Task 3.10 - CoCoMA

Content & Context Aware Multimedia Content Retrieval, Delivery & Presentation

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Presentation Overview

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Task 3.10 (CoCoMA) Description

Motivation

Multimedia Content Service Providers

- Context-based Content Delivery
- Semantic-based Content Selection
- Semantic-based Content Retrieval
- Semantic-based Content Filtering
- Topic-based Search

CoCoMA will support this scenario through the integration of semantic content and context-based multimedia retrieval with personalized delivery and consumption.

Ideal Multimedia Content Consumption Scenario
Task 3.10 (CoCoMA) Description

Objectives

- Establishment of an MPEG-7/21 based Framework that:
  - Allows Content and Context-based Multimedia Retrieval
  - Supports Semantic User Preferences in MPEG-7/21
  - Supports Personalization of the Presentation Flow and Duration
  - Allows Context-based Audiovisual Content Adaptation
Task 3.10 (CoCoMA) Description

Objectives

- Development (in JPA2) of a Demonstrator that:
  - Allows Multimedia Content Retrieval and Delivery based on the Content Semantics
  - Includes advanced components developed by the partners for Multimedia Content Selection, Delivery and Personalization
  - Includes an innovative Semantic Multimedia Content Description Model and a Semantic Multimedia User Preference Model

- Exploit (in JPA3) better the strengths of the Demonstrator Architecture:
  - Evolution and integration of the Semantic Multimedia Content Description Model and the Semantic Multimedia User Preference Model with a Semantic Context Model
  - Exploitation of those models in all the aspects of the Multimedia Content Retrieval, Delivery and Personalization in Multimedia Content Networks
CoCoMA Demonstrator Architecture

Components Utilized and Extended in CoCOMA

- **DS-MIRF (TUC/MUSIC):** Framework that allows OWL/MPEG-7 interoperability, domain ontology integration and supports semantic-based multimedia content retrieval and filtering

- **MM4U (OFFIS):** Generic and modular framework that supports multimedia content personalization applications

- **VizIR (TUV):** Content-based multimedia retrieval framework that also provides tools for media and media metadata visualization

- **Multimedia Authoring System (UNIMI):** Support for multimedia object presentation personalization according to users' preferences and skill levels

- **KoMMa (Klagenfurt University):** Open, extensible, and intelligent adaptation framework for multimedia data based on MPEG-7/21
CoCoMA Demonstrator Architecture

CoCoMA Component Diagram
CoCoMA Demonstrator Architecture

CoCoMA Flow Diagram

DELOS II - All Tasks Meeting

CoCoMA: Content and Context Aware Multimedia Content Retrieval, Delivery and Presentation
JPA2 Activities

Technical Results

- CoCoMA Architecture Specification & Agreement (Component Diagram)
- Specification of the Interactions of the CoCoMA Components (Flow Diagram)
  - Software Integration of the different Components is undergoing
- Design and Implementation of a Binding of VizIR to MM4U
  - Paradigms and Software for Dynamic Presentation Generation from CBR Queries
  - First Prototype (Personalized Photo Album Application)
JPA2 Activities

Technical Results

- Design of an Authoring Model for Multimedia Presentation Specification and Generation
  - Implementation in a Prototype System
- Investigation of the potential use of Object Annotations for Presentation Personalization with respect to:
  - Presentation Duration
  - Content Preferences of the Users
- Ontology-based Semantic Annotation of MM Content
- Provision of an API to the CoCoMA DB (MPEG-7 Metadata Repository)
- Development of an OWL Ontology for Content Adaptation that partially captures the MPEG-21 DIA
JPA2 Activities

Technical Results

- Specification of a Semantic User Preference Model for MPEG-7/21 that:
  - Follows the MPEG-7/21 Hierarchical Structure
  - Allows the utilization of Semantic Entities in User Profiles
    - Example: “I am interested in Zuninho’s goals”
  - Allows the explicit specification of Boolean Operators
    - Both between the Filter Hierarchy Components and inside the same component

- Implementation of the Semantic User Preference Model in:
  - MPEG-7 Syntax (Available at: http://elikonas.ced.tuc.gr/ontologies/MPEG7ext/semUP.xsd)
  - OWL (Available at: http://elikonas.ced.tuc.gr/ontologies/AppOntos/SUserPreferences)
  - Semantic User Preference Support for MPEG-7/21 in DS-MIRF is undergoing
JPA2 Activities

Task Coordination & Dissemination

- CoCoMA Poster [1] in the DELOS Poster Session held in conjunction with ECDL 2005
- 2 Researcher Exchanges:
  - Doris Divotkey (TUV → OFFIS)
  - Ansgar Scherp (OFFIS → TUV)
- 1 External (Univ. of Klagenfurt) Interested to become CoCoMA member
- Several Publications in National and International Conferences and Journals
JPA2 Activities

Next Steps

- Software Integration of the remaining CoCoMA components
- Component Integration Testing
- Demonstrator Setup
- Design Report for the CoCoMA Demonstrator
Task Extension in JPA3

New Research Directions and Objectives

- Integration of CBR (Content-Based Retrieval - based on low-level features) and SBR (Semantic-Based Retrieval)
- Development of a novel and innovative User Interface to formulate CBR and SBR Queries and access the result sets
- Optimize the Queries utilizing the User Preferences
- Automatic Media Transcoding and Adaptation Support
Task Extension in JPA3

New Research Directions and Objectives

- Specification of a Presentation Personalization approach with respect to the Presentation Duration
- Specification of a Presentation Personalization approach according to the User Preference Descriptions
- Development of a Semantic Context Model
- Support for User Preference Description updates based on the Usage History
CoCoMA Publications


CoCoMA Publications


7. Divotkey, D., and Eidenberger, H., Content-based Querying Embedded in Multimedia Presentations, IEEE Multimedia Signal Processing Workshop, Shanghai, China, 2005


CoCoMA Publications


