

# VITALAS at TRECVID 2009

## Studying User Search Behavior with a Video Retrieval System

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# Outline

- 1 **VITALAS System**  
VITALAS GUI  
Data Preparation
- 2 **Test Setup**  
User Test Setup  
Evaluation
- 3 **Results**  
Questionnaire  
Searchlogs
- 4 **Conclusions and Future Work**



# The VITALAS System

The GUI offers different **search types**:

- text (ASR) search
- concept search
- similarity search
- fused search: AND/OR combination of the above search types

The GUI offers the following **actions** on the results:

- zoom keyframe or play video
- add item to result “lightbox”

The GUI offers **concept suggestions** related to the current query



# Result View

VITALAS [Start New](#) [view current log](#)

welcome, cwi [search](#) | [my profile](#) | [video demo](#) | [questionnaire](#) | [help](#) | [logout](#)

BASIC SEARCH [ADVANCED SEARCH](#)

search: soccer [images](#) [videos](#) [search](#) [reset](#)

Keyword suggestions

Concept suggestions: soccer sports baseball flag

similar search color search

[mosaic view](#) [cluster view](#) [advanced visualization](#)

My Lightbox (0) [my feedback](#) [0+0-](#) [search session](#)

show results by: [relevance](#) | Items per page: [auto](#) | 9975 results [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#)

# Result View

The screenshot displays the VITALAS GUI interface for viewing search results. At the top, the VITALAS logo is visible on the left, and user information (welcome, csl) and search options (search, my profile, video demo, questionnaire, help, login) are on the right. Below the logo, there's a search bar containing the text 'soccer'. A blue callout bubble labeled 'Query Field' points to this search bar. To the right of the search bar are buttons for 'images', 'videos', 'search', and 'reset'. Below the search bar, there are sections for 'Keyword suggestions', 'Concept suggestions' (showing 'soccer sports baseball flag'), 'similar search', and 'color search'. The main area displays a grid of image results, with a 'show results by: relevance' dropdown and 'Items per page: auto' settings. The grid shows 9975 results. At the bottom, there are navigation controls including 'My Lightbox (0)', 'my feedback', 'O+ O-', and 'search session'.

# Result View

The screenshot displays the VITALAS GUI interface for the Result View. At the top, the VITALAS logo is visible on the left, and user navigation links (welcome, csl, search, my profile, video demo, questionnaire, help, login) are on the right. Below the logo is a 'view current log' button. The search bar contains the text 'soccer', with 'images' and 'videos' filters and 'search' and 'reset' buttons. A blue speech bubble labeled 'Concept Suggestions' points to the 'Concept suggestions' section, which displays 'soccer sports baseball flag'. To the right of this is a 'similar search' section with a color selection palette and an 'Upload' button. Below these sections are tabs for 'mosaic view', 'cluster view', and 'advanced visualization'. The main area shows a grid of 9975 results in a mosaic view. Navigation controls at the bottom include 'show results by: relevance', 'Items per page: auto', and a pagination bar.

# Result View

VITALAS

welcome, cat | search | my profile | video demo | questionnaire | help | login

search | images | videos | search | reset

BASIC SEARCH | ADVANCED SEARCH

Keyword suggestions

Concept suggestions

similar search

color search

Image Upload

mosaic view | cluster view | advanced visualization

My Lightbox (0) | my feedback | 0+0- | search session

show results by: relevance

Items per page: auto

9975 results

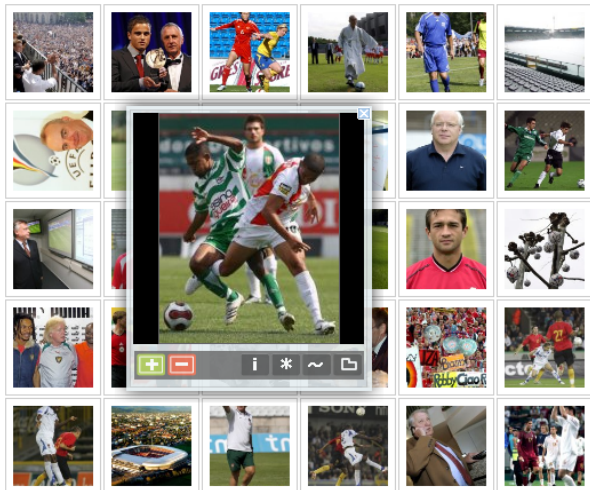
Navigation icons: back, forward, home, search, etc.

# Result View

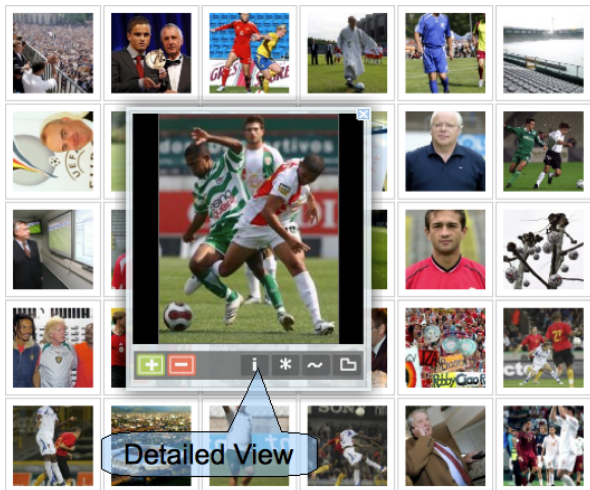
The screenshot displays the VITALAS GUI interface for the 'Result View'. At the top, the VITALAS logo is on the left, and user information (welcome, csl) and search options (search, my profile, video demo, questionnaire, help, login) are on the right. Below the logo, there are links for 'start log' and 'view current log'. The search bar contains the term 'soccer', with filters for 'images' and 'videos'. A 'search' button and a 'reset' button are also present. The interface is divided into two main sections: 'BASIC SEARCH' and 'ADVANCED SEARCH'. The 'BASIC SEARCH' section includes 'Keyword suggestions', 'Concept suggestions' (showing 'soccer sports baseball flag'), 'similar search', and 'color search'. The 'ADVANCED SEARCH' section includes 'mosaic view', 'cluster view', and 'advanced visualization'. Below these, there are options for 'show results by: relevance' and 'Items per page: auto'. The main area displays a grid of 9975 results, with a callout box labeled 'Result Keyframes' pointing to a specific image. The bottom of the interface features navigation controls and a status bar.



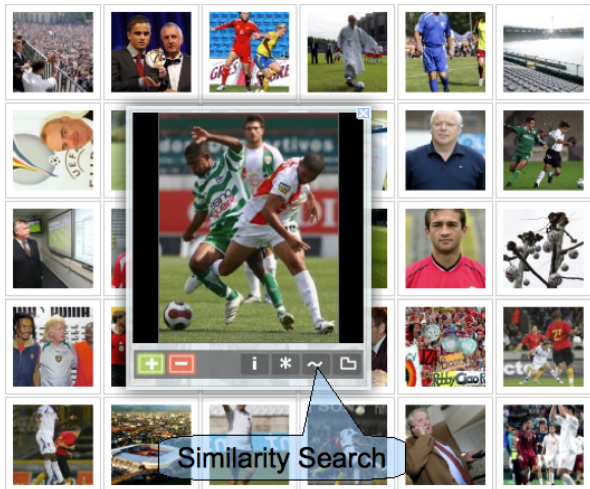
# Zoom View



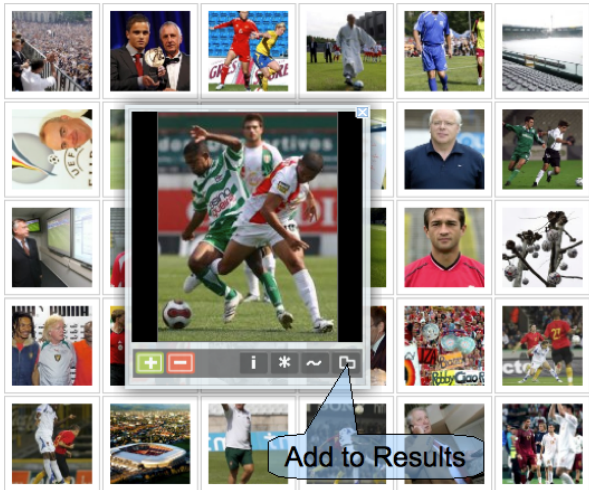
# Zoom View



# Zoom View



## Zoom View



# Data Preparation

## ASR

- machine translation of provided Limsi ASR to English
- shot-alignment of the English text

## Concepts

- complement VITALAS HLFE concepts with provided MediaMill concepts
- index the top 5000 concept scores per concept

## Visual Features

- extract and index SIFT features for similarity search



# Test Users

- 8 + 2 test users, not involved in system development
- 4 professional **archivists** / 4 + 2 non-professional **novice** users
- professionals used our system for the first time



# Training and Evaluation Methods

The users got

- tutorial and training topic
- [questionnaire](#) (3 parts: entry, search, exit)
- list of available concepts (only professional users)
- test instructions
  - *we did not ask to find as many results as possible*



User interaction [logging](#):

- issued searches and results
- zoom and add-to-result actions



# Topic Assignment

- each test user got 12 of TRECVID 2009 topics
- based on a latin squares arrangement

		TRECVID 2009 TOPICS																											
		269	270	271	272	273	274	275	276	277	278	279	280	281	282	283	284	285	286	287	288	289	290	291	292				
U S E R S	1																												
	15																												
	4																												
	16																												
	7																												
	9																												
	10																												
	12																												
	3																												
	6																												
		5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
		 Professional archivists														 Non-professional users													





# Research Objectives

- compare the use and effectiveness of the different search types:  
text (ASR) search, concept search, similarity search, fused search
- compare the behavior of the different user groups:  
archivists vs. novice users



# General search experiences

- the users feel they had enough time for the search tasks
- novice users always had enough time, professionals sometimes
- novice users are slightly more confident about the quality of their search results than professionals
- professional users show a higher correlation between self-judged completeness of search and satisfaction with search time



# Satisfaction with search types

## Users judging the search types

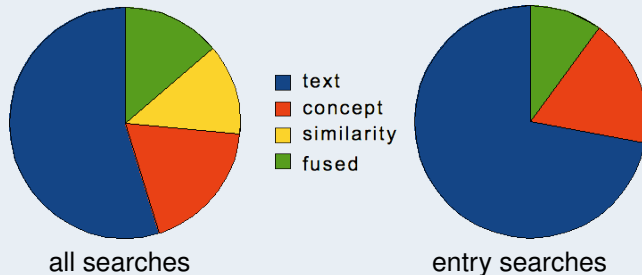
search type	archivists		novices	
	ease	eff.	ease	eff.
text	4.25	3	<b>4</b>	3.16
concept	4.25	<b>3.5</b>	3	3.5
similarity	4.25	2	3.16	3
fused	4.25	2.75	3.66	<b>3.83</b>

questionnaire scale: 1 – 5

- all search types are easy to use for professionals; novice users have more difficulties with search types other than text search
- concept search and fused search are experienced to be slightly more effective than text search

# Querying behavior

## Issued searches (type)



- most queries are text queries, 20% contain concepts, 13% contain similarity searches, and 14% combine different search types
- entry searches are most often text searches



# Actions on the search results

- professionals add on average 12.6 items per topic to the results, novices only add 6.6 items
- both user groups perform almost the same number of zoom actions
- professionals look deeper into the ranked results: median rank of zoomed/added items is double as high (34 for professionals vs. 18 for novices)



# User Assessor Agreement

## User vs. Assessor

- only 50% of the shots added by our users were judged by the assessors
- 50% of the judged added shots are marked by the assessors as irrelevant
- 40% of the judged zoomed-but-not-added shots are marked as relevant by the assessors
- 33% of the displayed-but-not-added shots are relevant

## User vs. user

- proportion of common shots found by more than one user within all added shots for a topic is only 17%

Users missed many shots by looking only at the keyframe thumbnails

# Search type effectiveness

## System vs. user effectiveness

search type	rel. displayed	added
text only	2.76	0.98
concept only	<b>13.47</b>	<b>2.69</b>
similarity only	4.32	1.07
fused	7.88	1.79

- **system perspective**: similarity searches retrieve 2 times as many relevant results than text searches, fused searches 3 times, concept searches 5 times as many
- **user perspective**: concept search results in 2.5 as many add actions than a text search or similarity search



# Conclusions and Future Work

## Conclusions

- all search types are useful, concept search is most effective on TRECVID topics
- different search behavior:
  - professionals search longer and deeper in the retrieved list
  - professionals search more recall oriented
- GUI personalization is necessary to deal with different users
- keyframe thumbnails are not sufficient to judge a shot

## Future work

- 2nd test phase with more test users is planned
- analyze search patterns, order of search actions
- analyze dependence between query type and search pattern