IMOTION at a Glance

• Project Title
  Intelligent Multimodal Augmented Video Motion Retrieval System (IMOTION)

• Project Start and Duration
  January 1\textsuperscript{st}, 2014 – December 31\textsuperscript{st}, 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 1\textsuperscript{st}, 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 3\textsuperscript{rd}, 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](http://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.