CDVP & TRECVID-2003 Interactive Search Task Experiments

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Físchlár Demonstrator System

- A Digital Video Management System
 - Web-based, supports browsing and search
 - Many different versions of the system
 - Underlying XML Architecture
 - XSL supporting display on multiple devices
- TREC2003 is our 3rd TRECVID Search Task
 - 2003 : explored benefits of incorporating image and feedback into a text search process
 - 2002 : explored benefits of incorporating features
 - 2001 : examined different keyframe browsers

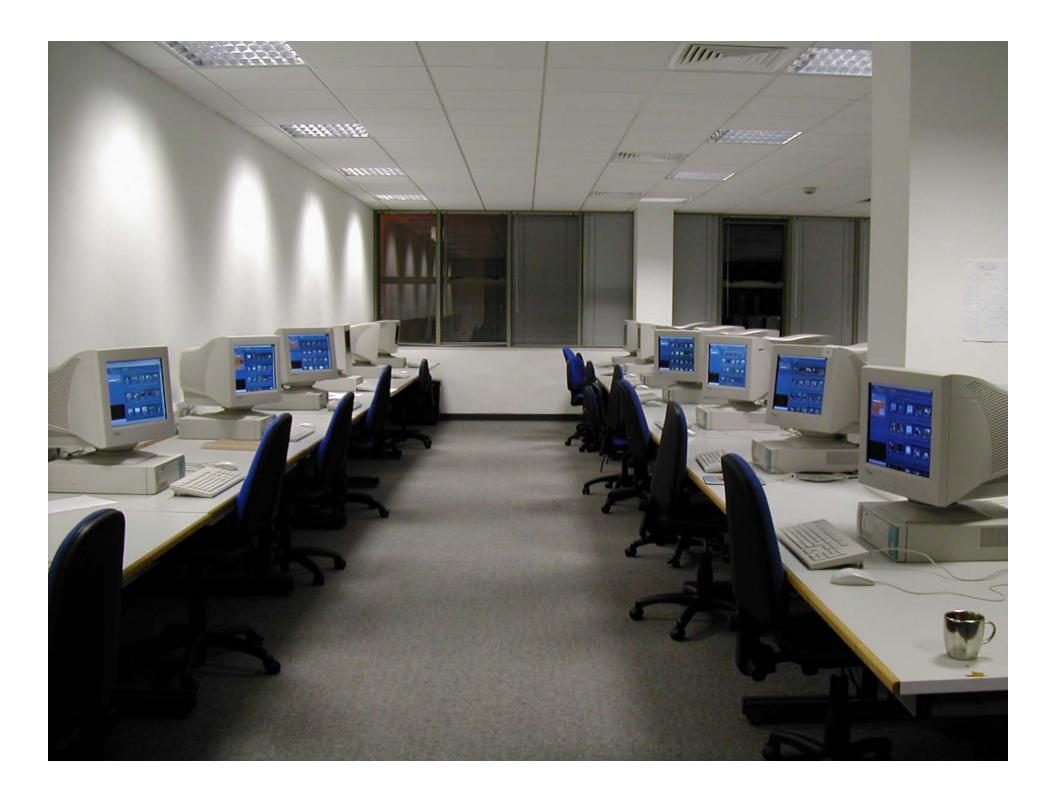


Interactive Search Experiment

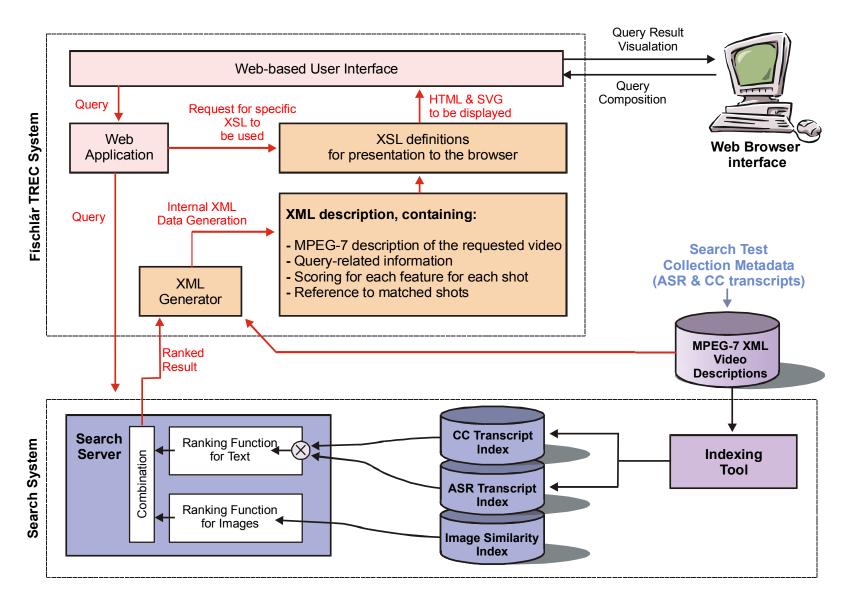
- Testing if a text/image search system incorporating 'more like this' feedback outperforms a text-only system.
- Developed two Físchlár systems:
 - Each highly interactive with a keyframe browser and playback window
 - (1) Text-only search and retrieval
 - ASR (LIMSI) & CC Text
 - (2) Text & Image search incorporating a feedback mechansim
 - ASR & CC Text
 - Keyframe-keyframe similarity (image matching)
 - 'more like this' feedback

Experiment Set-up

- User experiments in a computer lab environment
 - We used the recommended mixing algorithm for searchers / topics
 - Number of Users: 16
 - Typical postgraduate students
 - No prior experience of using the system
 - Topics per User: 12 (6 per system)
 - Minutes per Topic : 7 (last year 4 mins)
 - Each topic evaluated 8 times, 4 times on each system... reduces the effect of user variability
 - Users were trained for 10 mins then allowed two sample topics before experiment
 - Coffee, cookies & headphones were provided



System Architecture



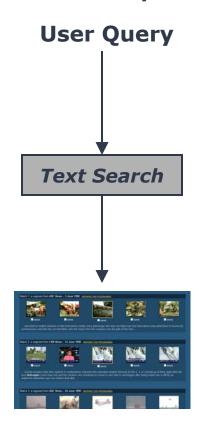


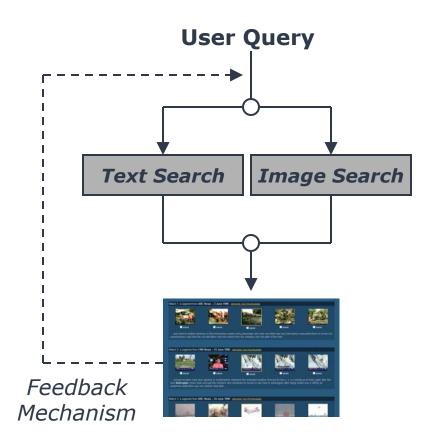
Two search options

- Text Search
 - Using conventional Search Engines (BM25)
 - Two employed, simple combination:
 - ASR Text
 - CC Text
 - Required alignment with the ASR text
- Image Search
 - Keyframe-keyframe or query imagekeyframe similarity using:
 - 4 low-level visual features
 - 3 colour-based features and 1 edge-based feature
 - Combined to produce dis-similarity values and were then normalised

User Interaction Differences

 User Interaction is/can be different for both systems:







Format of Results

- Results presented as Groups of Shots
 - Five sequential shots
 - Associated ASR text is also presented

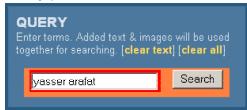


- Each shot contributes to the overall score of the group (0.08, 0.16, 0.5, 0.16, 0.08)
- Top 100 groups of shots ranked and presented in pages of size 20

Feedback Mechanism

CENTER FOR DIGITAL VIDEO PROCESSÍNG

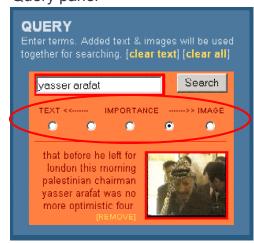
Query panel





Search result

Query panel





SAVE

✓ SAVE

Match 1: a segment from ABC News -- 3 May 1998 (BROWSE THIS PROGRAMME)

Clicking on **Add to Query** button below a keyframe adds that shot content (text and image) into Query panel: subsequent search will use this shot along with the initial text term used



Demonstration

Text, Image & Feedback System Demonstration



(P) 0 0 0 -1

- ₽ ×

Find shots from behind the pitcher in a baseball game as he throws a ball that the batter swings

Have a look at the examples below as hint for your search - where image and video examples are shown, you can click on the ADDIENT icon to use that image as a part of your query in your searching.







Video example: (Play this clip)







TASK 5:

Find shots from behind the pitcher in a baseball game as he throws a ball that the batter swings at

Have a look at the examples below as hint for your search - where image and video examples are shown, you can click on the





Video example: (Play this clip) ADD TO



Video example: (Play this clip)









0 shots saved (view saved shots)
>> Finish this Task

QUERY

Enter terms. Added text & images will be used together for searching. [clear text] [clear all]



SEARCH RESULT

Search found 100 matching shots. Following is the ranked list of the search result.

Click an image to play the segment, click on the ADDIAY icon below the image to help the subsequent searches, or tick the checkbox to save the shot as your answer.

RESULT PAGE: 1 2 3 4

Match 1: a segment from CNN News -- 21 April 1998 (BROWSE THIS PROGRAMME)











SAVE ADD T

... on wall street the dow is up thirty five and a half points the nasdaq composite gaining twelve that's dollars and sense lyn back to you thanks very much valerie **baseball** scores and highlights are coming your way next in headline sports ...

Match 2: a segment from CNN News -- 30 May 1998 (BROWSE THIS PROGRAMME)











... the board tonight in buffalo our players to this some of washington's players for granted and lost two games and when i realize that bothers a superstar and we didn't like it when i was last night the beverage open where top to continue to fall ten seed richard krajicek to lift out the hands said that the only that leaves only policing marcello rios is the survivor among the top team in seats on the women's side not as many upsets although american serena williams opted the fifth seed dominique van roost she will take on arancha sanchez the carrillo that the **baseball** the dodgers got the production from the other all star marlon they prayed for on friday told john that solo home run in the third it wasn't enough to read what ...

Match 3: a segment from ABC News -- 30 May 1998 (BROWSE THIS PROGRAMME)











... game seven tomorrow night in chicago and now from winner take all to the losers revenge and that's what it'd be if two of the nation's biggest media companies g. e. which owns n. b. c. and time warner which owns turner sports go ahead with a high risk plan to start a league of their own of football league to compete with the n. f. l. dreamers the beat here's a. b. c.'s bill redeker if you believe that he'll come in **baseball** movies perhaps but in real life football and that's what n. b. c. and turner sports fully ...







2 shots saved (view saved shots)
>> Finish this Task

QUERY

Enter terms. Added text & images will be used together for searching. [clear text] [clear all]



... on wall street the dow is up thirty five and a half points the nasdaq composite gaining twelve that's dollars and sense lyn back to you thanks very much valerie **baseball** scores and highlights are coming your way next in headline sports ...

Match 2: a segment from CNN News -- 30 May 1998 (BROWSE THIS PROGRAMME)











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Match 4: a segment from CNN News -- 8 May 1998 (BROWSE THIS PROGRAMME)









... four half months with a fractured wrist during was three for eleval with six rebounds in twenty seven minutes and new york fell down two games to zero in the series rick smith for twenty field indiana won eighty five seventy seven in baseball john smoltz proof the three annulled by driving in three runs as the braves doubled off san diego six to three the mets beat saint louis for one ...

Match 5: a segment from CNN News -- 6 May 1998 (BROWSE THIS PROGRAMME)

















2 shots saved (view saved shots)
>> Finish this Task

QUERY Enter terms. Added text & images will be used together for searching. [clear text] [clear all] baseball Search



... on wall street the dow is up thirty five and a half points the nasdaq composite gaining twelve that's dollars and sense lyn back to you thanks very much valerie **baseball** scores and highlights are coming your way next in headline sports ...

Match 2: a segment from CNN News -- 30 May 1998 (BROWSE THIS PROGRAMME)











... the board tonight in buffalo our players to this some of washington's players for granted and lost two games and when i realize that bothers a superstar and we didn't like it when i was last night the beverage open where top to continue to fall ten seed richard krajicek to lift out the hands said that the only that leaves only policing marcello rios is the survivor among the top team in seats on the women's side not as many upsets although american serena williams opted the fifth seed dominique van roost she will take on arancha sanchez the carrillo that the **baseball** the dodgers got the production from the other all star marlon they prayed for on friday told john that solo home run in the third it wasn't enough to read what ...

Match 3: a segment from ABC News -- 30 May 1998 (BROWSE THIS PROGRAMME)











... game seven tomorrow night in chicago and now from winner take all to the losers revenge and that's what it'd be if two of the nation's biggest media companies g. e. which owns n. b. c. and time warner which owns turner sports go ahead with a high risk plan to start a league of their own of football league to compete with the n. f. l. dreamers the beat here's a. b. c.'s bill redeker if you believe that he'll come in **baseball** movies perhaps but in real life football and that's what n. b. c. and turner sports fully ...

Match 4: a segment from CNN News -- 8 May 1998 (BROWSE THIS PROGRAMME)











... four half months with a fractured wrist during was three for eleven with six rd vake this shot a part of your next query and new york fell down two games to zero in the series rick smith for twenty field indiana won eighty five seventy seven in baseball john smoltz proof the three annulled by driving in three runs as the braves doubled off san diego six to three the mets beat saint louis for one ...

Match 5: a segment from CNN News -- 6 May 1998 (BROWSE THIS PROGRAMME)







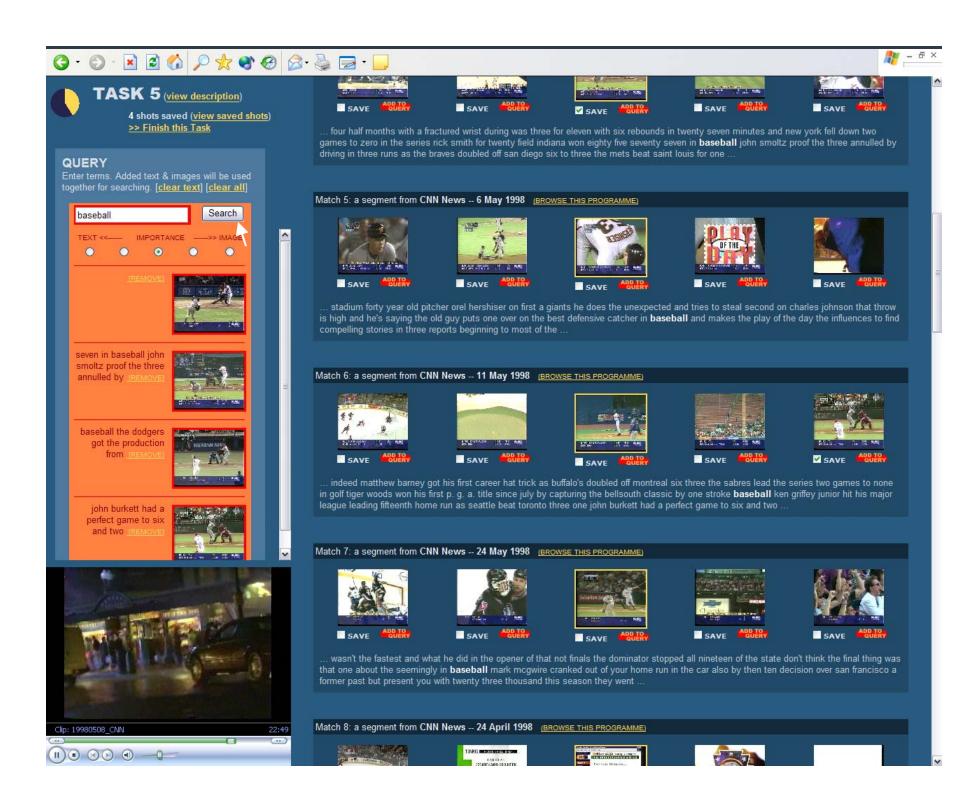






(REL) RELL ATLANTE









4 shots saved (view saved shots)
>> Finish this Task





john burkett had a

perfect game to six

and two

SEARCH RESULT

Search found 100 matching shots. Following is the ranked list of the search result.

Click an image to play the segment, click on the ADDIAN icon below the image to help the subsequent searches, or tick the checkbox to save the shot as your answer.

RESULT PAGE: 1 2 3 4

Match 1: a segment from CNN News -- 8 May 1998 (BROWSE THIS PROGRAMME)











ADD TO GUERY SAVE ADD TO GUERY SAVE

... four half months with a fractured wrist during was three for eleven with six rebounds in twenty seven minutes and new york fell down two games to zero in the series rick smith for twenty field indiana won eighty five seventy seven in **baseball** john smoltz proof the three annulled by driving in three runs as the braves doubled off san diego six to three the mets beat saint louis for one ...

Match 2: a segment from CNN News -- 30 May 1998 (BROWSE THIS PROGRAMME)











... the board tonight in buffalo our players to this some of washington's players for granted and lost two games and when i realize that bothers a superstar and we didn't like it when i was last night the beverage open where top to continue to fall ten seed richard krajicek to lift out the hands said that the only that leaves only policing marcello rios is the survivor among the top team in seats on the women's side not as many upsets although american serena williams opted the fifth seed dominique van roost she will take on arancha sanchez the carrillo that the **baseball** the dodgers got the production from the other all star marlon they prayed for on friday told john that solo home run in the third it wasn't enough to read what ...

Match 3: a segment from CNN News -- 24 May 1998 (BROWSE THIS PROGRAMME)











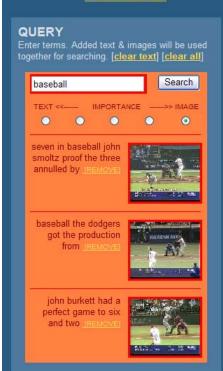
... wasn't the fastest and what he did in the opener of that not finals the dominator stopped all nineteen of the state don't think the final thing was that one about the seemingly in **baseball** mark mcgwire cranked out of your home run in the car also by then ten decision over san francisco a former past but present you with twenty three thousand this season they went ...

Match 4: a segment from CNN News -- 11 May 1998 (BROWSE THIS PROGRAMME)





7 shots saved (view saved shots)
>> Finish this Task





SEARCH RESULT

Search found 100 matching shots. Following is the ranked list of the search result.

Click an image to play the segment, click on the ADDIAN icon below the image to help the subsequent searches, or tick the checkbox to save the shot as your answer.

RESULT PAGE: 1 2 3 4

Match 1: a segment from CNN News -- 30 May 1998 (BROWSE THIS PROGRAMME)











... the board tonight in buffalo our players to this some of washington's players for granted and lost two games and when i realize that bothers a superstar and we didn't like it when i was last night the beverage open where top to continue to fall ten seed richard krajicek to lift out the hands said that the only that leaves only policing marcello rios is the survivor among the top team in seats on the women's side not as many upsets although american serena williams opted the fifth seed dominique van roost she will take on arancha sanchez the carrillo that the **baseball** the dodgers got the production from the other all star marlon they prayed for on friday told john that solo home run in the third it wasn't enough to read what ...

Match 2: a segment from CNN News -- 11 May 1998 (BROWSE THIS PROGRAMME)











... baseball ken griffey junior hit his major league leading fifteenth home run as seattle beat toronto three one john burkett had a perfect game to six and two thirds innings and helped the taxes that we've five to three national league the braves beat san diego eight to five and tied a franchise record hitting home runs and ...

Match 3: a segment from CNN News -- 8 May 1998 (BROWSE THIS PROGRAMME)











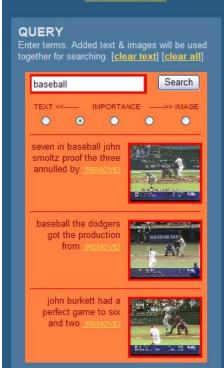
... four half months with a fractured wrist during was three for eleven with six rebounds in twenty seven minutes and new york fell down two games to zero in the series rick smith for twenty field indiana won eighty five seventy seven in **baseball** john smoltz proof the three annulled by driving in three runs as the braves doubled off san diego six to three the mets beat saint louis for one ...

Match 4: a segment from CNN News -- 23 May 1998 (BROWSE THIS PROGRAMME)





7 shots saved (view saved shots)
>> Finish this Task





CNN News -- 8 May 1998

The **timeline** below shows where your query matched in this programme, and below it the full content of the news - click on the timeline to bring up the corresponding segment below. Click an image to play the segment, click on the ADDIEN icon below the image to help the subsequent searches, or tick the checkbox to save the clip as your answer.

Back to SEARCH RESULT



at ninety eight in the extra period jazz up three eighths sitting down maker of desperation three hit the iron utah wins one oh nine one oh six and goes up two games to nothing in this series and needs patrick ewing made his comeback last night after missing four half months with a fractured wrist during was three for eleven with six rebounds in twenty seven minutes and new york fell down two games to zero in the series rick smith for twenty field indiana won eighty five seventy



seven in **baseball** john smoltz proof the three annulled by driving in three runs as the braves doubled off san diego six to three the mets beat saint louis for one rookie preston wilson the stepson of mookie wilson had three hits and an r. b. i, his major league debut



american league roger clemens extended his scoreless innings streak to eighteen helped lead toronto past seattle six nothing the mariners traded sixteen setting an american league record on the ice dallas took the opener of the western conference semifinals with a three one win over edmonton thursday's new ball scored twice washington won game one of the eastern conference semifinals four to over ottawa at a most



peter bondra and brian bellows all scored russell biven c. n. n. headline to the n. h. l. playoffs is the senators and capitals caps goalie olaf kolzig stops nice shot from the point that makes it incredible glove save to stop the rebound and since you probably didn't see any of that let's look again on on a geiger has the easy rebound goal but kolzig robs him with the glove















7 shots saved (view saved shots)
>> Finish this Task



john burkett had a

perfect game to six and two removes



SAVED SHOTS

You saved 7 video shots, shown below - these are your answers to the current task. Uncheck the checkbox beside each shot if you don't think it is a correct answer for the task.

Click on the ACCIECT icon to make that shot a part of your next query. Click an image to play the video from that shot.

REFRESH THE LISTI





(shot length: 00:00:02) baseball the dodgers got the production from

SAVE

A shot from CNN News (BROWSE THIS PROGRAMME)



(shot length: 00:00:03) seven in baseball john smoltz proof the three annulled by

✓ SAVE

A shot from CNN News (BROWSE THIS PROGRAMME)



(shot length: 00:00:02) john burkett had a perfect game to six and two

✓ SAVE

A shot from CNN News (BROWSE THIS PROGRAMME)



(shot length: 00:00:05) let's go to last night's baseball action where one can solace when he and drove in five runs

✓ SAVE

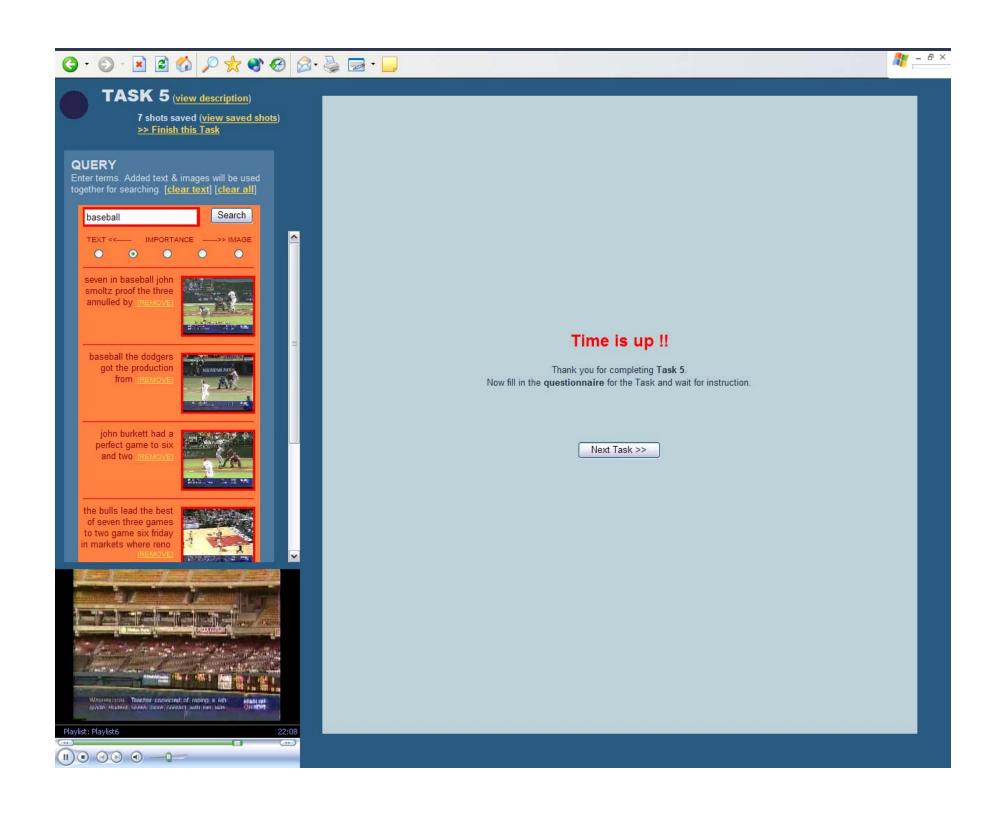
A shot from CNN News (BROWSE THIS PROGRAMME)



(shot length: 00:00:05) in baseball mark mcgwire cranked out of your home run in the car also by then ten decision over san

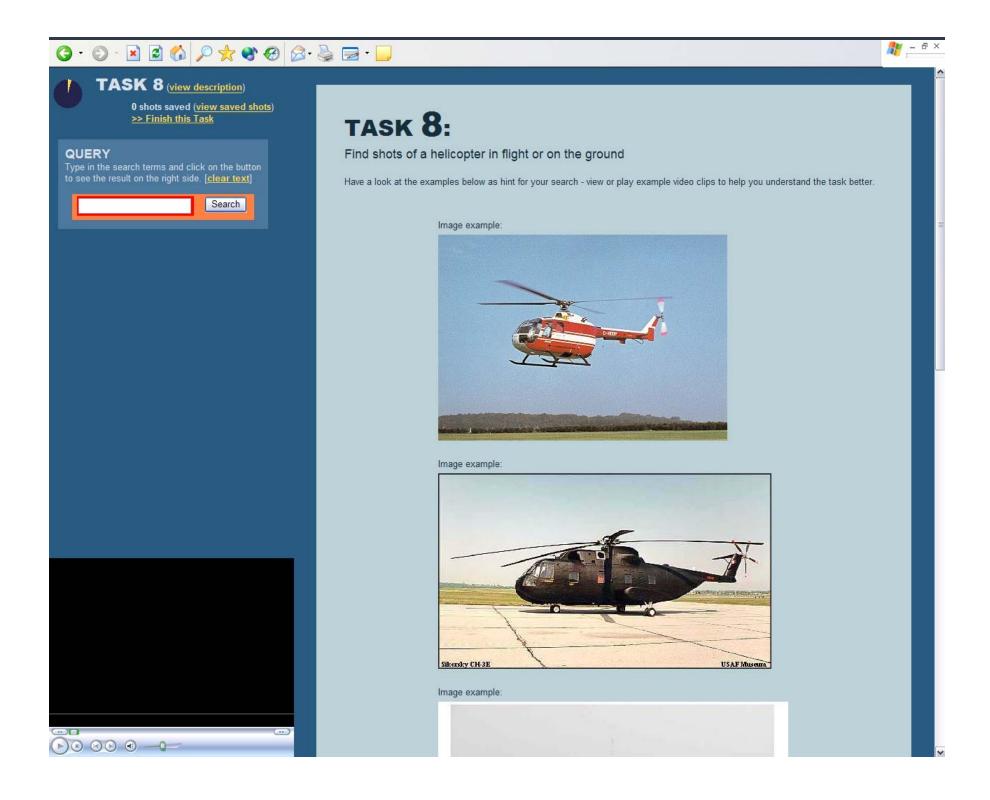
SAVE

A shot from CNN News (BROWSE THIS PROGRAMME)



Demonstration

Text-only System Demonstration







0 shots saved (view saved shots)
>> Finish this Task

QUERY

Type in the search terms and click on the button to see the result on the right side. [clear text]

helicopter

(P) (B) (B) (-1)

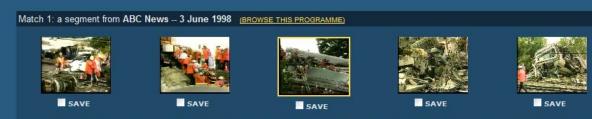
Search

SEARCH RESULT

Search found 27 matching shots. Following is the ranked list of the search result.

Click an image to play the segment, or tick the checkbox to save the shot as your answer.

RESULT PAGE: 1



... and steel to shatter windows to free themselves nearly every passenger who was not killed was hurt helicopters evacuated them to house but eyewitnesses said that the car had fallen onto the tracks from the overpass into the path of the train ...



... closed tornados were also spotted in southeastern nebraska the extended weather forecast for the u. s. is coming up at thirty eight after the hour **helicopter** crews have rescued the climbers who remained on mount to rain here in washington after being swept over a cliff by an avalanche authorities say one climber died after ...







6 shots saved (view saved shots)
>> Finish this Task

QUERY

Type in the search terms and click on the button to see the result on the right side. [clear text]

helicopter flight chopper

Search

SEARCH RESULT

Search found 100 matching shots. Following is the ranked list of the search result.

Click an image to play the segment, or tick the checkbox to save the shot as your answer.

SULT PAGE: 1 2 3 4













E

... peterson's statement to investigators was devastating to hurt the fans rescue workers in bogota colombia say there're no signs of survivors in the crash of a boeing seven twenty seven air france **flight** four twenty two slammed into a mountain here the capital moments after takeoff

Match 2: a segment from ABC News -- 3 June 1998 (BROWSE THIS PROGRAMME)











SAVE

yesterday all fifty three people on board are feared dead and that plane was leased by a company from .

... and steel to shatter windows to free themselves nearly every passenger who was not killed was hurt helicopters evacuated them to house but eyewitnesses said that the car had fallen onto the tracks from the overpass into the path of the train ...

Match 3: a segment from CNN News -- 12 June 1998 (BROWSE THIS PROGRAMME)











SAVE

SAVE

SAVE

SAVE

SAVE

... closed tornados were also spotted in southeastern nebraska the extended weather forecast for the u. s. is coming up at thirty eight after the hour **helicopter** crews have rescued the climbers who remained on mount to rain here in washington after being swept over a cliff by an avalanche authorities say one climber died after ...

Match 4: a segment from ABC News -- 24 June 1998 (BROWSE THIS PROGRAMME)





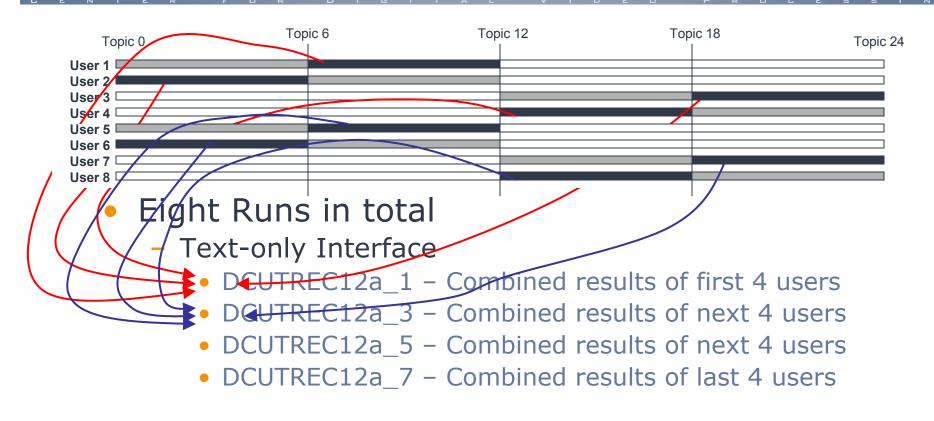








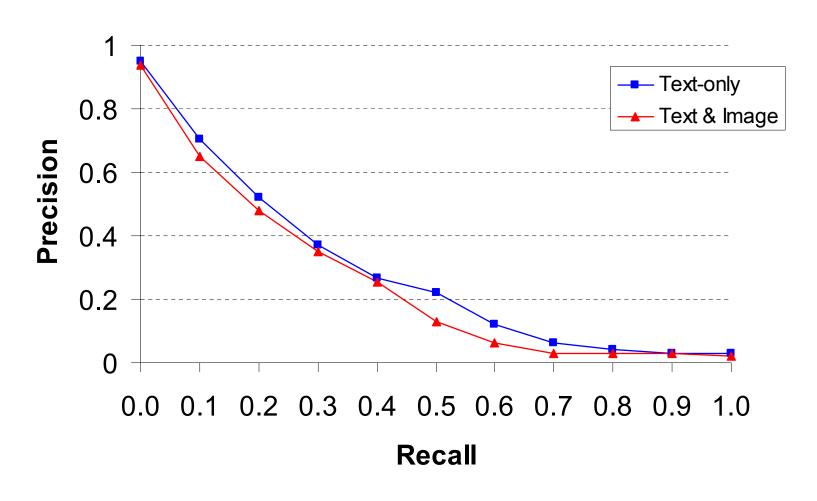
Submitted Runs



- Text, Image & Feedback Interface
 - DCUTREC12b_2 Combined results of first 4 users
 - DCUTREC12b_4 Combined results of next 4 users
 - DCUTREC12b_6 Combined results of next 4 users
 - DCUTREC12b_8 Combined results of last 4 users

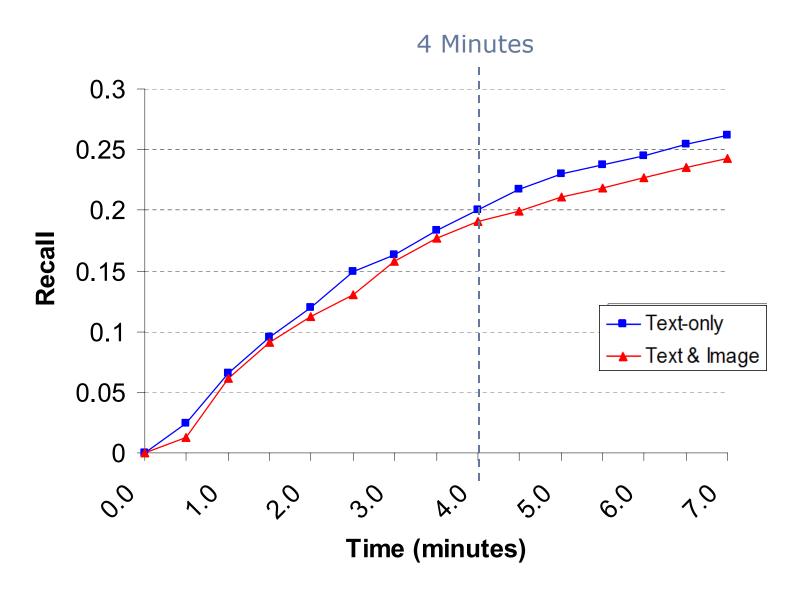
Precision Recall graph

Aggregation of all 4 runs for each system



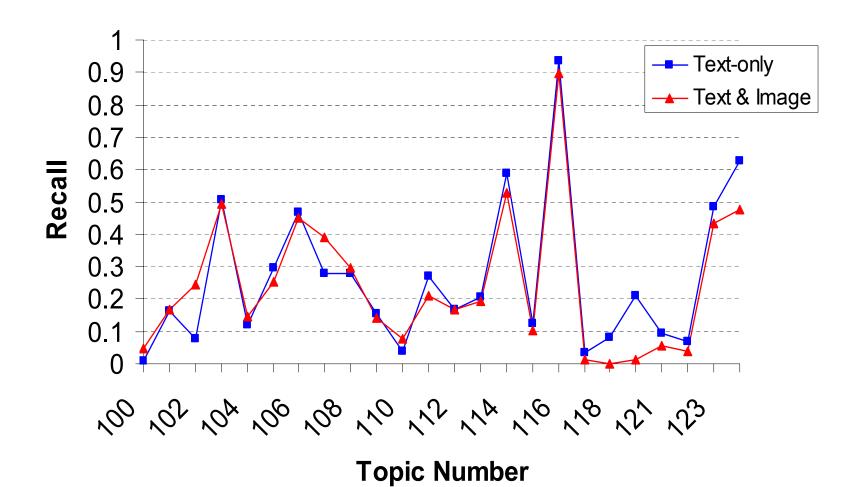


Examing time





Recall over Topic



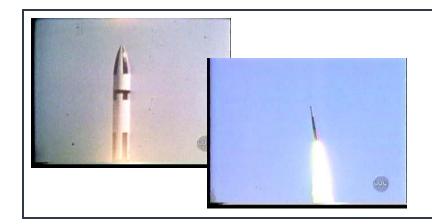


Text, Image & Feedback Queries



Topic 102

Find shots from behind the pitcher in a baseball game as he throws a ball that the batter swings at



Topic 107

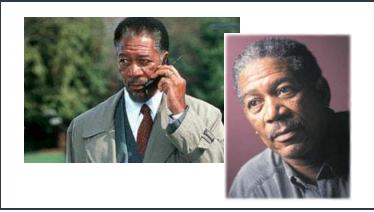
Find shots of a rocket or missile taking off. Simulations are acceptable

Text-only Queries



Topic 111

Find shots with a locomotive (and attached railroad cars if any) approaching the viewer

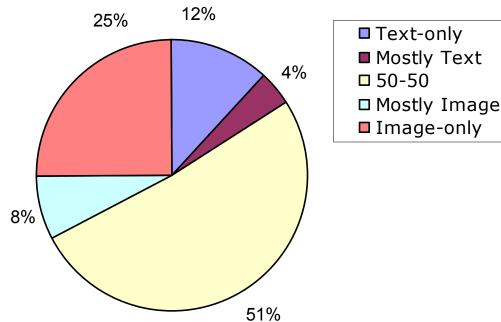


Topic 119 Find shots of Morgan Freeman

User Observations

- Average of 6 queries / topic (both systems)
 - 564 in total on the Text-only and 581 on Text,
 Image and Feedback
 - Of 581 Text, Image & Feedback Queries:
 - > 99% contain text and 81% contain an image
- When given the choice, users chose:







Conclusions

- Both systems perform comparably
 - Text-only seems to be slightly better than the text, image and feedback system
 - But not by any significant amount
- Why is this the case?
 - Text-only is better...
 - Users more comfortable with text querying...
 - Query response time of the text, image and feedback system was slower than text-only...
 - By a few seconds only over the seven minutes.
- We still have more work to do on evaluating the user data gathered during the experiments

