Multi-User, Multi-Site Experiments: K-Space @ TRECVID 2008

Pete Wilkins, … and many others

Overview

- K-Space: Who we are (1)
- Experiment Overview (3)
- System/Interfaces Overview (4)
- Experimental Analysis (7)
- Conclusion (1)

K-Space: Who we are [1/1]

- European Network of Excellence (NoE), ending 2008, specializing in Content Analysis, Knowledge Extraction, Semantic Inference
- Comprised of 14 European Academic and Research groups
- TRECVID 2008 involved 11 partner institutes contributing towards search engine and/or search experiment
- Groups involved include:
  - *DCU, CWI, Eurecom, ITI, JRS, QMUL, TUB, UEP, UG*
- Developed resources available to community:

  http://kspace.cdvp.dcu.ie/

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Experiment Overview [1/3]

- Multi-Site, Multi-System User experiment
- Key components:
  - 3 User Interfaces developed
  - 1 Common search engine
  - 3 Geographically disparate sites (Amsterdam, Dublin, Glasgow)
  - 12 Users per site, 36 total
- Objective: To isolate as many variables as possible that may affect Interactive Video IR performance, notably:
  - User Interface impact
  - User effect
  - Site effect

Experiment Overview [2/3]

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
S1	GU	GU	GU	GU					DCU_1	DCU_1	DCU_1	DCU_1									DCU_2	DCU_2	DCU_2	DCU_2
S2	DCU_1	DCU_1	DCU_1	DCU_1					DCU_2	DCU_2	DCU_2	DCU_2									GU	GU	GU	GU
S3	DCU_2	DCU_2	DCU_2	DCU_2					GU	GU	GU	GU									DCU_1	DCU_1	DCU_1	DCU_1
S4	GU	GU	GU	GU									DCU_1	DCU_1	DCU_1	DCU_1	DCU_2	DCU_2	DCU_2	DCU_2				
S5	DCU_1	DCU_1	DCU_1	DCU_1									DCU_2	DCU_2	DCU_2	DCU_2	GU	GU	GU	GU				
S6	DCU_2	DCU_2	DCU_2	DCU_2									GU	GU	GU	GU	DCU_1	DCU_1	DCU_1	DCU_1				
S7					GU	GU	GU	GU	DCU_1	DCU_1	DCU_1	DCU_1					DCU_2	DCU_2	DCU_2	DCU_2				
S8					DCU_1	DCU_1	DCU_1	DCU_1	DCU_2	DCU_2	DCU_2	DCU_2					GU	GU	GU	GU				
S9					DCU_2	DCU_2	DCU_2	DCU_2	GU	GU	GU	GU					DCU_1	DCU_1	DCU_1	DCU_1				
S10					GU	GU	GU	GU					DCU_1	DCU_1	DCU_1	DCU_1					DCU_2	DCU_2	DCU_2	DCU_2
S11					DCU_1	DCU_1	DCU_1	DCU_1					DCU_2	DCU_2	DCU_2	DCU_2					GU	GU	GU	GU
S12					DCU_2	DCU_2	DCU_2	DCU_2					GU	GU	GU	GU					DCU_1	DCU_1	DCU_1	DCU_1

- Each user completed 12 topics, 4 topics on each system
- Topic assignment from Latin Squares experiment design
- Order of systems was randomized
- Order of topic progression for a system was not randomized
- Prior to each system, user was shown demonstration video and had 1 training topic of 5 minutes duration to learn the system.

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Experiment Overview [3/3]

- Quantitative and qualitative data captured
- Qualitative data in form of survey questions at:
  - Pre-experiment
  - Post-topic
  - Post-system
- Extensive time-stamped logging, events including:
  - Searches made, type & terms used
  - Shot saved
  - Shot played
  - Shot removed

System/Interfaces Overview [1/4]

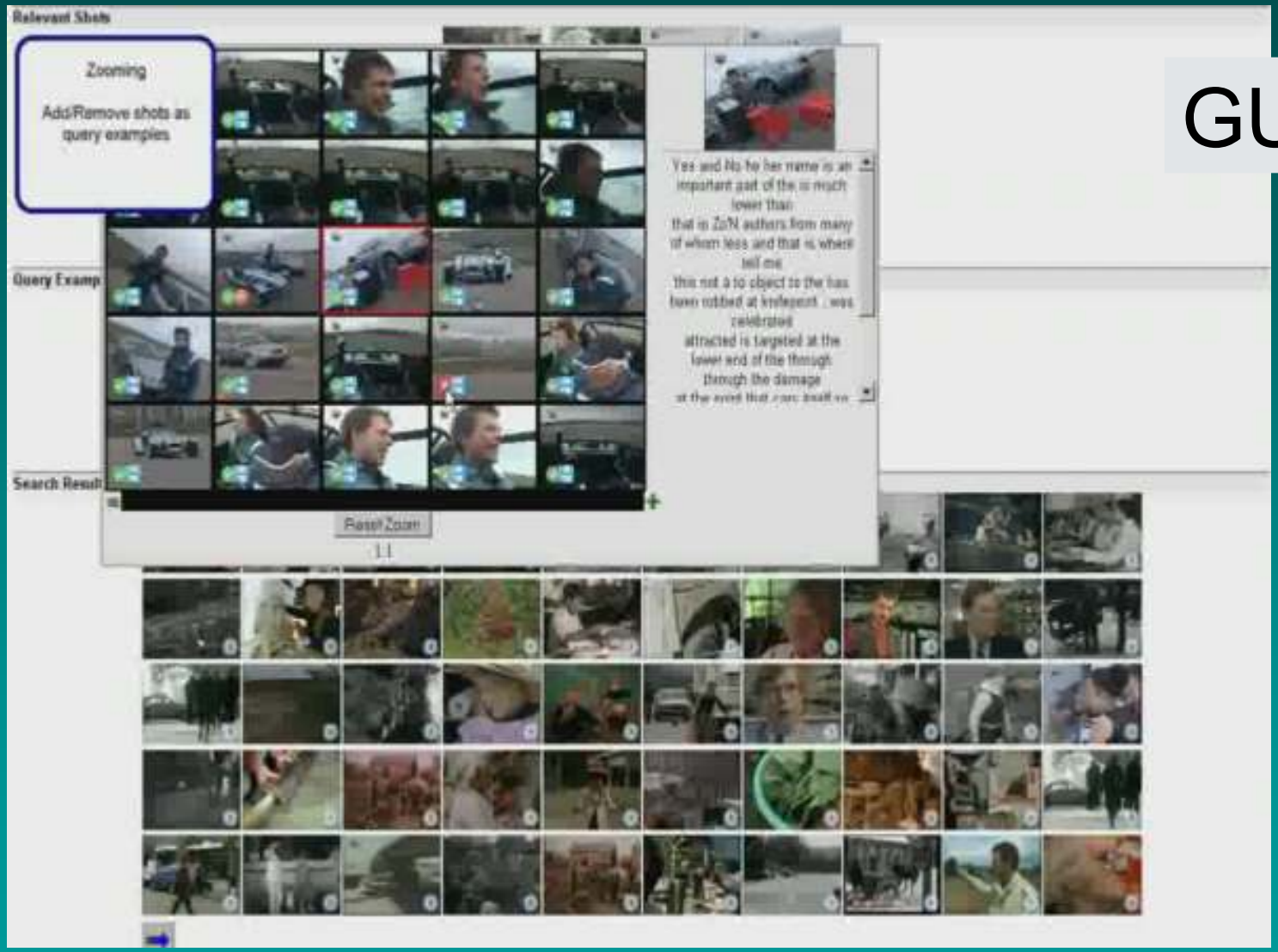
- Common Search Engine allows for:
  - Text only search
  - Multiple Query by Example
  - Multimodal Search
- Text Search:
  - ASR Indexed
  - CU-VIREO 374 (Thanks to Columbia and CUHK) and additional semantic feature terms expanded through WordNet and indexed with shot
- Visual Search:
  - Low-level MPEG-7 visual features for visual similarity
- Set of audio and visual ‘filters’ available

System/Interfaces Overview [2/4]

DCU-1

System/Interfaces Overview [3/4]

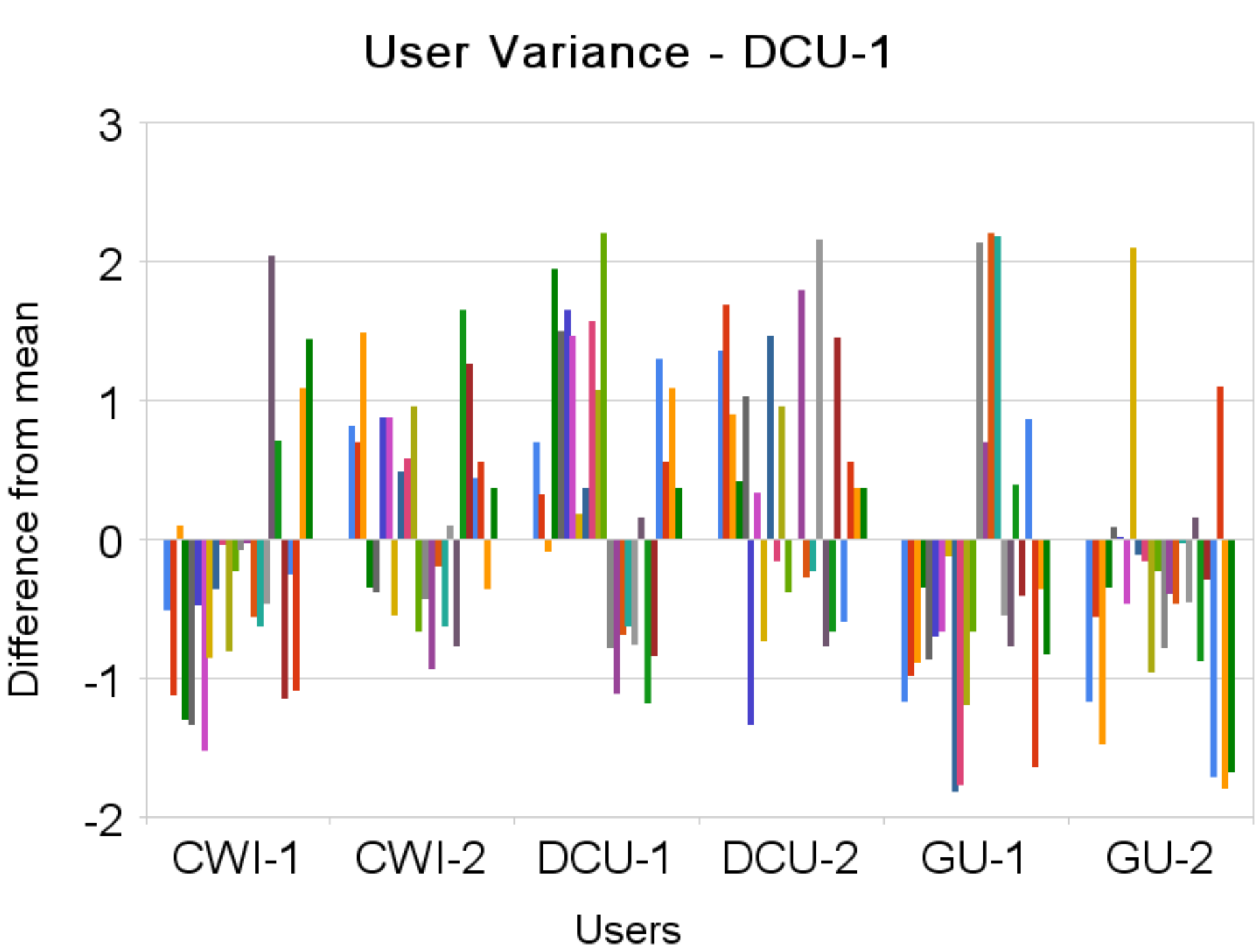
System/Interfaces Overview [4/4]

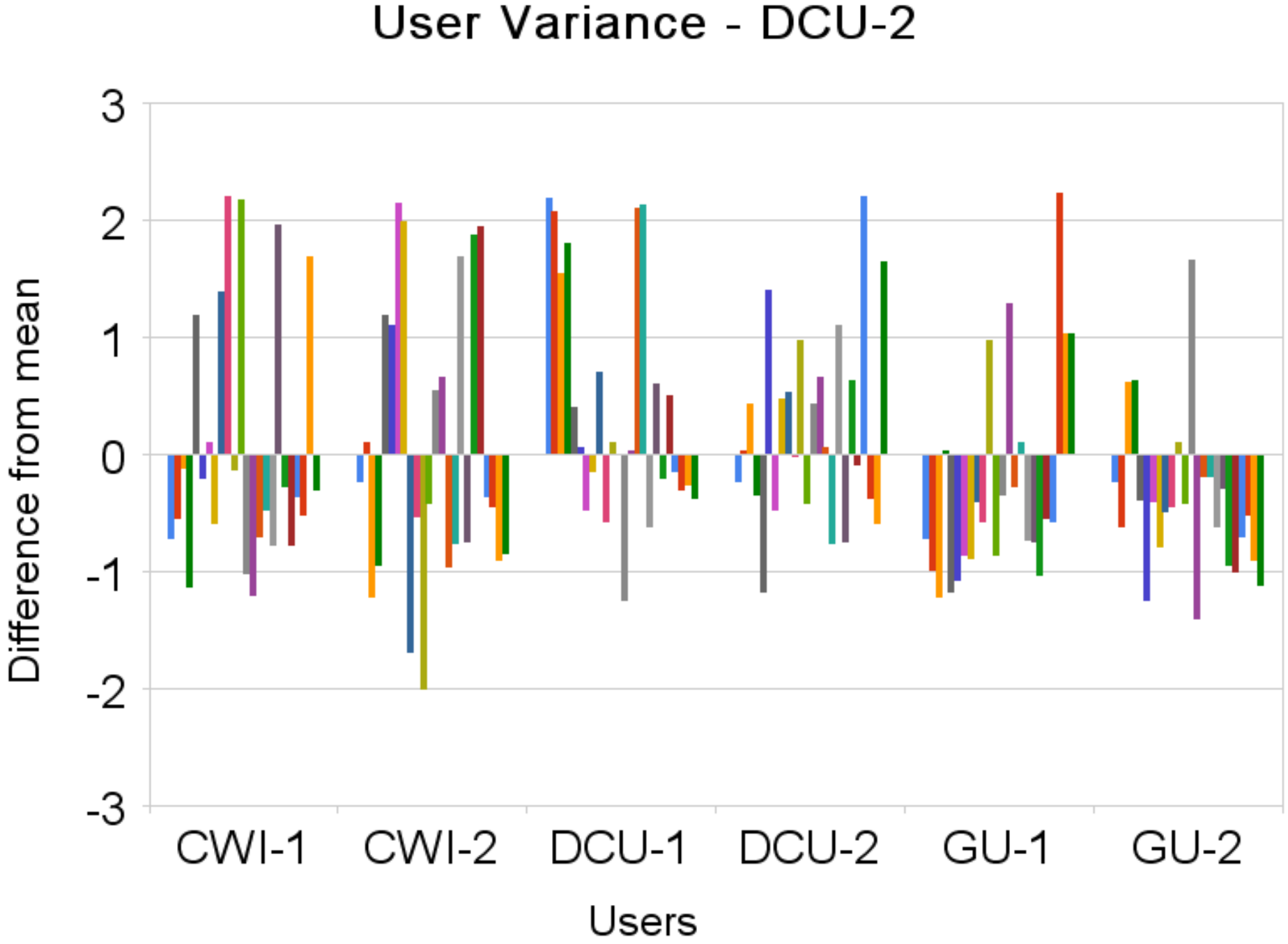


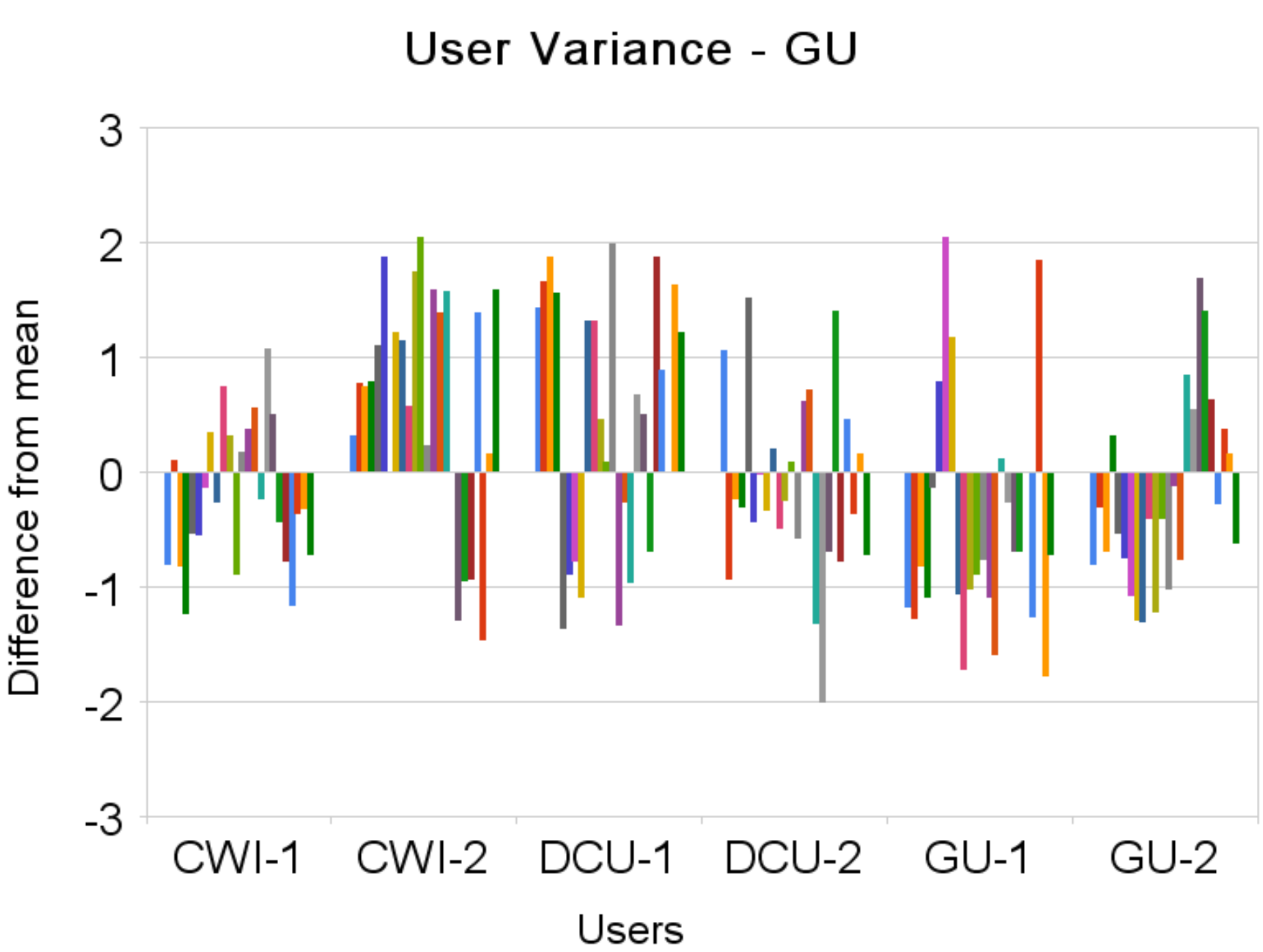
GU

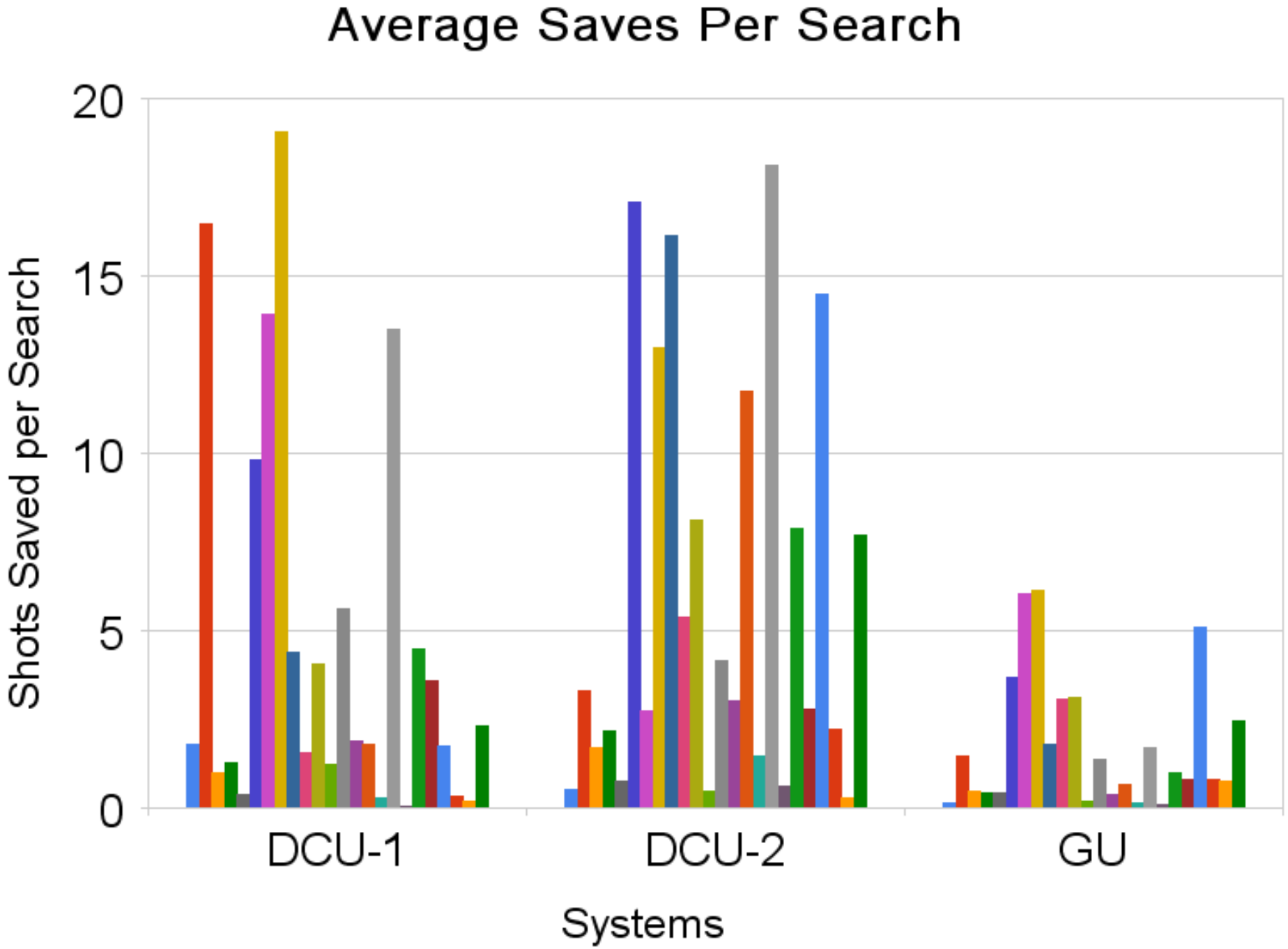
Analysis [1/7]

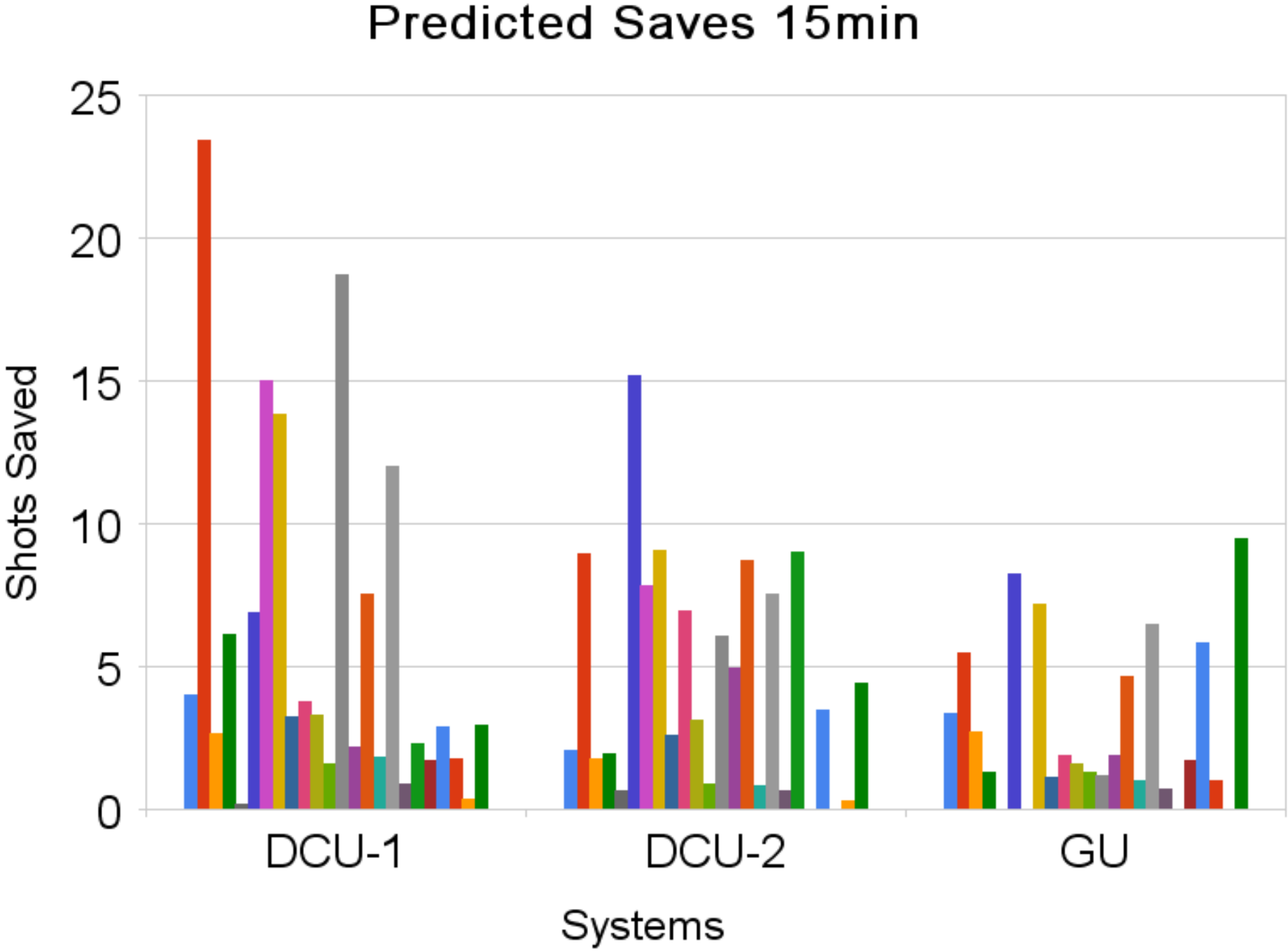
- Analysis presented here is preliminary
- Very large amount of experimental data, allowing multiple research questions to be examined
- Data to be made available
- Following analysis from viewpoint that if user saved shot it was considered relevant to that user

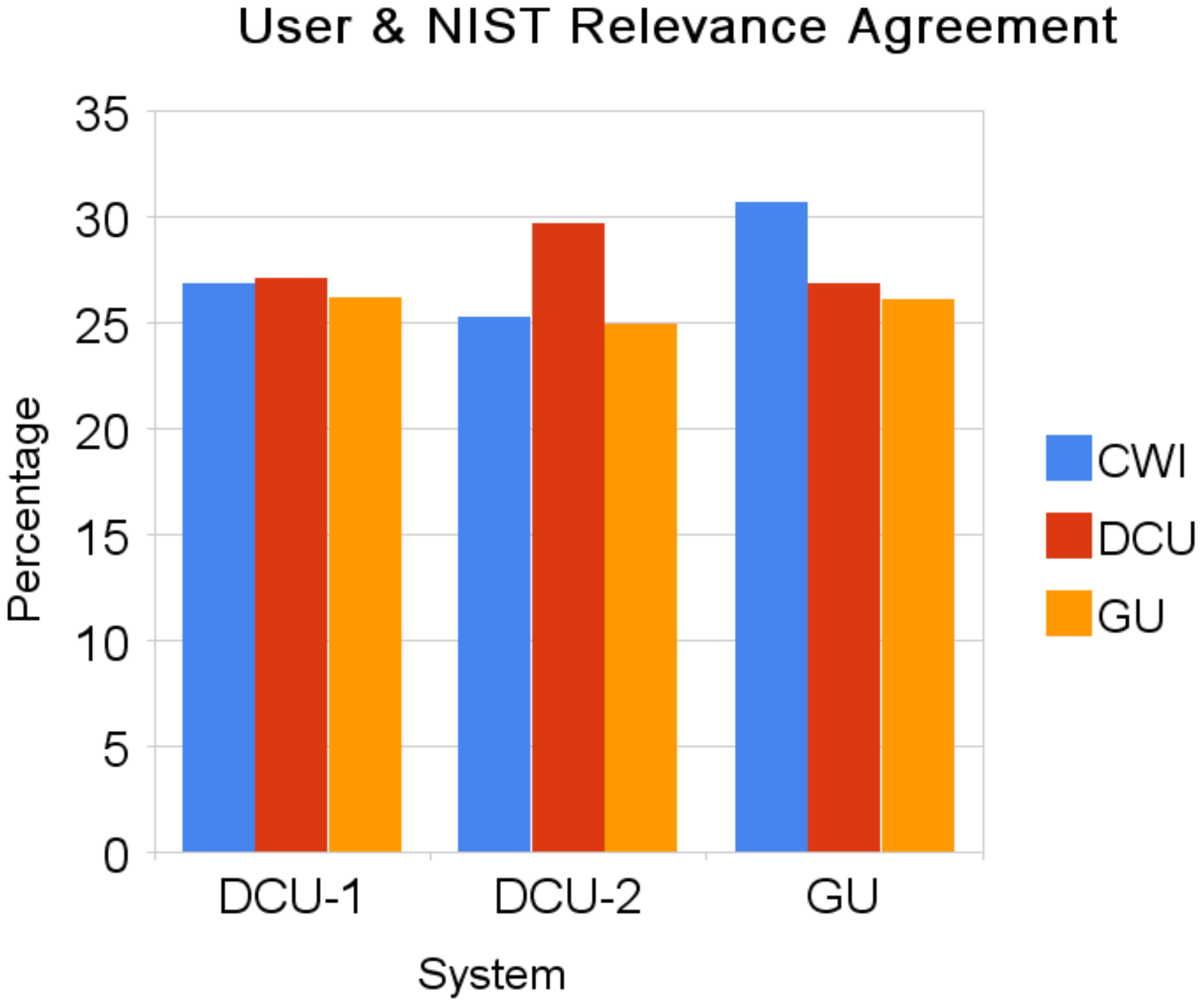

User Variance - DCU-1
Difference from mean
3
2
1
0
-1
-2
CWI-1
CWI-2
DCU-1
DCU-2
GU-1
GU-2
Users


User Variance - DCU-2
Difference from mean
3
2
1
0
-1
-2
-3
CWI-1
CWI-2
DCU-1
DCU-2
GU-1
GU-2
Users


User Variance - GU
Difference from mean
3
2
1
0
-1
-2
-3
CWI-1
CWI-2
DCU-1
DCU-2
GU-1
GU-2
Users


Average Saves Per Search
Shots Saved per Search
20
15
10
5
0
DCU-1
DCU-2
GU
Systems


Predicted Saves 15min
25
20
15
10
5
0
Shots Saved
DCU-1
DCU-2
GU
Systems


User & NIST Relevance Agreement
35
30
25
20
15
10
5
0
Percentage
DCU-1
DCU-2
GU
System
CWI
DCU
GU

Conclusion

- Large laboratory Video IR experiment, 36 users, 3 sites, 3 interfaces
- Produced a *very* large amount of experimental data
- Multiple ways of analysing data, this is just starter
- Objective to clean and release data to wider community