THESEUS Project -
Structure and Activities
of Core Technology
Cluster (CTC)

Ralf Schäfer
schaefer@hhri.de
http://ip.hhi.de
THESEUS Organisation

Steering Committee

BMWi

Program Management

DLR

TG: Business Models

TG: Architecture

USE CASE 1

USE CASE 6

.........

Core Technology Cluster “CTC”

General Assembly

external partners

BMWi

DLR

TG: Architecture

TG: Business Models

USE CASE 1

USE CASE 6

Core Technology Cluster “CTC”

General Assembly

external partners
Structure of CTC

- WP1: CTC Management (HHI)
- WP2: Video, Audio, Metadata, Platforms (HHI)
- WP3: Ontology Management (FZI)
- WP4: Situation Aware Dialogue Shell for the Semantic Access to Media and Services (DFKI)
- WP5: User Interface, Visualization (IGD)
- WP6: Statistical Machine Learning (Siemens)
- WP7: DRM/IPR Management (IIS)
- WP8: Evaluation (IDMT)
WP2: Video, Audio, Metadata, Platforms

- Task 2.1: Image Recognition
- Task 2.2: Video Recognition
- Task 2.3: Video Codec
- Task 2.4 Metadata Standards and Standardization
- Task 2.5 Metadata Generation, Indexing and Retrieval
- Task 2.6 Automatic Picture Quality Assessment
Task 2.2: Video Recognition

Video Segmentation for object-based metadata extraction and video coding

- Motion Analyzer
- Post-Proc
- Feature Extraction
- Server

Spatial Segm

Color
Texture
Motion
Task 2.5: Indexing and Retrieval

Two possible perspectives of retrieval

- **Search! Similar Image**
  - Concept A = People ^ Load
  - 1. Find People
  - 2. Find Load
  - 3. Intersection of 1 and 2

- **Search! People on the load**
  - 1. Find People
  - 2. Find Load
  - 3. Intersection of 1 and 2

- **Video Archive**
  - Metadat a-Base
  - High Dimensional Feature Index
  - Traditional B-Tree Index
  - Reasoner
WP3: Ontology Management

- Task 3.1: Ontology Design
- Task 3.2: Ontology Mapping / Interoperability
- Task 3.3: Ontology Evolution
- Task 3.4: Reasoning
WP4: Situation Aware Dialogue Shell for the Semantic Access to Media and Services

- Task 4.1: Usability analysis tools
- Task 4.2: Multimodal semantic processing
- Task 4.3: Semantic navigation and interaction
- Task 4.4: Interactive semantic mediation
- Task 4.5: User adaptation and personalization
- Task 4.6: Interactive service composition and query
- Task 4.7: Semantic output representation
- Task 4.8: Semantic user interface framework
- Task 4.9: Cooperative Answering from Unstructured Resources using Semantic Metadata
WP4 - Situation Aware Dialogue Shell for the Semantic Access to Media and Services

**Task 1: Usability analysis tools**
- Task 2: Multimodal semantic processing
- Task 3: Semantic navigation and interaction
- Task 4: Interactive semantic mediation
- Task 5: User adaptation and personalization
- Task 6: Interactive service composition and query
- Task 7: Semantic output representation
- Task 9: Cooperative Answering from Unstructured Resources using Sem. Metadata

**Task 8: Semantic user interface framework**

(Multimodal) Middleware with standard APIs

**Task 9: Cooperative Answering from Unstructured Resources using Sem. Metadata**

Off-the-shelf solutions
- Recognizer 1
- Speech Rec.
- Recognizer n
- Generator 1
- Speech Synth.
- Generator n

WP5 - User Interface, Visualization
- Device 1
- Device 2
- Device n

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WP5: User Interface, Visualization

- Task 5.1: Modular GUI framework for the visualization of semantic information in Web and Rich Clients
- Task 5.2: Web 3.0 Clients
- Task 5.3: Aspect-oriented information visualization
- Task 5.4: Visual Ontology Editing Framework
- Task 5.5: Visualization techniques for semantic annotation
WP5 Reference Model & Tasks

- **Data model**: API
- **Visualisation**: API, Display & Interaction API
- **Data sources**
- **Schemata**
- **Visual structures**
- **Presentation**

**Tasks**

5.1 Modular GUI framework for the visualization of semantic information in Web and Rich Clients

5.2 Web 3.0 Clients

5.3 Aspect-oriented information visualization

5.4 Visualization techniques for semantic annotation

5.5 Visual Ontology Editing Framework
WP6: Statistical Machine Learning

- Task 6.1: Learning with Relational Data and Ontologies
- Task 6.2: Learning Semantic Annotation in Textual Data and Web Services
- Task 6.3: Learning Semantic Annotations from Images; Managing and Querying Large Sets of Semantically Described Image Contents
- Task 6.4: Learning Semantic Annotations from Images: Detecting embedded content information
- Task 6.5: Large-Scale Self-Learning Textual Archives
- Task 6.6: Learning Semantic Annotations from Video Data
Novel methods for image representation as the basis for semantic representations

Different representations for each object:
- color
- shape
- contrast
- entropy

multi-instance and graph-learning techniques

Database-System (DBS)

object
WP7: DRM/IPR Management

- Task 7.1: Cross-Platform, interoperable DRM
- Task 7.2: Watermarking
- Task 7.3: User-/Device Authentication
- Task 7.4: Conditional Access
- Task 7.5: Content Protection, Encryption
- Task 7.6: Labeling, Filtering and Identification Technology
WP7.1 Cross Platform DRM

• OMA Digital Rights Management
• DRM Standardisation
• OMA DRM Implementation
• Demo

Content Provider
- AV Content protection
- File Format & Streaming
- Content Management

eShop
- Billing
- User Management
- User Interface

Rights Issuer
- Rights & Key Management
- License Delivery
- Device and Domain Management

Public Key Infrastructure
- Device Authentication

DRM Client
- Rights & Key Management
- Content decryption
- Content rendering
WP8: Evaluation

- Task 8.1: Databases
- Task 8.2: Speech Reproduction
- Task 8.3: Speech Analysis
- Task 8.4: Picture Analysis
- Task 8.5: Audio Quality
- Task 8.6: Picture Quality
- Task 8.7: Usability & User Experience
- Task 8.8: Privacy
- Task 8.9: Field Testing
Evaluation in CTC

Why evaluation is important:

• Goals and problems must be defined precisely
• Developers can experiment and validate their ideas, and keep only those leading to improvements
• Developers can better judge the interest of experiments made by others, and reproduce them
• Developers must innovate to stay ahead
• Missing science can be identified
• Funding agencies know where to put the effort and avoid waste of public money
Evaluation Organisation and Roles

- **Corpus provider**
- **Human expert**
- **Reference**
- **Error rate**
- **System**
- **Output**
- **Comparison**
- **Developers**

*Source: Quaero*
Situation Aware Dialogue Shell for the Semantic Access to Media and Services

Video, Audio, Metadata Platforms

Ontology Management

Statistical Machine Learning

User Interface, Visualization

DRM/IPR Management

Evaluation
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Thank you

We put science into action