



Towards Efficient and Context-sensitive Cross-media Search

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Example Scenarios

Queries like:

- 'Find out *more about this style*'
- 'Find materials *fitting with this theme*'
- 'Find *something on Queen Mary*'

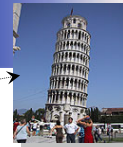
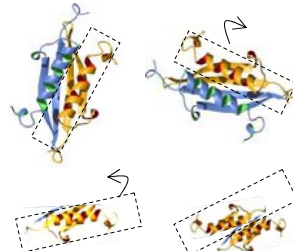
news?
gossip?
image?




?




- 'Find 3D objects which are similar to this query object'






Our focus & challenges


- Cross media type search
 - Working with different media types
- User query interpretation (context)
 - Defining preferred medium, content of the searched resource, user's context, etc.
- Query and Object transformations
 - Incl. temporality constraints (temporal order in video/audio/text sequences)
 - Incl. geometric transformation (e.g. rotations and translations of 3D objects)
- Search result integration and interpretation

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Traditional approach

- Data objects transformed to feature vectors
- Similarity measures assume a particular, known feature vector representation
- Search is performed by calculating the similarity between the query and data objects
 - Different media use different, incompatible features
 - Query processing is often 'linear', based on matching rather than translation, interpretation and exploration
 - Query is treated as a set of items, little attempt made on interpreting it as a whole

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Our proposition

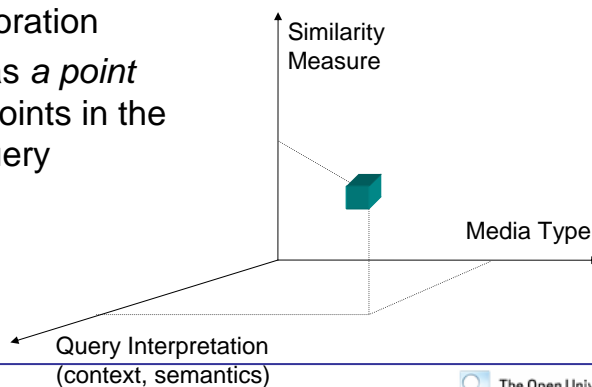
- A series of Representation Models addressing different stages of 'querying':
 - User Query Formulation model
 - Query Composition and Processing model
 - Query Data Integration model
- Each model is multi-dimensional rather than relying solely on similarity measures
- Key dimensions: *features, media, similarity measures, transformations, and mappings*

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User Query Formulation

- Media-specific query decomposition
- Query interpretation and Context incorporation
- A query seen as *a point* or a series of points in the 3D space of query formulation



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Query Composition & Processing

- Dynamic set of features chosen based on a specific medium or context
- Query processed 'in parallel'; i.e. matching combined with transformations and filters
- Search processed as a *path* through possible query compositions in this 3D space

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Query Data Integration

- Cross-media integration requires semantic interpretation
- Similarity measures for different media need to be mapped onto each other (semantically & heuristically)
- Query result emerging as a *cluster* of data points in the 3D space of possible query result interpretations

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Our research goal

A systematic study of the multi layered model of querying multi-media resources using the federated set of next generation search engines