

IMOTION

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IMOTION at a Glance

- Project Title

**Intelligent Multimodal Augmented Video Motion Retrieval System
(IMOTION)**

- Project Start and Duration

January 1st, 2014 – December 31st, 2016 (3 years)

- Project Partners

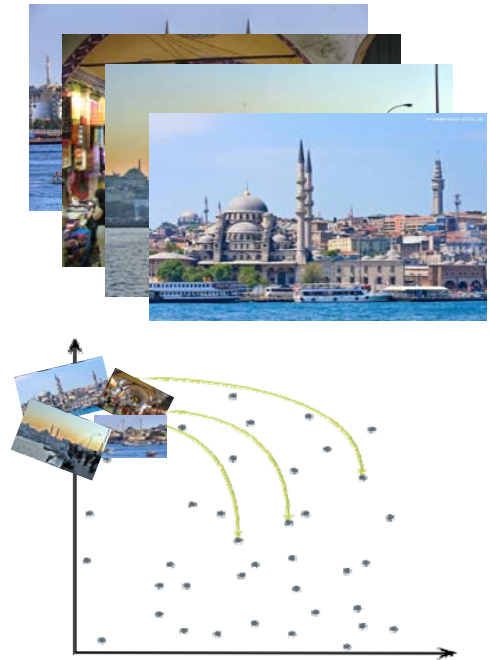
- **University of Basel (UNIBAS)**, Switzerland (Coordinator)
- **Koç University (Koç)**, Istanbul, Turkey
- **University of Mons (UMONS)**, Belgium

Scientific Background

- **Large Multimedia Collections**
 - Private use, professional applications, education
- **Content-based Multimedia Retrieval**
 - Manual annotations not feasible
 - Use of inherent features (colors, shapes, objects, etc.)
 - Strong focus on image features
- **Video Retrieval**
 - ***Motion*** distinguishes video from still images
 - Efficient and effective content-based retrieval of (parts of) videos based on ***motion specification*** is lacking

→ **IMOTION will develop and evaluate**

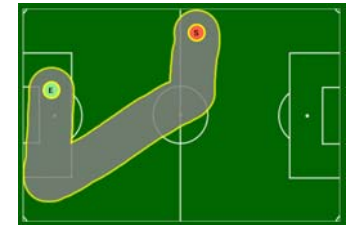
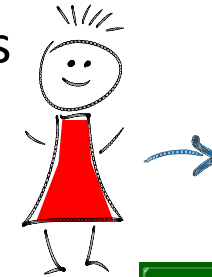
Innovative Multi-Modal User Interfaces for Interacting with Videos



Key Challenges & Potential Impact

Goal: Support novel types of **motion queries** in video collections

- **User Interaction** for Query Specification
 - Users can specify **motion paths of objects** in videos
 - via **sketches, gestures, natural language**, or combinations
- **Machine Learning** for Motion Features
 - Extraction of **high-level motion descriptors**
 - Based on **motion ontology**
- **Information Retrieval & Data Management** for Efficient Search
 - Index structures to jointly support **video features and motion metadata**
 - Distributed IR Engine: **Scalability** to very large collections
- **Quantitative and Qualitative Evaluation**
 - **User studies** based on collections released by the project consortium

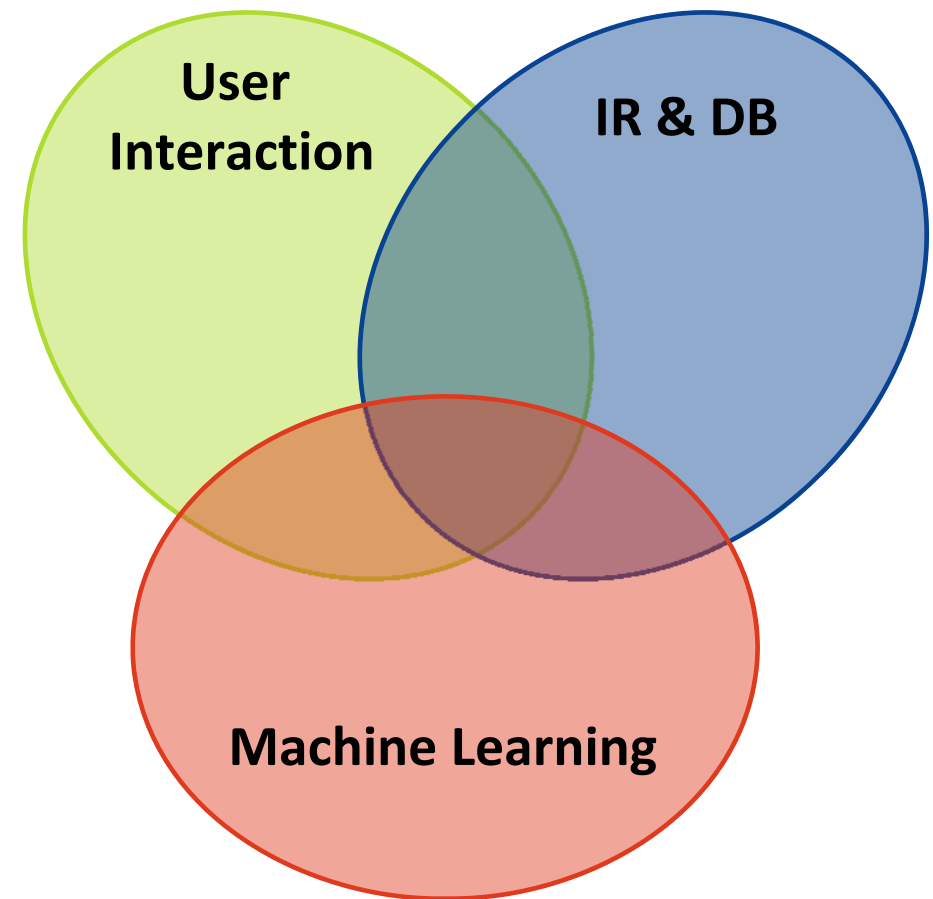


„Show me all shots
on goal from the
penalty area, with
support from the
left wing“

Consortium as a Whole ...

Competences needed for IMOTION:

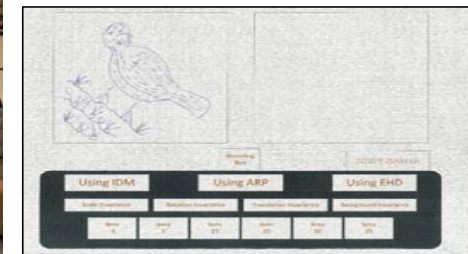
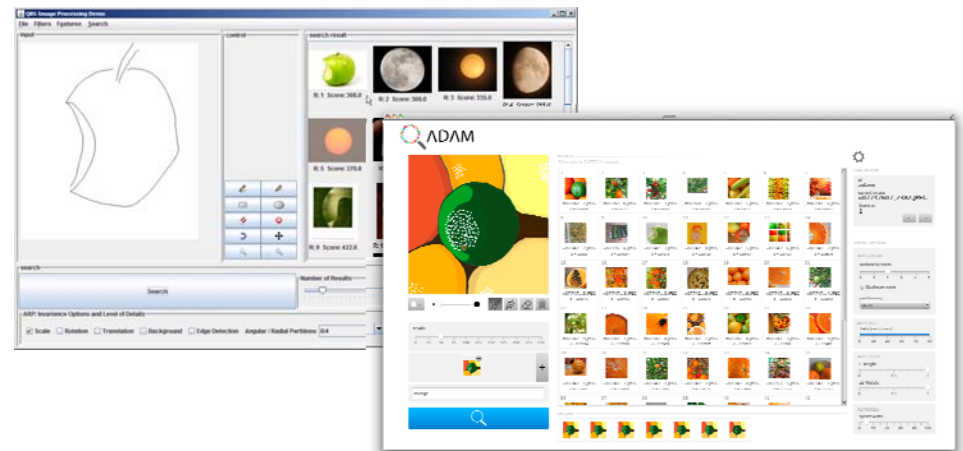
- **User Interaction**
 - Sketch-based Interfaces
 - Speech-based Interfaces
- **Information Retrieval & Databases**
 - Indexing, Retrieval Models
 - Distributed Data Management
- **Machine Learning**
 - Feature Extraction



University of Basel

Databases and Information Systems Group (Prof. Heiko Schuldt)

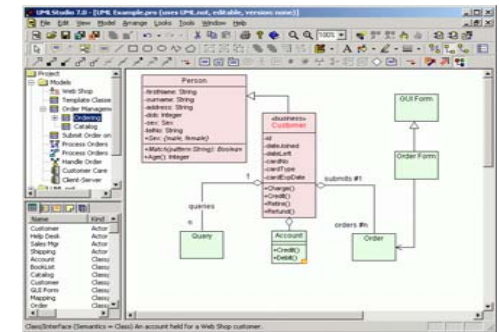
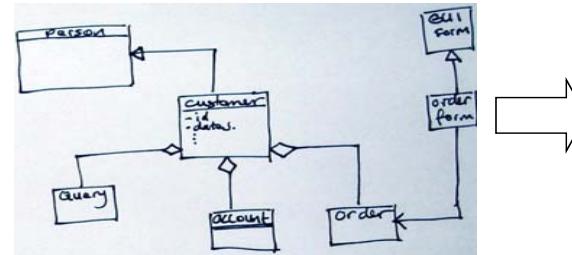
- **Management of Large Volumes of Data / Big Data Collections**
 - Cloud Data Management
 - Digital Libraries
- **Multimedia Retrieval**
 - Sketch-based Image Retrieval
 - Indexing
 - Distribution
 - Feature Extraction
- **User Interfaces**
 - Interactive Paper
 - IR-based gesture recognition



Intelligent User Interfaces Laboratory (Prof. T. Metin Sezgin)

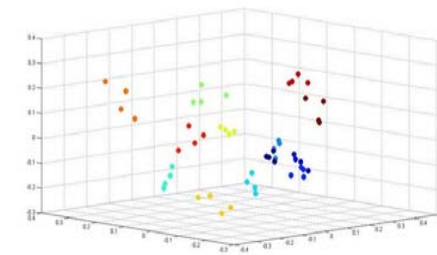
- **Sketch-based Interfaces**

- Natural modalities
- Sketch recognition
- Sketch understanding



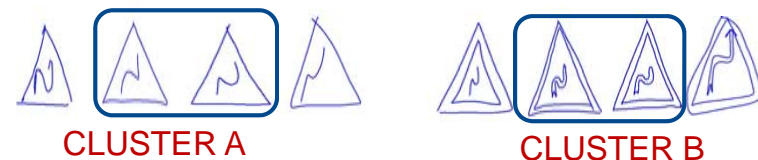
- **Multimodal Interaction**

- Sketch Interfaces
- Speech Interfaces
- Affective Interfaces



- **Machine Learning**

- Adaptation to the user
- Labeling large data sets



University of Mons

Research Center in Information Technologies &
Research Institute for Creative Technologies (Dr. Stéphane Dupont)

- **Motion Capture**

- Semantic Analysis of Human Movements in Videos
- Enable the animation of virtual characters
- Modeling of motion



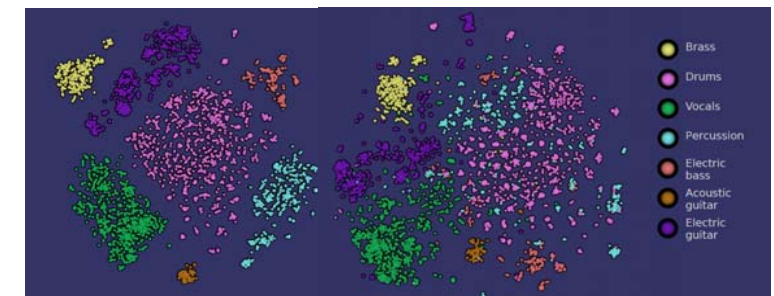
- **Machine Learning**

- Deep Learning for Motion Features



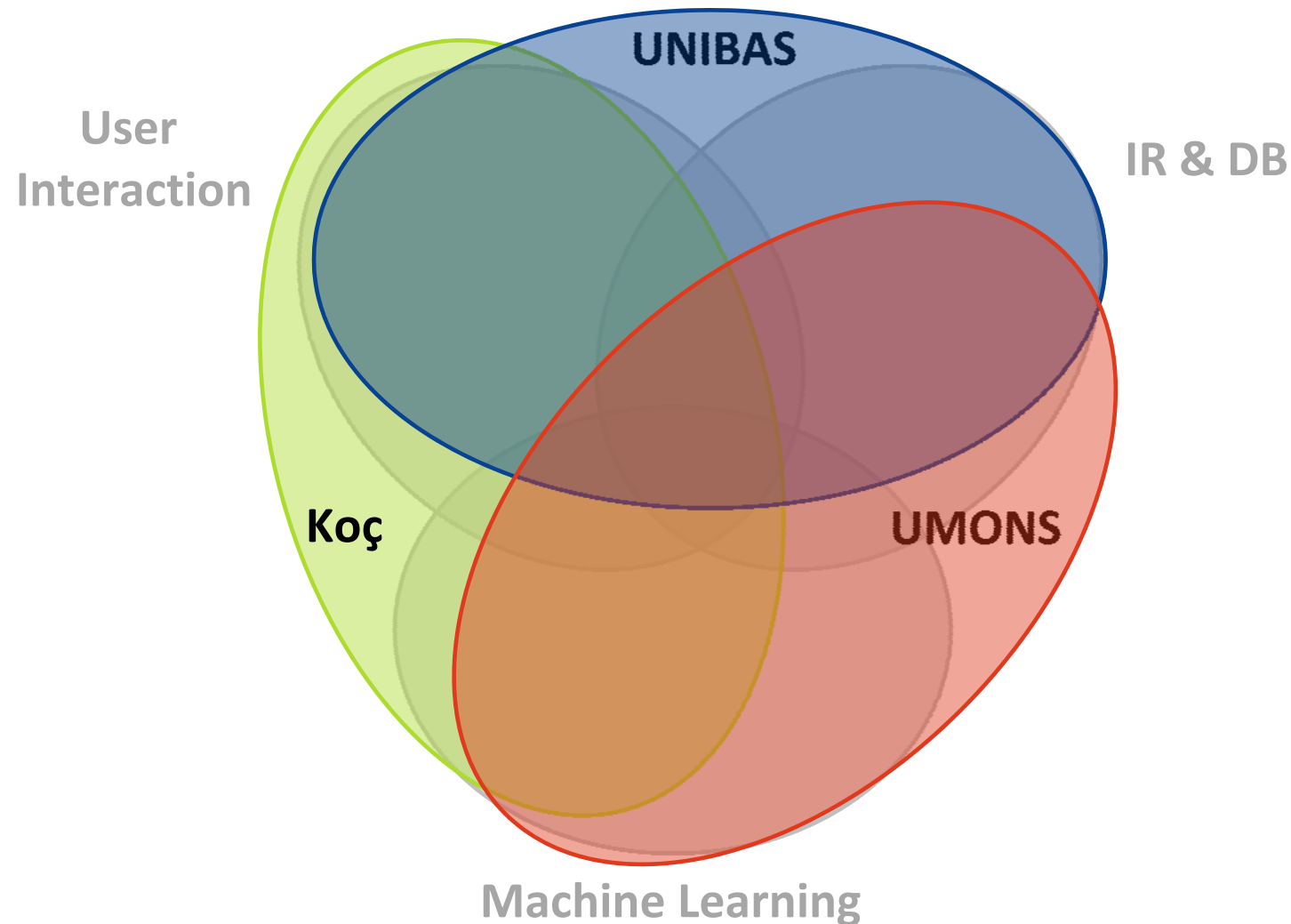
- **Multimedia Information Retrieval**

- Dimensionality reduction
- Map-like representations
- Classification



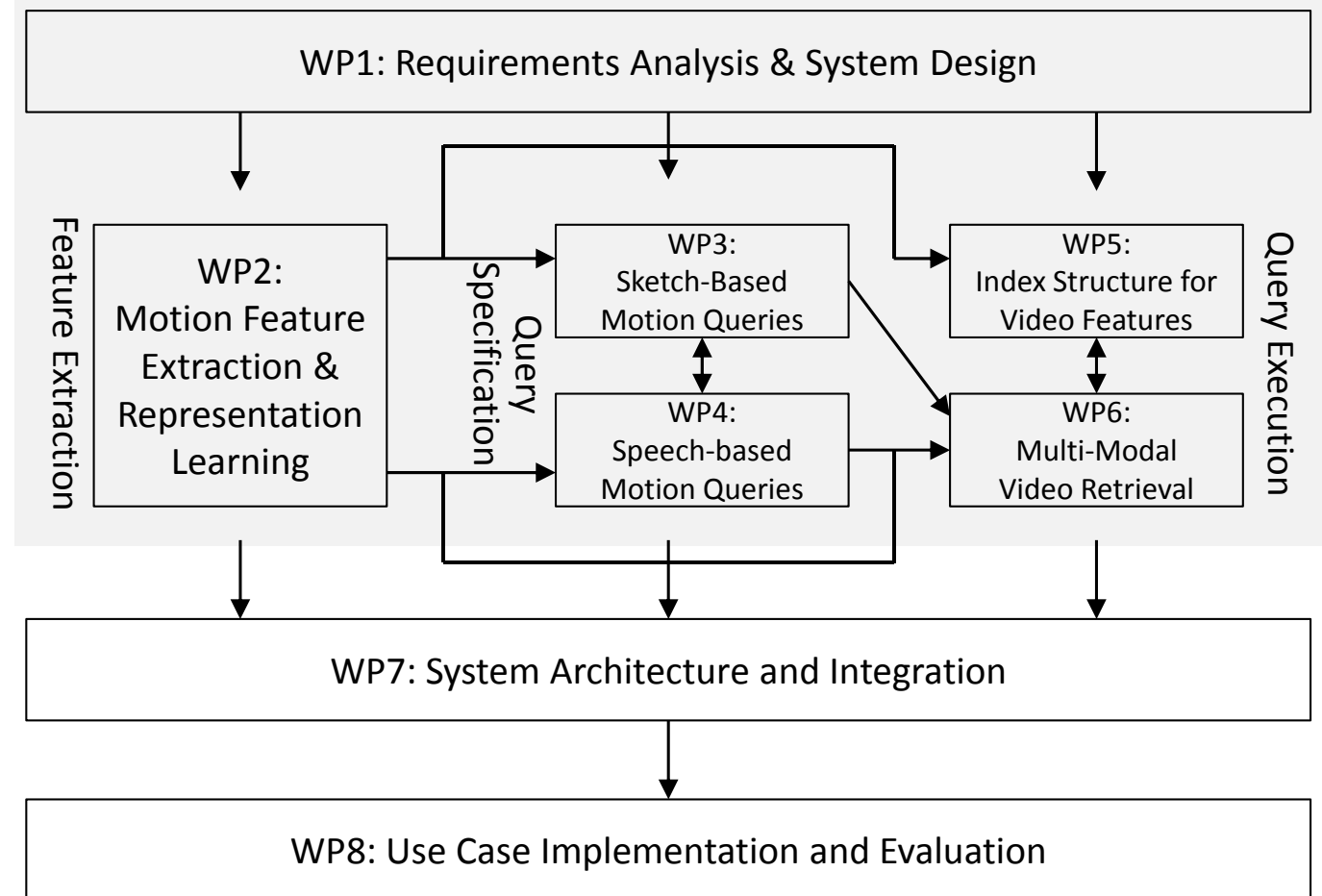
... Consortium as a Whole

- Small, but highly complementary consortium



IMOTION Workplan

- WP1 (all, lead: UNIBAS)
 - Analyze use cases (e.g., sports, animal behavior, weather satellite videos, etc.)
 - User Requirements
- WP2 (UMONS)
 - Feature Extraction
- WPs 3 & 4 (Koç)
 - UI for Query Specification
- WPs 5 & 6 (UNIBAS)
 - Query Execution



Project Management ...

- **Project has started on January 1st, 2014**
- **Staffing** (mostly completed)
 - UNIBAS
 - 2 PhD students for 3 years
 - 1 PostDoc for 2 years (start: summer 2014)
 - Koç
 - 2 PhD students for 3 years
 - 1 PostDoc for 2 years
 - UMONS
 - 1 PhD student for 3 years
- **Internal project meetings**
 - Kick-off: February 3rd, 2014 in Basel
 - Infrastructure (repository, website, mailing list, etc.) has been set up
 - Consortium Agreement in preparation

... Project Management

- **Student/scientists exchanges**
 - Plan currently under preparation
- **Financial reporting**
 - Nothing to report
- **Dissemination**
 - Project Website: imotion-project.eu
 - Scientific results, publications, other outputs will be announced on the project website
- **Sustainability**
 - Project deliverables to be published as scholarly papers
 - IMOTION software in open source license
 - Collections and evaluation metrics released to the research community

Thank you for your attention.

