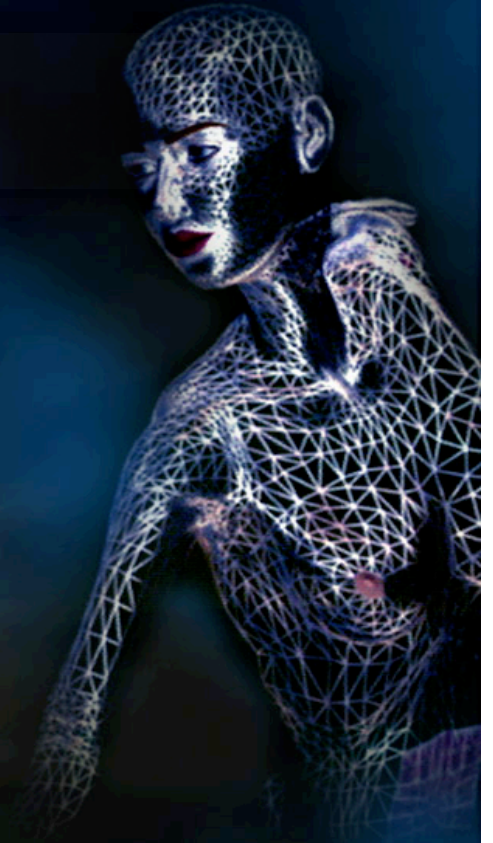


INTERMEDIA Scenario A



- Chloe prepares herself to go out while listening to her preferred music. She transmits orally her program of the day as well as her itinerary to her electronic agenda, which is somewhere in the house.
- At the time of leaving, she puts on her **“INTERMEDIA” jacket**.
- At this moment, all the data of each multimedia device are transmitted automatically to her jacket (e.g. the itinerary which she intends to take this morning and her music selection).
- Chloe gets into her car. The information contained on the jacket are transferred towards the electronic devices being in the car: the radio car and the GPS system for guidance by satellite according to the recorded itinerary.

INTERMEDIA Scenario B



- Chloe is traveling by plane; she is wearing her **INTERMEDIA jacket**.
- All her personal data are transmitted to the computer, which is in front of her seat.
- She can easily continue working on her files, listen to her preferred music or watch her preferred movies and receives her preferred meal.

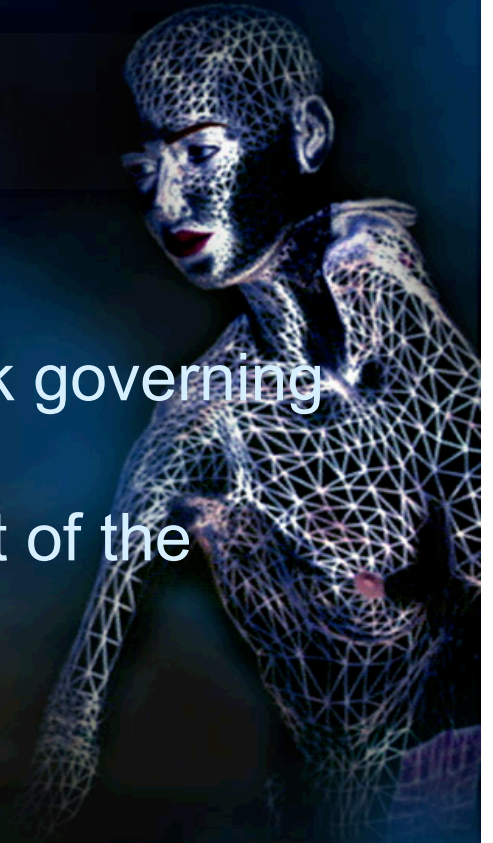
MIRALab in INTERMEDIA

- **Leading**

- Construction and Management of Network governing bodies
- Financial and Administrative Management of the Network
- Installation of a Web portal
- Organization of open forums
- Definition of the requirements in content sharing for user-centric convergence

- **As a partner**

- Ontology model creation to link all descriptors
- Creation, annotation and organization of the audiovisual content according to a showcase scenario



MIRALAB in the group

■ Technical

- Expertise in complex multimedia content authoring and in collaborative virtual environments
- Technologies for scalable 3D content
- 3D renderers on different platforms
- Standardization activities
 - Khronos standards (OpenGL ES, Collada ...)
 - MPEG standards
 - AFX version 2 (3D compression group)
 - MPEG-21 Digital Item Adaptation

■ Others

- Concertation and communication with related EU projects
- Contributions to proposals for FP7 calls

