Designing Novel Applications for Multimedia

Connecting Emerging Multimedia Techniques to Usable Application Scenarios

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Example 1: Interactive TV for Multimedia

Multimedia Techniques

- Shot Boundary Detection
- Scene Detection and Classification
- News Story Segmentation
- Sports Summarisation
- Content-based Searching
- Meta-data augmentation by crawling the Web
- Video Recommendation

+ Network and Storage on the TV set

Characteristics of TV Interaction

- Lean-back (as opposed to Lean-forward)
- Multiple levels of viewer attention
- Use of remote control (as opposed to Mouse/Keyboard)
- Divided attention between playback and interactive elements

=> Design Implications!

Solution – Combination of:

- Overlay & semi-transparency
  - Supporting passive & active viewing
- Multiple levels of interface sophistication
  - Simple interaction while supporting sophisticated features
- Colour buttons for flat (shallow) menu access
  - No deep navigation with remote
- Genre-dependent presentation
  - One button action resulting in variety of presentation depending on the context of watching
- Query without text input
  - Shift interaction burden from the viewer to the system

Lee H, Ferguson P, Gurrin C, Smeaton A.F, O'Connor N and Park H. Balancing the Power of Multimedia Information Retrieval and Usability in Designing Interactive TV. uxTV 2008 - International Conference on Designing Interactive User Experiences for TV and Video, Mountain View, CA, 22-24 October 2008.

Example 2:
LifeLogging with SenseCam

SenseCam: What is it?

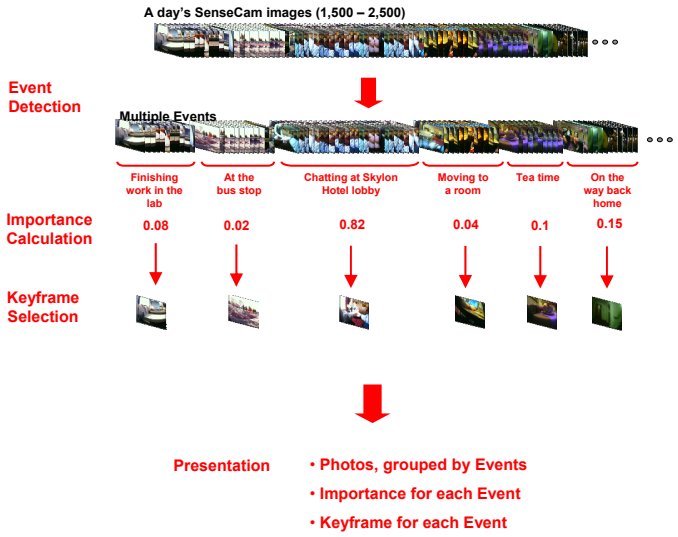
- **Wearable digital camera** with sensors:
  - Light sensor
  - Passive infra-red sensor
  - Accelerometer (X-Y-Z axes)
  - Ambient thermometer
- Sensor status triggers automatic photo capture: **"Passive Capture"**

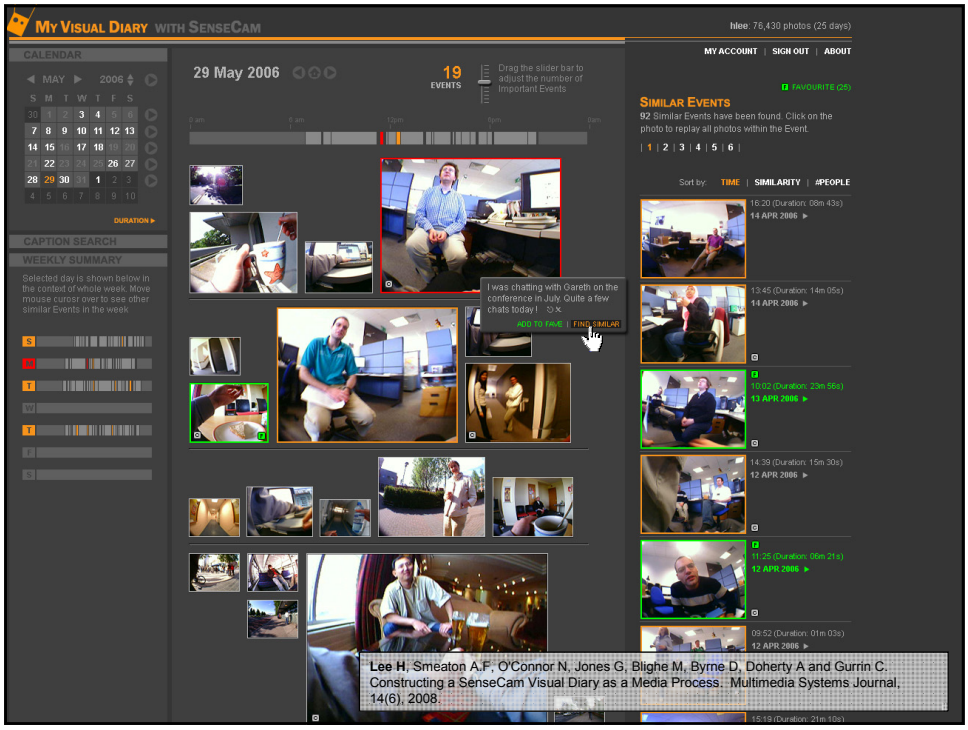
What does it generate?

- **About 1,500 - 2,500 photos** on an average day

=> Example: review of my day…

- To structure images automatically, using content-based Multimedia techniques...





Lee H, Smeaton A.F, O'Connor N, Jones G, Blighe M, Byrne D, Doherty A and Gurrin C. Constructing a SenseCam Visual Diary as a Media Process. Multimedia Systems Journal, 14(6), 2008.

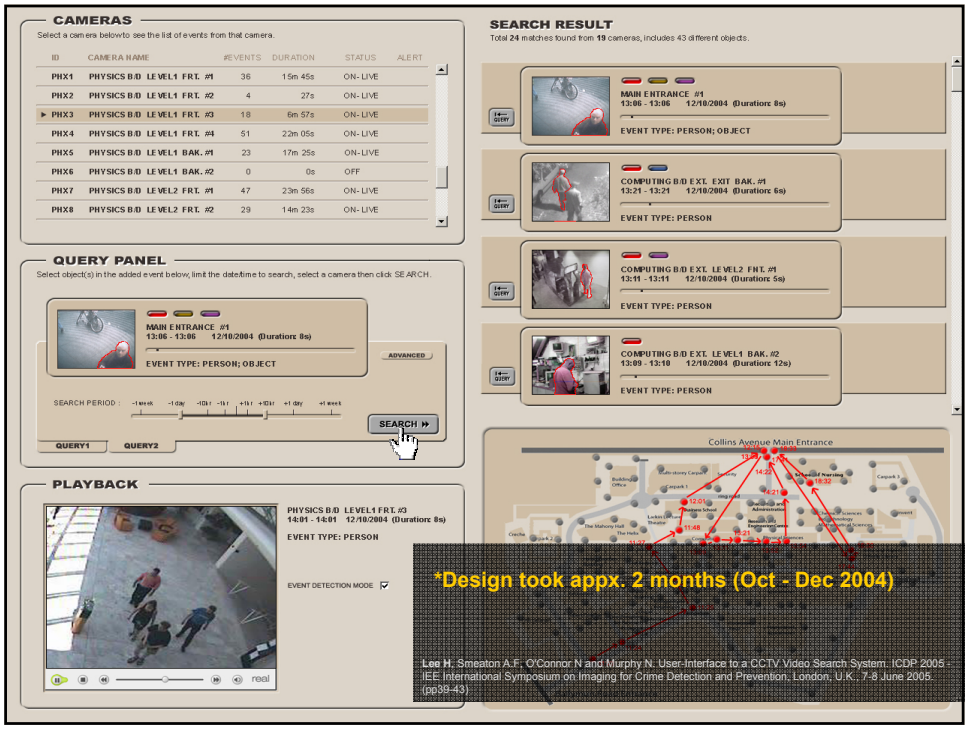
Interaction Design for Multimedia: Challenge

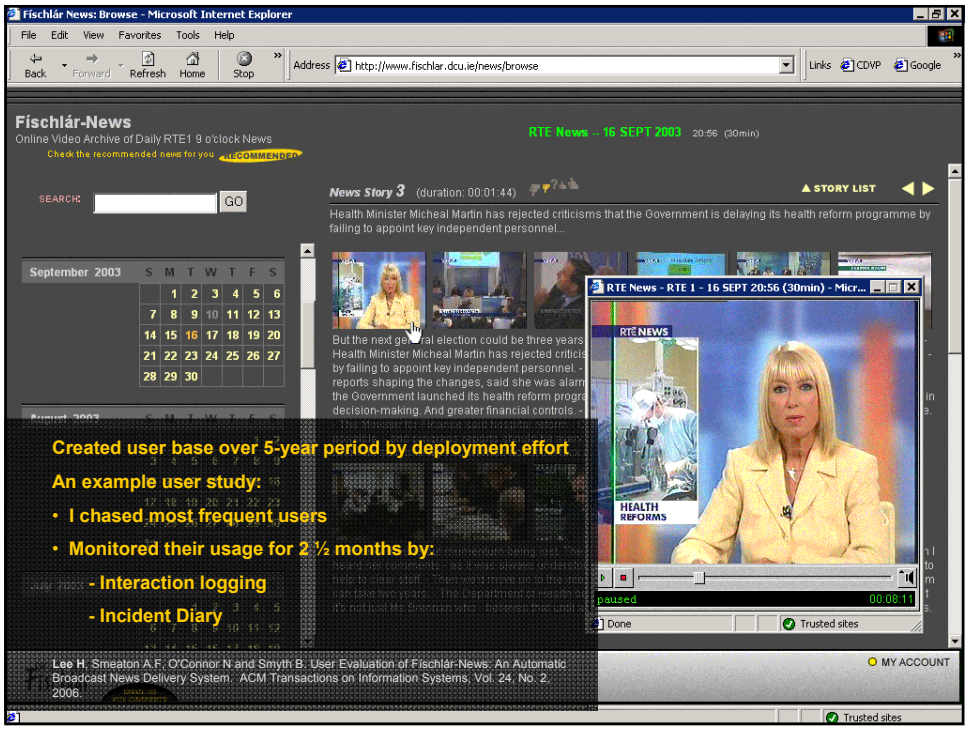
- Often no "typical users" available: new breed of automatic multimedia indexing systems not yet currently in use
  - Establishing user requirements & needs problematic
  - User testing problematic

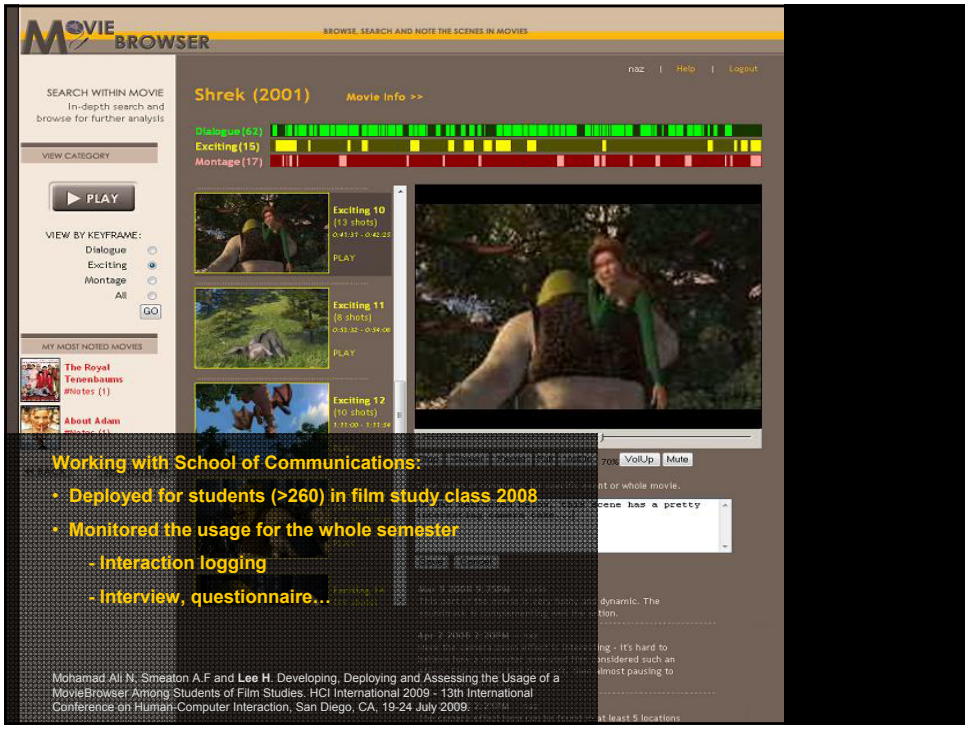
    => So I tend to depend heavily on general principles & minimal/assumed usage


QUERY PANEL
SEARCH RESULT
TASK 1
SAVED SHOTS
*Design took appx. Near full-time 4 months (April - July 2004)
O'Connor N, Lee H, Smeaton A.F., Jones G, Cooke E, Le Borgne H and Gurrin C. Fischlár-TRECVid2004: Combined Text- and Image-Based Searching of Video Archives. ISCAS 2006 - IEEE International Symposium on Circuits and Systems, Kos, Greece, 21-24 May 2006.


MY FRIENDS' FACES
On the table
*Design took total 5 months (February – June 2007), involving:
• 3 Major re-design
• 3 Brainstorming & whiteboarding with all involved
• 8 Brainstorming with a 3-people design team
• Total 11 Iterative refinements
User-Feedback on a Feature-Rich Photo Organiser. Sadlier D, Lee H, Gurrin C, Smeaton A.F and O'Connor N. WIAMIS 2008 - 9th International Workshop on Image Analysis for Multimedia Interactive Services, Klagenfurt, Austria, 7-9 May 2008.


CAMERAS
Select a camera belowto see the list of events from that camera.
ID CAMERA NAME #EVENTS DURATION STATUS ALERT
PHX1 PHYSICS B/D LEVEL1 FRT. #1 36 15m 45s ON-LIVE
PHX2 PHYSICS B/D LEVEL1 FRT. #2 4 27s ON-LIVE
PHX3 PHYSICS B/D LEVEL1 FRT. #3 18 6m 57s ON-LIVE
PHX4 PHYSICS B/D LEVEL1 FRT. #4 51 22m 05s ON-LIVE
PHX5 PHYSICS B/D LEVEL1 BAK. #1 23 17m 25s ON-LIVE
PHX6 PHYSICS B/D LEVEL1 BAK. #2 0 0s OFF
PHX7 PHYSICS B/D LEVEL2 FRT. #1 47 23m 56s ON-LIVE
PHX8 PHYSICS B/D LEVEL2 FRT. #2 29 14m 23s ON-LIVE
QUERY PANEL
Select object(s) in the added event below, limit the date/time to search, select a camera then click SEARCH.
MAIN ENTRANCE #1
13:06 - 13:06 12/10/2004 (Duration: 8s)
EVENT TYPE: PERSON; OBJECT
ADVANCED
SEARCH PERIOD :
SEARCH
QUERY1
QUERY2
PLAYBACK
PHYSICS B/D LEVEL1 FRT. #3
14:01 - 14:01 12/10/2004 (Duration: 8s)
EVENT TYPE: PERSON
EVENT DETECTION MODE
real
SEARCH RESULT
Total 24 matches found from 19 cameras, includes 43 different objects.
MAIN ENTRANCE #1
13:06 - 13:06 12/10/2004 (Duration: 8s)
EVENT TYPE: PERSON; OBJECT
COMPUTING B/D EXT. EXIT BAK. #1
13:21 - 13:21 12/10/2004 (Duration: 6s)
EVENT TYPE: PERSON
COMPUTING B/D EXT. LEVEL2 FNT. #1
13:11 - 13:11 12/10/2004 (Duration: 5s)
EVENT TYPE: PERSON
COMPUTING B/D EXT. LEVEL1 BAK. #2
13:09 - 13:10 12/10/2004 (Duration: 12s)
EVENT TYPE: PERSON
Collins Avenue Main Entrance
*Design took appx. 2 months (Oct - Dec 2004)
Lee H. Smeaton A.F. O'Connor N and Murphy N. User-Interface to a CCTV Video Search System. ICDP 2005 - IEE International Symposium on Imaging for Crime Detection and Prevention. London, U.K., 7-8 June 2005. (pp39-43)


Fischlár News: Browse - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Refresh Home Stop
Address http://www.fischlar.dcu.ie/news/browse
Links CDVP Google
Fischlár-News
Online Video Archive of Daily RTE1 9 o'clock News
Check the recommended news for you RECOMMENDER
SEARCH: GO
RTE News -- 16 SEPT 2003 20:56 (30min)
News Story 3 (duration: 00:01:44)
STORY LIST
Health Minister Micheal Martin has rejected criticisms that the Government is delaying its health reform programme by failing to appoint key independent personnel...
September 2003
RTE News - RTE 1 - 16 SEPT 20:56 (30min) - Micr...
RTE NEWS
HEALTH REFORMS
paused 00:08:11
Done
Trusted sites
MY ACCOUNT
Created user base over 5-year period by deployment effort
An example user study:
• I chased most frequent users
• Monitored their usage for 2 ½ months by:
- Interaction logging
- Incident Diary
Lee H. Smeaton A.F. O'Connor N and Smyth B. User Evaluation of Fischlár-News: An Automatic Broadcast News Delivery System. ACM Transactions on Information Systems, Vol. 24, No. 2, 2006.



Conclusion

- HCI activity in Multimedia group
  - Come up with novel application scenarios
  - Design interaction strategies
- Design consultancy within the group…
- "Educating" our members on HCI and usability
- Help our group envisage the future usage of the developing technologies

Thank you