Client-Side Preservation Techniques for ORE Aggregations

Michael L. Nelson & Sudhir Koneru

Old Dominion University, Norfolk VA

OAI-ORE Specification Roll-Out

Open Repositories 2008

Southampton UK, April 4, 2008

Research Supported by the Andrew Mellon Foundation

Outline

- Background: Let the “Web Infrastructure” preserve your information
- Premise: ReMs are critical for preservation purposes
- Client-side vs. Server-side approaches to preservation
- Sketch of a possible framework for client-side preservation techniques

msn Search

SPURL.NET

YAHOO!

Google

hanzo:web

Ask.com

LookSmart

FURL | Your Personal Web File

Web Infrastructure

INTERNET ARCHIVE

WayBackMachine

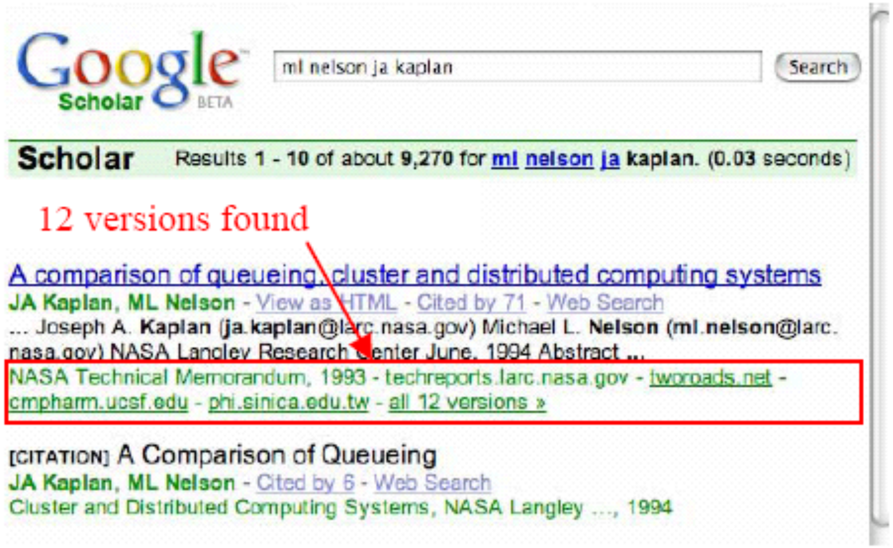
UK WEB ARCHIVING CONSORTIUM

www.webarchive.org.uk

CiteSeer.IST

Scientific Literature Digital Library

slide from Frank McCown

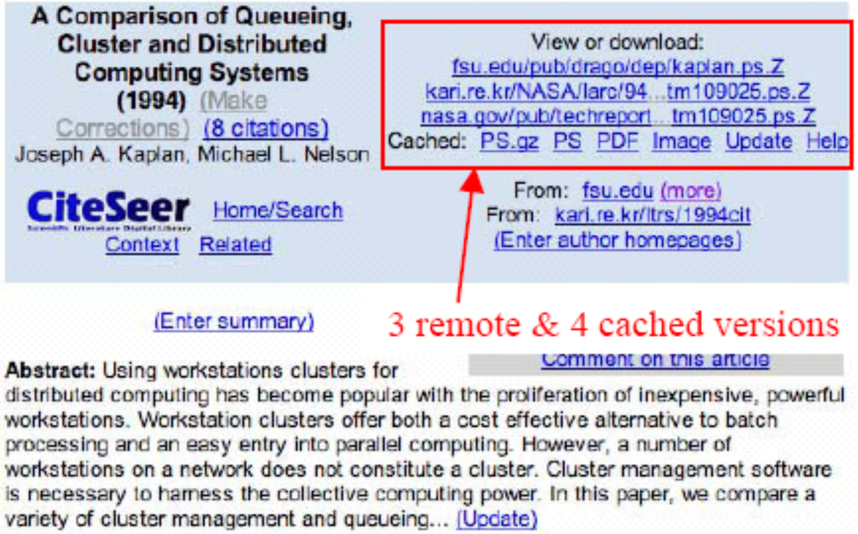


Scholar Results **1** - **10** of about **9,270** for **ml nelson ja kaplan**. (**0.03** seconds)

12 versions found

A comparison of queueing, cluster and distributed computing systems
JA Kaplan, ML Nelson - View as HTML - Cited by 71 - Web Search
... Joseph A. **Kaplan** (**ja.kaplan**@larc.nasa.gov) Michael L. **Nelson** (**ml.nelson**@larc.nasa.gov) NASA Langley Research Center June, 1994 Abstract ...
NASA Technical Memorandum, 1993 - techreports.larc.nasa.gov - tworoads.net - cmpharm.ucsf.edu - phi.sinica.edu.tw - all 12 versions »

[CITATION] A Comparison of Queueing
JA Kaplan, ML Nelson - Cited by 6 - Web Search
Cluster and Distributed Computing Systems, NASA Langley ..., 1994


A Comparison of Queueing, Cluster and Distributed Computing Systems (1994) (Make Corrections) (8 citations)
Joseph A. Kaplan, Michael L. Nelson

View or download:
fsu.edu/pub/drago/dep/kaplan.ps.Z
kari.re.kr/NASA/larc/94...tm109025.ps.Z
nasa.gov/pub/techreport...tm109025.ps.Z
Cached: PS.gz PS PDF Image Update Help

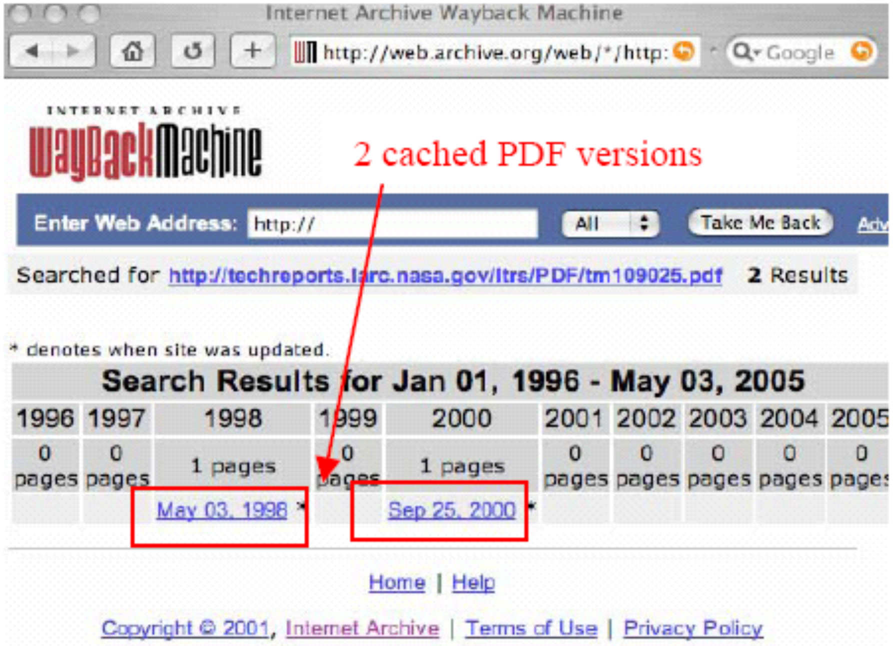
From: fsu.edu (more)
From: kari.re.kr/ltrs/1994cit
(Enter author homepages)

(Enter summary)

3 remote & 4 cached versions

Comment on this article

Abstract: Using workstations clusters for distributed computing has become popular with the proliferation of inexpensive, powerful workstations. Workstation clusters offer both a cost effective alternative to batch processing and an easy entry into parallel computing. However, a number of workstations on a network does not constitute a cluster. Cluster management software is necessary to harness the collective computing power. In this paper, we compare a variety of cluster management and queueing... (Update)


Internet Archive Wayback Machine
http://web.archive.org/web/*/http:
Google
INTERNET ARCHIVE
WaybackMachine
Enter Web Address: http://
All
Take Me Back
Adv

2 cached PDF versions

Searched for http://techreports.larc.nasa.gov/ltrs/PDF/tm109025.pdf **2** Results

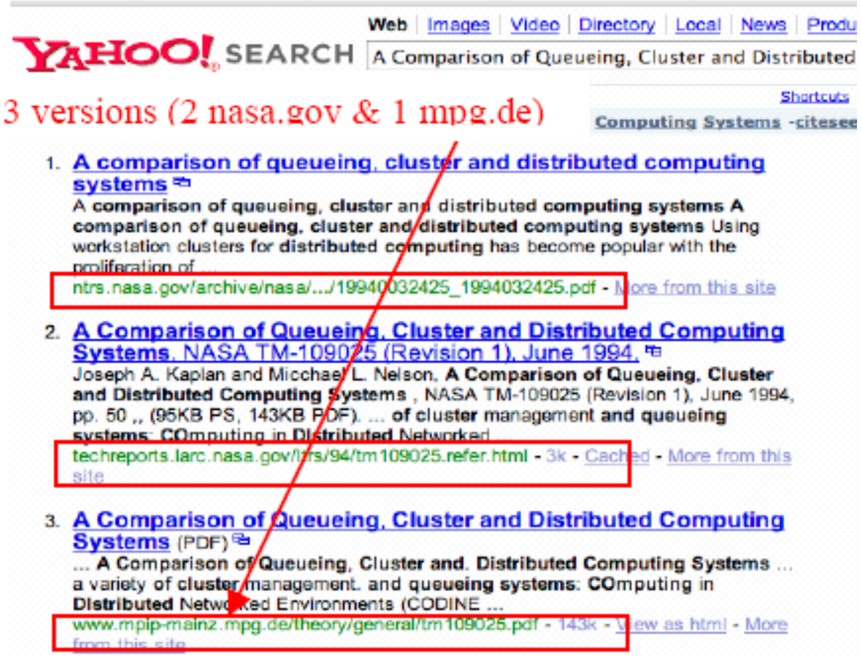
* denotes when site was updated.

Search Results for Jan 01, 1996 - May 03, 2005

1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
0 pages	0 pages	1 pages	0 pages	1 pages	0 pages	0 pages	0 pages	0 pages	0 pages
		May 03, 1998 *		Sep 25, 2000 *					

Home | Help

Copyright © 2001, Internet Archive | Terms of Use | Privacy Policy


Web | Images | Video | Directory | Local | News | Produ
YAHOO! SEARCH
A Comparison of Queueing, Cluster and Distributed
Shortcuts
Computing Systems -citesee

3 versions (2 nasa.gov & 1 mpg.de)

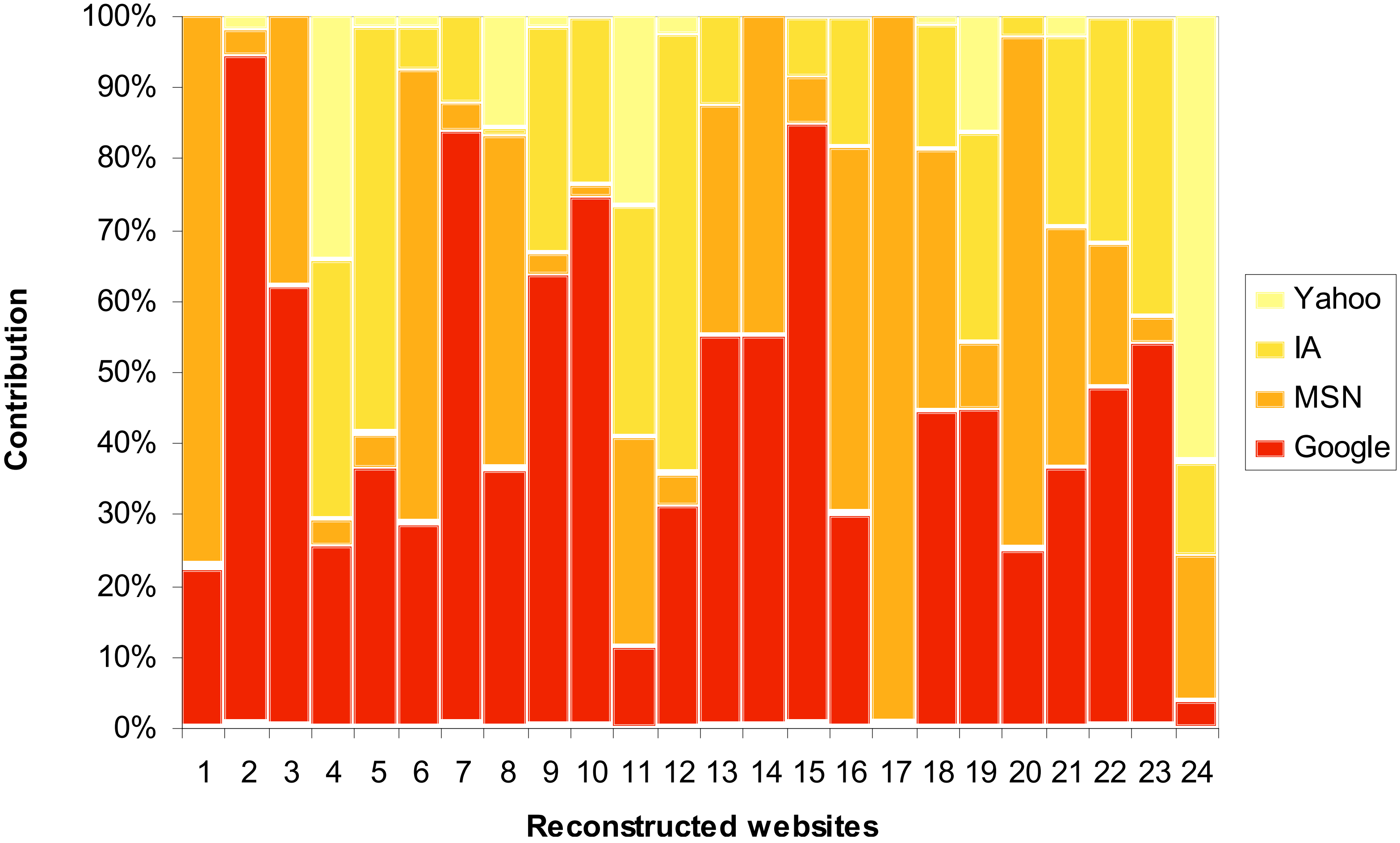
1. A comparison of queueing, cluster and distributed computing systems
A comparison of queueing, cluster and distributed computing systems A comparison of queueing, cluster and distributed computing systems Using workstation clusters for **distributed computing** has become popular with the proliferation of ...
ntrs.nasa.gov/archive/nasa/.../19940032425_1994032425.pdf - More from this site

2. A Comparison of Queueing, Cluster and Distributed Computing Systems, NASA TM-109025 (Revision 1), June 1994.
Joseph A. Kaplan and Micchael L. Nelson, **A Comparison of Queueing, Cluster and Distributed Computing Systems**, NASA TM-109025 (Revision 1), June 1994, pp. 50 ,, (95KB PS, 143KB PDF). ... **of cluster** management **and queueing systems**: **COmputing in Distributed** Networked ...
techreports.larc.nasa.gov/ltrs/94/tm109025.refer.html - 3k - Cached - More from this site

3. A Comparison of Queueing, Cluster and Distributed Computing Systems (PDF)
... **A Comparison of Queueing, Cluster and. Distributed Computing Systems** ... a variety of **cluster** management. and **queueing systems**: **COmputing** in **Distributed** Networked Environments (CODINE ...
www.mpip-mainz.mpg.de/theory/general/tm109025.pdf - 143k - View as html - More from this site

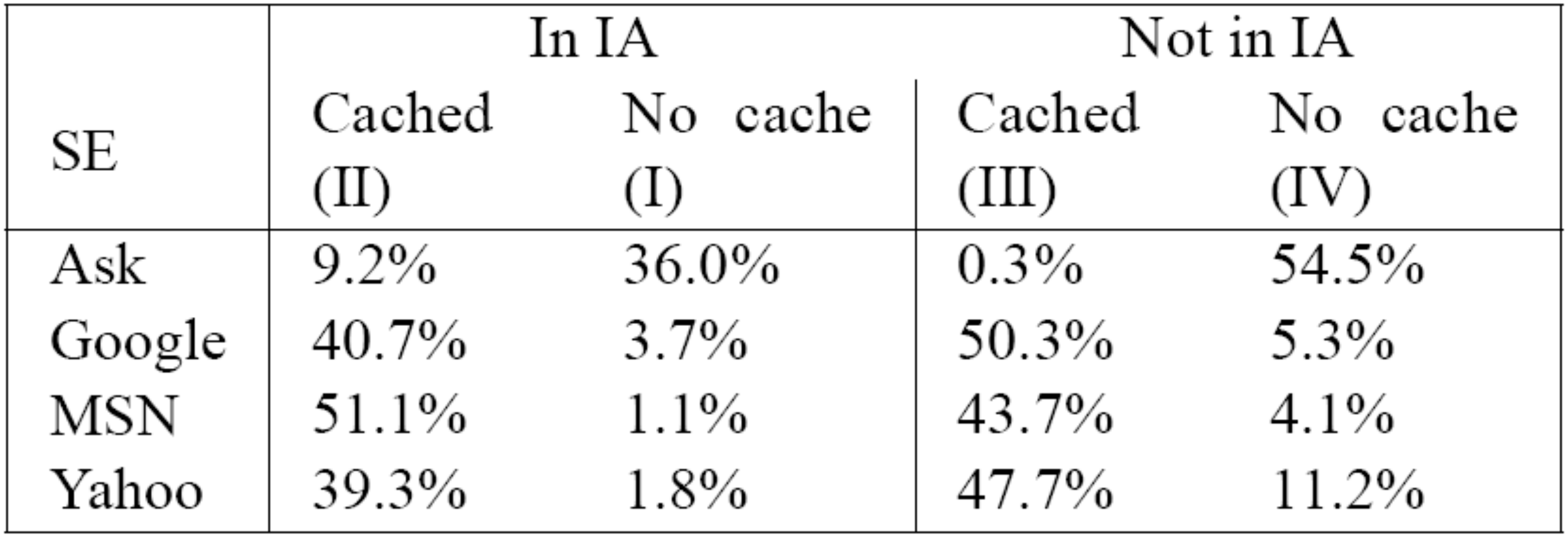
preservation = refreshing + migration

Web Repository Contributions

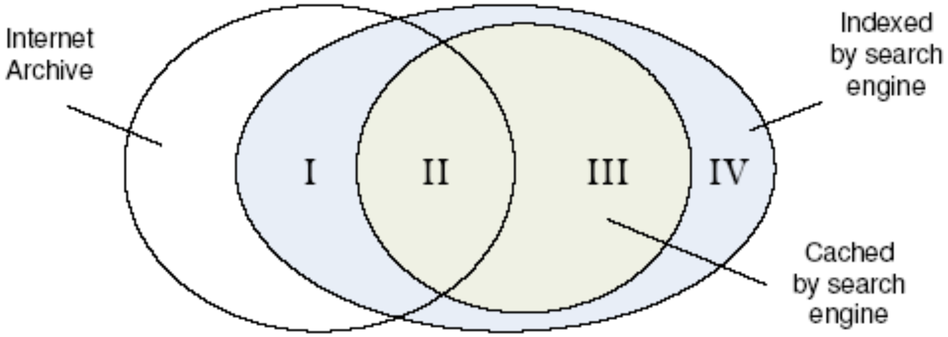


Frank McCown, Joan A. Smith, Michael L. Nelson, Johan Bollen, Lazy Preservation: Reconstructing Websites by Crawling the Crawlers, Proceedings of WIDM 2006,pp. 67-74. http://www.cs.odu.edu/~mln/pubs/widm-2006/lazyp-widm06.pdf

Overlap with Internet Archive



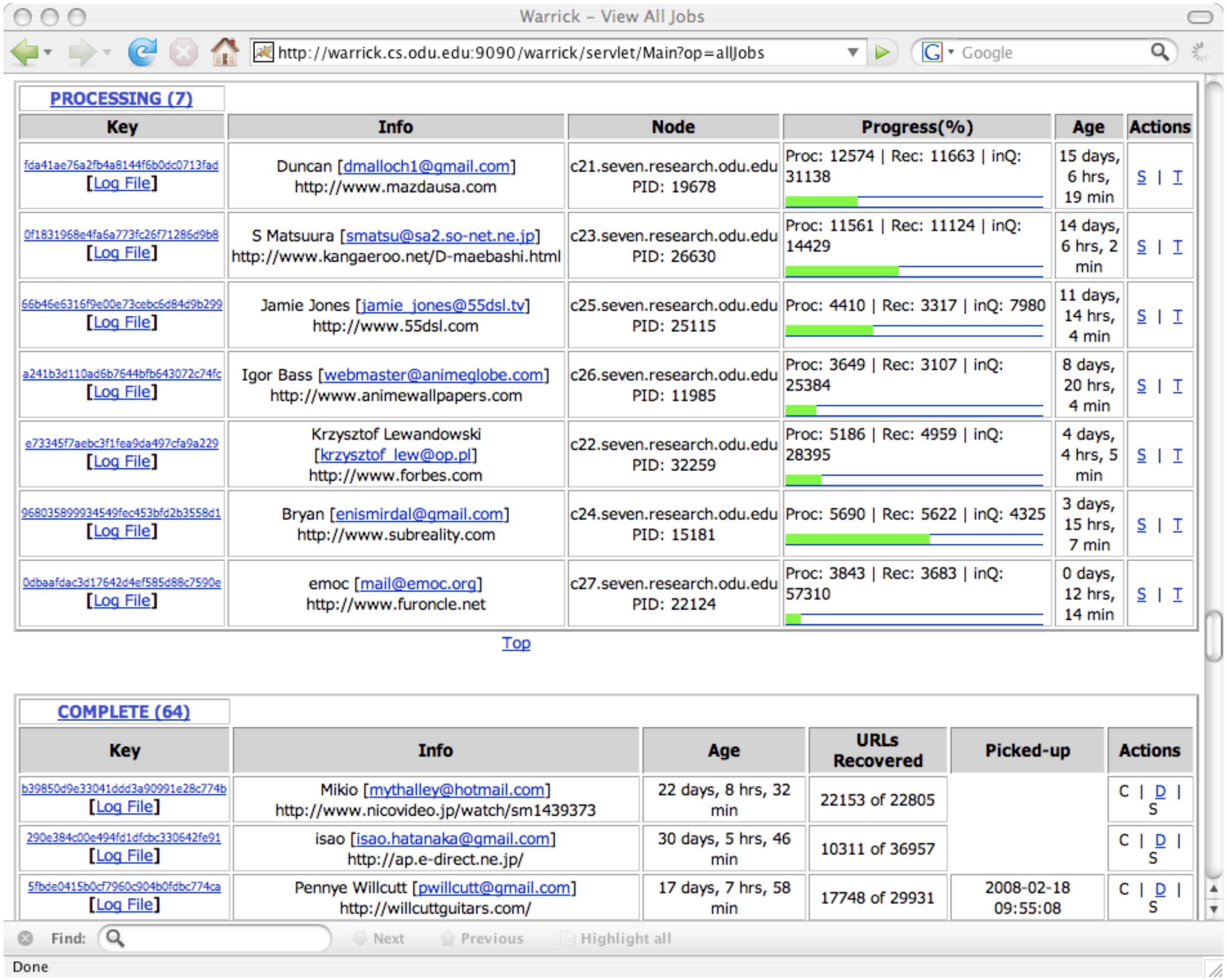
SE	In IA		Not in IA	
	Cached (II)	No cache (I)	Cached (III)	No cache (IV)
Ask	9.2%	36.0%	0.3%	54.5%
Google	40.7%	3.7%	50.3%	5.3%
MSN	51.1%	1.1%	43.7%	4.1%
Yahoo	39.3%	1.8%	47.7%	11.2%



Frank McCown, Michael L. Nelson, Characterization of Search Engine Caches,
Proceedings of IS&T Archiving 2007, pp. 48-52. http://arxiv.org/abs/cs.DL/0703083

Warrick -- A Service to Recover Lost Websites

warrick.cs.odu.edu


Warrick – View All Jobs
http://warrick.cs.odu.edu:9090/warrick/servlet/Main?op=allJobs
Google

PROCESSING (7)

Key	Info	Node	Progress(%)	Age	Actions
fda41ae76a2fb4a8144f6b0dc0713fad [Log File]	Duncan [dmalloch1@gmail.com] http://www.mazdausa.com	c21.seven.research.odu.edu PID: 19678	Proc: 12574 | Rec: 11663 | inQ: 31138	15 days, 6 hrs, 19 min	S | T
0f1831968e4fa6a773fc26f71286d9b8 [Log File]	S Matsuura [smatsu@sa2.so-net.ne.jp] http://www.kangaeroo.net/D-maebashi.html	c23.seven.research.odu.edu PID: 26630	Proc: 11561 | Rec: 11124 | inQ: 14429	14 days, 6 hrs, 2 min	S | T
66b46e6316f9e00e73cebc6d84d9b299 [Log File]	Jamie Jones [jamie_jones@55dsl.tv] http://www.55dsl.com	c25.seven.research.odu.edu PID: 25115	Proc: 4410 | Rec: 3317 | inQ: 7980	11 days, 14 hrs, 4 min	S | T
a241b3d110ad6b7644bfb643072c74fc [Log File]	Igor Bass [webmaster@animeglobe.com] http://www.animewallpapers.com	c26.seven.research.odu.edu PID: 11985	Proc: 3649 | Rec: 3107 | inQ: 25384	8 days, 20 hrs, 4 min	S | T
e73345f7aebc3f1fea9da497cfa9a229 [Log File]	Krzysztof Lewandowski [krzysztof_lew@op.pl] http://www.forbes.com	c22.seven.research.odu.edu PID: 32259	Proc: 5186 | Rec: 4959 | inQ: 28395	4 days, 4 hrs, 5 min	S | T
968035899934549fec453bfd2b3558d1 [Log File]	Bryan [enismirdal@gmail.com] http://www.subreality.com	c24.seven.research.odu.edu PID: 15181	Proc: 5690 | Rec: 5622 | inQ: 4325	3 days, 15 hrs, 7 min	S | T
0dbaafdac3d17642d4ef585d88c7590e [Log File]	emoc [mail@emoc.org] http://www.furoncle.net	c27.seven.research.odu.edu PID: 22124	Proc: 3843 | Rec: 3683 | inQ: 57310	0 days, 12 hrs, 14 min	S | T

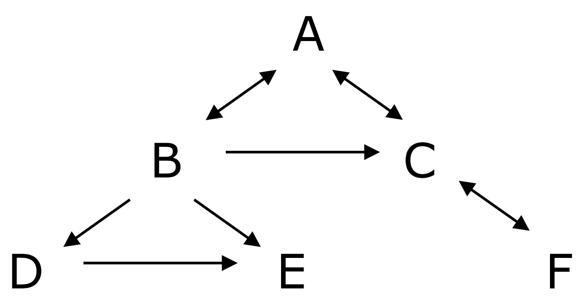
Top

COMPLETE (64)

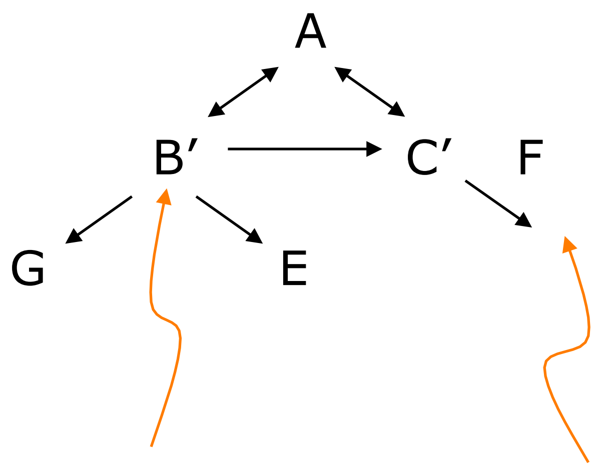
Key	Info	Age	URLs Recovered	Picked-up	Actions
b39850d9e33041ddd3a90991e28c774b [Log File]	Mikio [mythalley@hotmail.com] http://www.nicovideo.jp/watch/sm1439373	22 days, 8 hrs, 32 min	22153 of 22805		C | D | S
290e384c00e494fd1dfcbc330642fe91 [Log File]	isao [isao.hatanaka@gmail.com] http://ap.e-direct.ne.jp/	30 days, 5 hrs, 46 min	10311 of 36957		C | D | S
5fbde0415b0cf7960c904b0fdbc774ca [Log File]	Pennye Willcutt [pwillcutt@gmail.com] http://willcuttguitars.com/	17 days, 7 hrs, 58 min	17748 of 29931	2008-02-18 09:55:08	C | D | S

How Much Did We Reconstruct?

“Lost” web site



Reconstructed web site



Missing link to D; points to old resource G

F can’t be found

Four categories of recovered resources:

1) Identical: A, E
2) Changed: B, C
3) Missing: D, F
4) Added: G

slide from Frank McCown

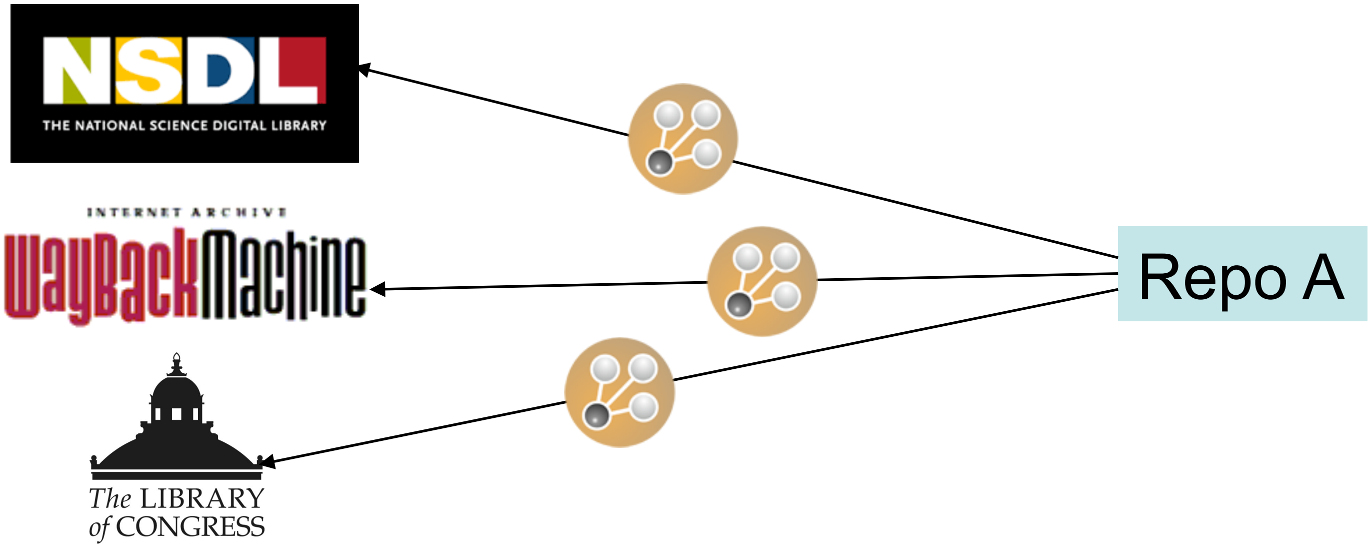
Resource Maps Unambiguously Define an Aggregation

- The “manifest” nature of ReMs allow us to know “if we got it all”
  - “known knowns”
  - “known unknowns”
  - “unknown unknowns”

- Assuming the ReM is recovered, the implications for preservation are clear:
  - defines members of the aggregations
  - defines relationships between them

Server-Side Techniques

- Repository A uses ReMs for their aggregations.
- Repository B harvests ReMs to ensure total coverage of Repository A.
- Repository A can use its ReMs to validate transfer to Repository B.
- Third parties use ReMs to audit B’s preservation of A.
- New ReMs created to reflect migration, refreshing of aggregations.



Can We Involve End-Users in the Preservation Process?

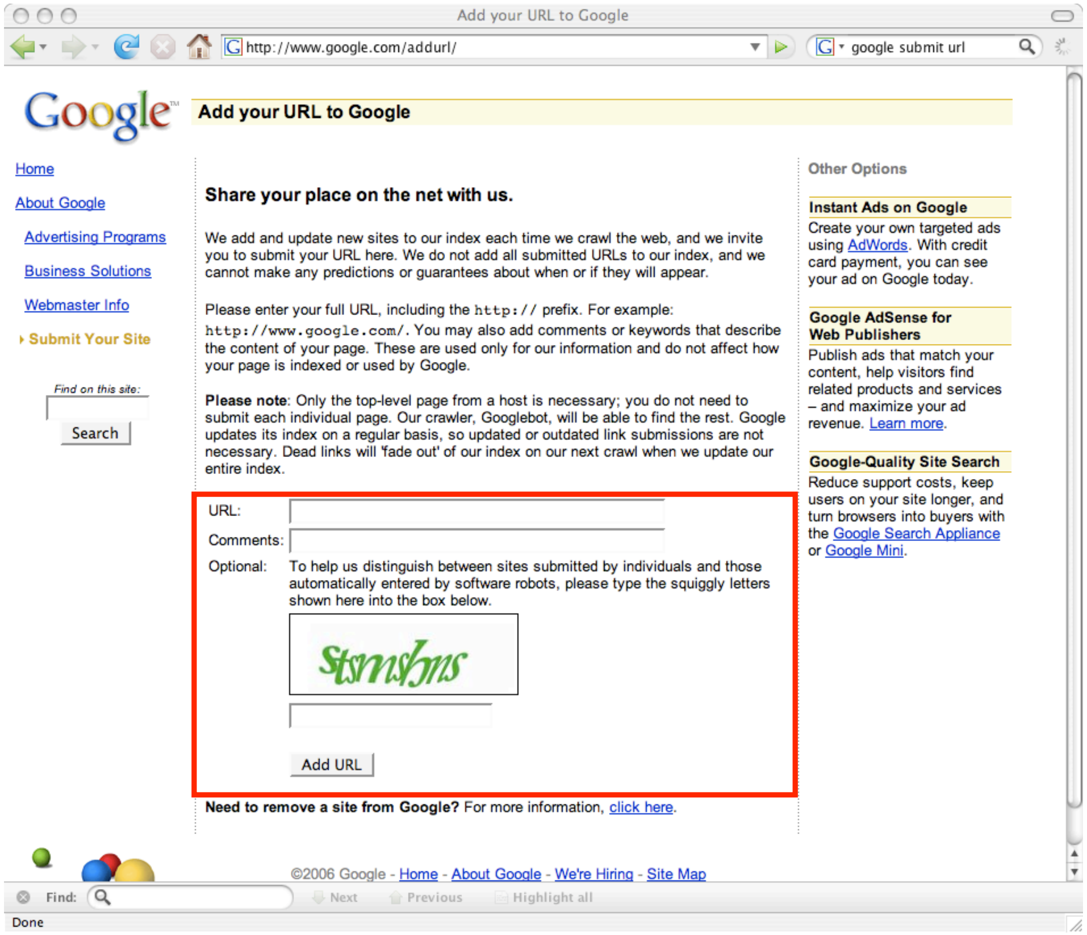
- Leverage the actions of end users?
  - “people helping robots…”
- Make preservation more accessible?
  - light-weight and easy like Google Analytics and reCAPTCHA?

```
<html>
…
<h1>hello world</h1>
…
<script type=”text/javascript”>
resourcemap=”http://www.foo.edu/repo/helloworld/rem.atom”;
webReposToCheck=”google,yahoo,internetArchive”;
checkMirrors=”yes”;
writeBack=”http://www.bar.org/wiki/”; </script>
<script type=”text/javascript”
src=”http://ore.cs.odu.edu/preserve.js”> </script>
…
</html>
```

Client-Side Techniques

- Operations on the ReM and Aggregated Resources (ARs)
  - validation, http status, ReM visualization, etc.
- Interacting with the Web Infrastructure
  - checking for ReM, ARs in Internet Archive, search engine caches, etc.
  - reconstructing aggregation for a given time interval
  - submitting ReM, ARs to WI
- Inter-client communication
  - my client updates/repairs ReM -- how to communicate that to other clients and servers?

One Reason Why We Need Humans in the Loop



Add your URL to Google

Home

About Google

Advertising Programs

Business Solutions

Webmaster Info

Submit Your Site

Find on this site:

Search

Share your place on the net with us.

We add and update new sites to our index each time we crawl the web, and we invite you to submit your URL here. We do not add all submitted URLs to our index, and we cannot make any predictions or guarantees about when or if they will appear.

Please enter your full URL, including the `http://` prefix. For example: `http://www.google.com/`. You may also add comments or keywords that describe the content of your page. These are used only for our information and do not affect how your page is indexed or used by Google.

Please note: Only the top-level page from a host is necessary; you do not need to submit each individual page. Our crawler, Googlebot, will be able to find the rest. Google updates its index on a regular basis, so updated or outdated link submissions are not necessary. Dead links will 'fade out' of our index on our next crawl when we update our entire index.

URL:

Comments:

Optional: To help us distinguish between sites submitted by individuals and those automatically entered by software robots, please type the squiggly letters shown here into the box below.

Add URL

Need to remove a site from Google? For more information, click here.

Other Options

Instant Ads on Google

Create your own targeted ads using AdWords. With credit card payment, you can see your ad on Google today.

Google AdSense for Web Publishers

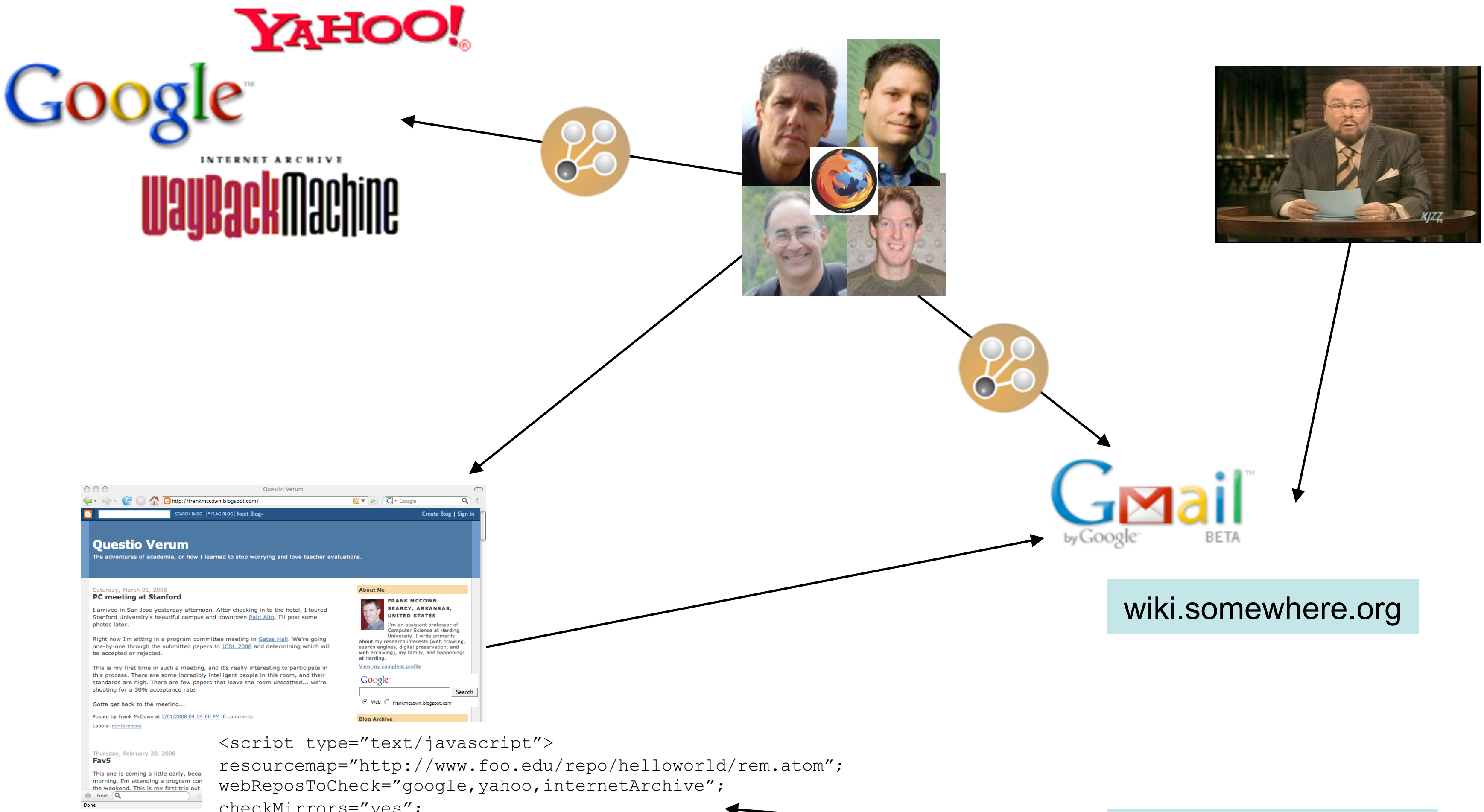
Publish ads that match your content, help visitors find related products and services – and maximize your ad revenue. Learn more.

Google-Quality Site Search

Reduce support costs, keep users on your site longer, and turn browsers into buyers with the Google Search Appliance or Google Mini.

©2006 Google - Home - About Google - We're Hiring - Site Map

A Possible Scenario…



Questio Verum

The adventures of academia, or how I learned to stop worrying and love teacher evaluations.

Saturday, March 01, 2008

PC meeting at Stanford

I arrived in San Jose yesterday afternoon. After checking in to the hotel, I toured Stanford University's beautiful campus and downtown Palo Alto. I'll post some photos later.

Right now I'm sitting in a program committee meeting in Gates Hall. We're going one-by-one through the submitted papers to JCDL 2008 and determining which will be accepted or rejected.

This is my first time in such a meeting, and it's really interesting to participate in this process. There are some incredibly intelligent people in this room, and their standards are high. There are few papers that leave the room unscathed... we're shooting for a 30% acceptance rate.

Gotta get back to the meeting...

Posted by Frank McCown at 3/01/2008 04:54:00 PM 0 comments

Labels: conferences

Thursday, February 28, 2008

Fav5

This one is coming a little early, becau
morning. I'm attending a program con
the weekend. This is my first trip out

About Me

FRANK MCCOWN
SEARCY, ARKANSAS, UNITED STATES

I'm an assistant professor of Computer Science at Harding University. I write primarily about my research interests (web crawling, search engines, digital preservation, and web archiving), my family, and happenings at Harding.

View my complete profile

Google

Search

● Web ○ frankmccown.blogspot.com

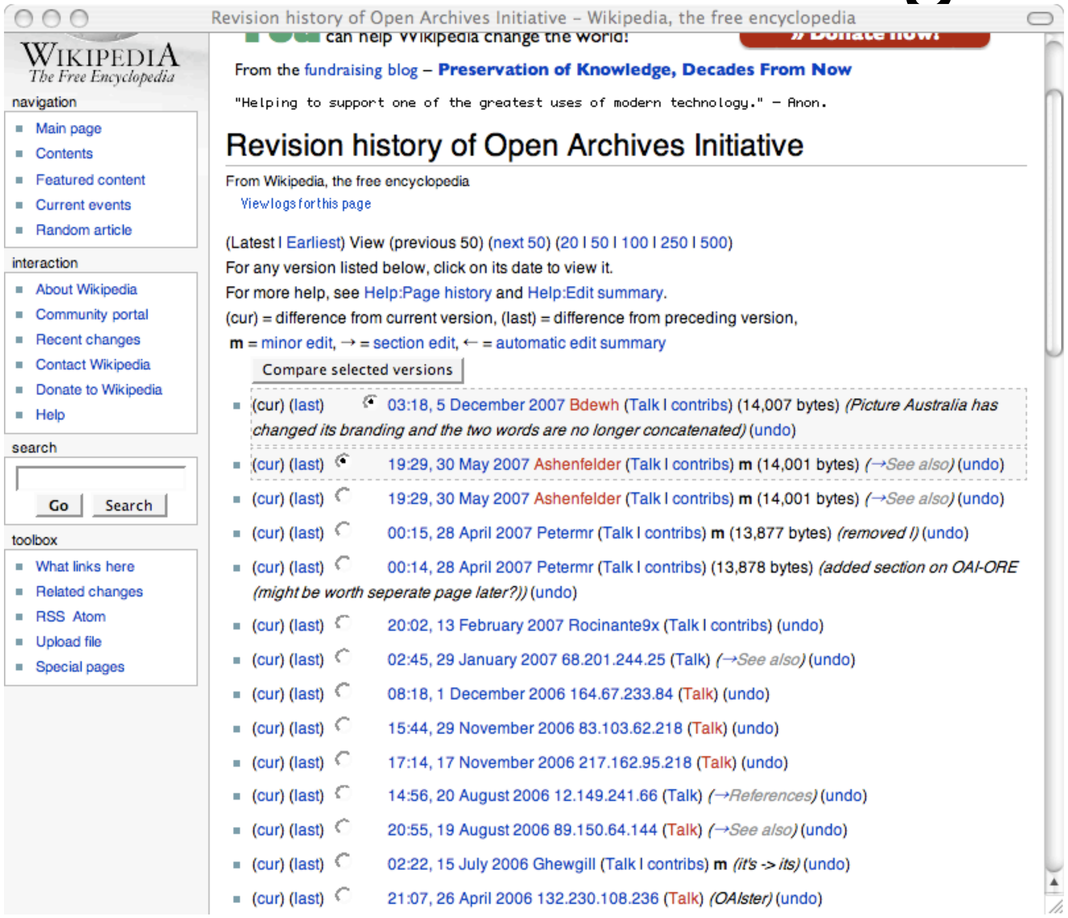
Blog Archive

wiki.somewhere.org

```
<script type=”text/javascript”>
resourcemap=”http://www.foo.edu/repo/helloworld/rem.atom”;
webReposToCheck=”google,yahoo,internetArchive”;
checkMirrors=”yes”;
writeBack=”http://www.bar.org/wiki/”; </script>
<script type=”text/javascript”
src=”http://ore.cs.odu.edu/preserve.js”> </script>
```

ore.cs.odu.edu

Wikis Would Make a Nice Inter-Client Message Store



From the fundraising blog – **Preservation of Knowledge, Decades From Now**

"Helping to support one of the greatest uses of modern technology." – Anon.

Revision history of Open Archives Initiative

From Wikipedia, the free encyclopedia

View logs for this page

(Latest | Earliest) View (previous 50) (next 50) (20 | 50 | 100 | 250 | 500)

For any version listed below, click on its date to view it.

For more help, see Help:Page history and Help:Edit summary.

(cur) = difference from current version, (last) = difference from preceding version,

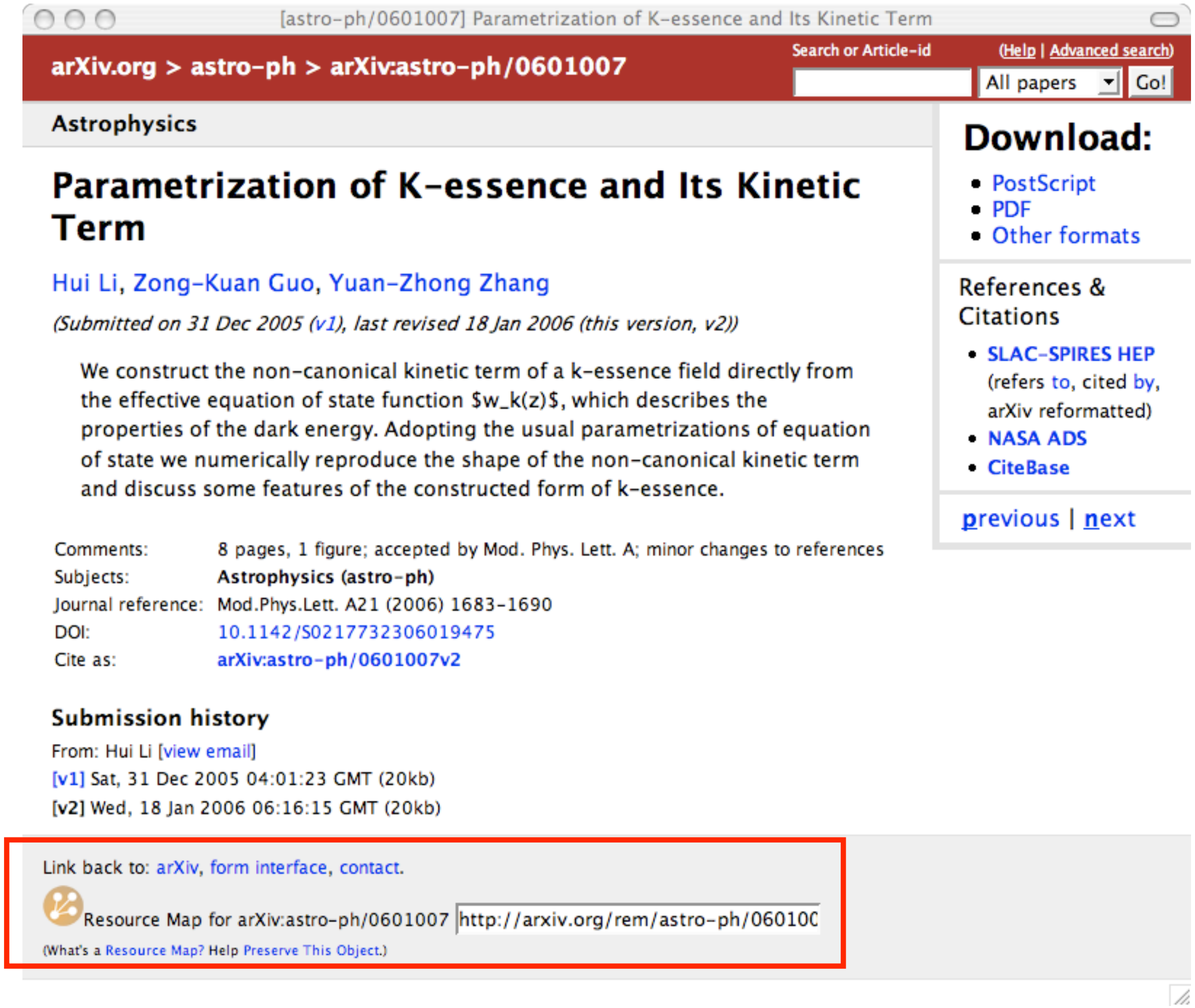
m = minor edit, → = section edit, ← = automatic edit summary

Compare selected versions

- (cur) (last) ● 03:18, 5 December 2007 Bdewh (Talk | contribs) (14,007 bytes) *(Picture Australia has changed its branding and the two words are no longer concatenated)* (undo)
- (cur) (last) ● 19:29, 30 May 2007 Ashenfelder (Talk | contribs) **m** (14,001 bytes) *(→See also)* (undo)
- (cur) (last) ○ 19:29, 30 May 2007 Ashenfelder (Talk | contribs) **m** (14,001 bytes) *(→See also)* (undo)
- (cur) (last) ○ 00:15, 28 April 2007 Petermr (Talk | contribs) **m** (13,877 bytes) *(removed I)* (undo)
- (cur) (last) ○ 00:14, 28 April 2007 Petermr (Talk | contribs) (13,878 bytes) *(added section on OAI-ORE (might be worth seperate page later?))* (undo)
- (cur) (last) ○ 20:02, 13 February 2007 Rocinante9x (Talk | contribs) (undo)
- (cur) (last) ○ 02:45, 29 January 2007 68.201.244.25 (Talk) *(→See also)* (undo)
- (cur) (last) ○ 08:18, 1 December 2006 164.67.233.84 (Talk) (undo)
- (cur) (last) ○ 15:44, 29 November 2006 83.103.62.218 (Talk) (undo)
- (cur) (last) ○ 17:14, 17 November 2006 217.162.95.218 (Talk) (undo)
- (cur) (last) ○ 14:56, 20 August 2006 12.149.241.66 (Talk) *(→References)* (undo)
- (cur) (last) ○ 20:55, 19 August 2006 89.150.64.144 (Talk) *(→See also)* (undo)
- (cur) (last) ○ 02:22, 15 July 2006 Ghewgill (Talk | contribs) **m** *(it's -> its)* (undo)
- (cur) (last) ○ 21:07, 26 April 2006 132.230.108.236 (Talk) *(OAIster)* (undo)

Function as a publicly (computers + humans) readable revision control system for ReMs

“Help Preserve This Object”


[astro-ph/0601007] Parametrization of K-essence and Its Kinetic Term
Search or Article-id
(Help | Advanced search)
All papers
Go!

arXiv.org > astro-ph > arXiv:astro-ph/0601007

Astrophysics

Parametrization of K-essence and Its Kinetic Term

Hui Li, Zong-Kuan Guo, Yuan-Zhong Zhang

(Submitted on 31 Dec 2005 (v1), last revised 18 Jan 2006 (this version, v2))

We construct the non-canonical kinetic term of a k-essence field directly from the effective equation of state function $w_k(z)$, which describes the properties of the dark energy. Adopting the usual parametrizations of equation of state we numerically reproduce the shape of the non-canonical kinetic term and discuss some features of the constructed form of k-essence.

Comments:	8 pages, 1 figure; accepted by Mod. Phys. Lett. A; minor changes to references
Subjects:	**Astrophysics (astro-ph)**
Journal reference:	Mod.Phys.Lett. A21 (2006) 1683-1690
DOI:	10.1142/S0217732306019475
Cite as:	**arXiv:astro-ph/0601007v2**

Submission history

From: Hui Li [view email]
[v1] Sat, 31 Dec 2005 04:01:23 GMT (20kb)
[v2] Wed, 18 Jan 2006 06:16:15 GMT (20kb)

Download:

- PostScript
- PDF
- Other formats

References & Citations

- SLAC-SPIRES HEP (refers to, cited by, arXiv reformatted)
- NASA ADS
- CiteBase

previous | next

Link back to: arXiv, form interface, contact.

Resource Map for arXiv:astro-ph/0601007 http://arxiv.org/rem/astro-ph/06010C

(What's a Resource Map? Help Preserve This Object.)

http://www.cs.odu.edu/~skoneru/indstd/

Current Status

- Hierarchical view of ReM
- Finds copies of Aggregated Resources in Internet Archive, Google, Yahoo
- Next up:
  - use Simile time line software (http://simile.mit.edu/timeline/) to display ARs in time
  - chose a time interval for reconstruction
  - send edited ReMs to a wiki or public email service
  - write a program to read & vet edited ReMs from public store