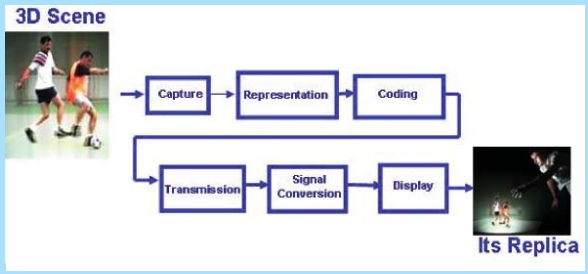

Technical Aspects of the Problem

Scene Capture

- Multi-camera scene capture
- Single-camera based techniques
- Specific techniques to handle human face and body
- Object-based representation and segmentation
- Holographic camera techniques
- Pattern projection and calibration
- Motion analysis and tracking
- Registration

Scene Representation

- Point, Surface,Volume representations for general 3-D scenes
- Human face and body specific 3D motion representation and animation techniques
- Pseudo-3D techniques
- Object Specific Representations
  - Modeling,
  - Rendering
  - Animation

Display

- Holographic and Autostereoscopic displays
  - requirements for a small, compact RGB laser or LED source
  - evaluation of human factors
- 3D Display Technologies
  - SLMs
  - VLSI Technologies
  - Micro-optical Technologies

Coding and Transmission

- Compression
  - hologram compression
  - multi-view video coding
  - 3D mesh compression
  - multiple description coding for 3D
- Compound bit-stream structure for digital 3DTV
- 3D watermarking
- Streaming systems for 3DTV
- Error-related issues and handling
- Loss concealment
- Scalable content delivery methods for 3DTV
- Wireless applications

Signal Processing

- Information theory and signal processing for
  - Optical Propogation
  - Diffraction
  - Holography
  - Device Specific wavefield reconstruction
- Diffraction computation from arbitrary surfaces
- Phase shifting digital holography
- Multicolor parallel recording
- Simultaneous 3 color reconstruction.
- SA in holographic 3DTV
- C.Graph. for hologram

3DTV NoE - Contact Information

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3DTV

"The True Vision"

www.3dtv-research.org

3DTV
INTEGRATED THREE-DIMENSIONAL TELEVISION-CAPTURE, TRANSMISSION, AND DISPLAY

Information Society Technologies

• Capturing three-dimensional visual information of a real-life scene and creating an exact (except the scale) optical duplicate of it at a remote site instantaneously, or at a later time, are ultimate goals in visual communications.

All core and peripheral components related to this goal are collectively referred as "Integrated Three-Dimensional Television (3DTV)".The main goal of the project is to align the research works of participating European researchers along the mentioned issues, which create the 3DTV focus.

Objectives:

Recording, processing, interacting with, and displaying 3D visual information.

Experiences and Activities of the Researchers:

Signal processing (with emphasis on multi-dimensional signals and video), computer graphics, communication and information theory, optics and physics.

Long term collaboration beyond the lifetime of the project is targeted.

Potential Application Areas:

Haptics, Telepresence
Medical Imaging, Dentistry
Museums, Instruments
Entertainment, Video Games

Social impact of 3DTV will be examined.

Major Efforts for Succesful Integration of the Research Works of Partners:

Various small and large-scale meetings, both technical and non-technical, were being held. Exchange programs mobilizing graduate students and researchers will be arranged.

Strong Organizational Structure

Carefully designed operational and administrative units, equipped with the right amount of deceision-making powers to cater the needs of participants.
Project Management Office is established.
Bodies of NoE are;

- Supervisory Board
- Advisory Board
- Management Committee
- Technical Committees.

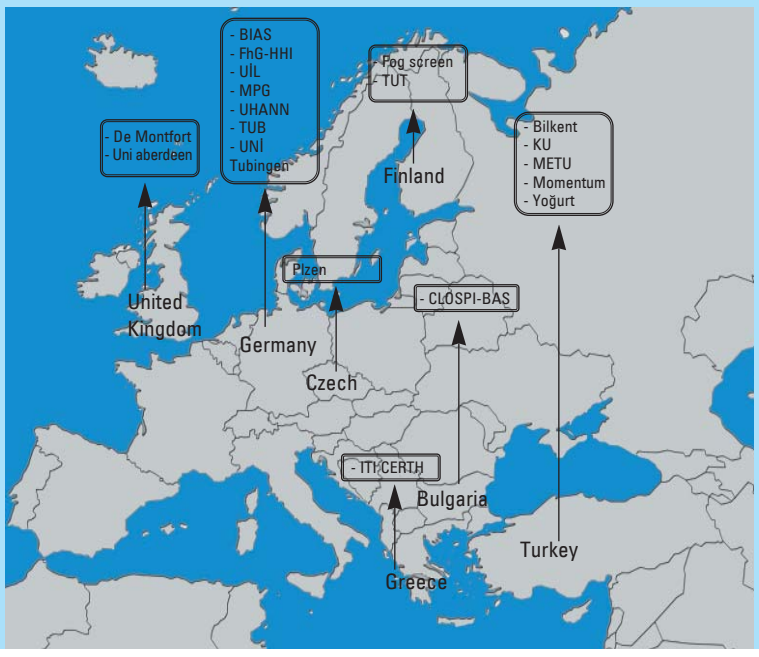
Dissemination Activities:

- Technical paper publications in reputable conferences and journals,
- Edited book on 3DTV,
- Web site for public.

Consortium will consider standardization issues, as well as other Commercialization issues.

Conclusion:

An NoE is formed under the EC FP6.
We have a strong and well-motivated team.
A long lasting collaboration with productive partnership and succesful results are targeted.



Capture:

- Many experimental multi-camera capture systems are designed and tested. Synchronization among the cameras is achieved.
- Many techniques are developed to generate automated 3D personalized human avatars from multi-camera video input.
- Image-based methods are developed for surface reconstruction of moving garment from multiple calibrated video cameras.
- A method based on synthetic aperture radar techniques is developed to increase the resolution of CCD based holographic recording.
- Signal processing methods are developed for automated detection of face, facial parts, facial features and facial motion in recorded video.
- A method for generating and animating a 3D model of a human face is developed.

Representation:

- A method to represent 3D objects using multiresolution tetrahedral meshes is developed.
- A technique is developed to recognize head and hand gestures; the method is then used to synthesize speech-synchoronized gestures.
- A method for representing scalable 3D image-based video objects is developed.
- Software tools for easy description of 3D video objects are developed.

Coding and Compression:

- A technique to automatically segment stereo 3D video sequences is developed.
- A full end-to-end multi-view video codec is implemented and tested.
- A storage format for 3D video is developed.
- A proposal submitted to MPEG for multiview video coding by a partner of our project was performed best in subjective tests among eight other proposals.
- Multi-view test data sets using arrays of eight camera have been produced and made available to MPEG and general scienific research community.
- Various 3D mesh compression, watermarking, hologram compression techniques, and methods for coding and rendering free-view point video are developed.

Transmission:

- An optimal cross-layer scheduling for video streaming is developed.
- An optimal streaming strategy under rate and quality constraints are developed.
- Different approaches for error concealment in stereoscopic images are developed.
- Color and depth representation based end-to-end 3DTV is further developed and tested.

Signal Processing Issues in Difraction and Holography:

- Analytical solutions for complex coherent light field generation by a deflectable mirror array device are developed.
- Fast methods to compute diffraction between tilted planes are developed and tested.
- Algorithms to compute 3D optical fields from data distributed over 3D space are developed and tested.

Display:

- Autostereoscopic displays for 3DTV are further developed.
- Viewer tracking autostereoscopic displays are further developed.
- Characterization and calibration techniques for various spatial light modulator based holographic displays are developed.