Adventure in Data

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Thanks to a Great Team ...





Fabian Suchanek











Gjergji Kasneci

2010

Maya Ramanth

Gerard de Melo

Ndapa Nakashole

Johannes Hoffart Asia Biega

2015



Martin Thomas Ralf Theobald Neumann Schenkel

2005



... and its Spirit of Adventure











My Research Adventures

ACM SIGMOD Record Interview 2007:

Gerhard Weikum Speaks Out on Why We Should Go for the Grand Challenges ...



Q: Someone suggested that ... you may be being seduced by the dark side and end up doing AI. Are you heading in this direction?



A: Mike Stonebraker used to say "This problem is AI-complete", meaning the problem was beyond any hope of solution, was science fiction, was on the same level as "Scotty, beam me up!". Now, as I grow older, I think this attitude is wrong.



Fundamental Goals in Science







- infinite wisdom
- infinite wealth
- infinite beauty

Fundamental Goals in Science

- Wisdom = Depth: intellectually deep insights (open or close area, mathematical analyses, etc.)
- Wealth = Significance: practical viability & wide use (application needs, systems, etc.)
- Beauty = Elegance: aesthetically appealing contributions (unifying frameworks, elegant architecture, etc.)







Episode 1: Transactions & Systems

1983-1992 plus 1997-2000:

- transactional concurrency control & recovery
- storage systems ("plumbing")









- if $(lp \rightarrow b off == bsize)$ {
- if ((ret = log write(dblp, dblp->bufp, bsize)) != 0) return (ret);
- lp -> b off = 0;++lp->stat.st wcount fill;

Episode 1: Lessons Learned



Lesson #1: Build systems – not just fun, but an honest-to-yourself test of viability !

Episode 2: DB Auto-Tuning

1990-2002:

- automatic performance tuning (COMFORT project)
- systems work with math principles





Caching, Data Partitioning, Storage Layout, Load Control ...



Stochastic Modeling and Service Quality Guarantees (throughput, resp. time quantiles, availability, performability)

 $f *_{X} (s) = \int_{0}^{\infty} e^{-sx} f_{X}(x) dx = E[e^{-sX}]$ $f_{Rdisk}^{*} = f_{serv}^{*}(s) \frac{s(1-\rho)}{s-\lambda_{disk} + \lambda_{disk} f_{serv}^{*}(s)}$ $P[R \ge t] \le \inf_{\theta \ge 0} \left\{ e^{-\theta t} f_{R}^{*}(-\theta) \right\}$ $E_{ij}(t) = \frac{1}{v} \sum_{z=0}^{\infty} e^{-vt} \frac{(vt)^{z}}{z!} \sum_{n=0}^{z-1} \overline{p}_{ij}^{(n)}$

Episode 2: Lessons Learned



Lesson #2: Don't be afraid of (any) math – it is (eventually) useful and makes it easier to acquire new skills !

Episode 3: DB & IR Integration

2000 – now:

make Internet search as crisp as DB querying

- add semantics to unstructured contents
- add statistics (ranking ...) to query answers

\rightarrow semantic search engines for XML, RDF, XKG ...



Adding Relevance to XML

Anja Theobald and Gerhard Weikum

Department of Computer Science University of the Saarland, Germany WWW: http://www.dbs.cs.uni-sb.de E-mail: {theobald, weikum}@cs.uni-sb.de

Abstract. XML query languages proposed so far are limited to Boolean retrieval in the sense that query results are sets of qualifying XML elements or subgraphs. This search paradigm is intriguing for "closed" collections of XML documents such as e-commerce catalogs, but we argue that it is inadequate for searching the Web whe relevance estimation. If **WebDB 20000** fresults based on relevance estimation. If compared the formation of the search paradigm is by combining XML search language, that reconciles both search paradigms by combining XML search language, that reconciles both search paradigms by combining XML search language, that metation issues, and preducing ranked lists of XML subgraphs as search results. The paper describes the language design, sketches implementation issues, and presents preliminary experimental results.





Semantic Search: Killer Queries



Asilomar, CA. January 5-8 First Biennial Conference on lovative Data Systems Research

- German professors who teach IR and have projects on XML
- drama with three women making a prophecy
- French woman I met at PC meeting chaired by Alon

politicians who are scientists



- green politicians in Panama Papers
- proteins binding to Zika virus
- antidepressants interfering with thyroid drugs

Semantic Search: Answers 2003

Google Web Images Groups^{New!} News Froogle more work Advanced Search Advanced Search Preferences

The following words are very common and were not included in your search: with a. [details]

Web Results 1 - 10 of about 85,800 for drama with three women making a prophecy (0.29 seconds)

Quick Tips for Meeting, Dating, and Attracting Women.

... Don't Lose Your Nerve. The 3-Day Test. Do You Have a Phone? ... The Pity Kiss. An Obvious Talent - Palm Reading. Learn to Play Golf. ... Don't Pursue **Women**. Attract Them. ... www.sosuave.com/quick/default.htm - 49k - <u>Cached</u> - <u>Similar pages</u>

An eyewitness to Shakespeare's plays

... of his death (though he may have committed suicide to make his **prophecy** ... More than a play. ... riding through a wood, there stood before them **three women** fairies or ... ise.uvic.ca/Library/SLTnoframes/life/forman.html - 6k - <u>Cached</u> - <u>Similar pages</u>

The Guide to World Drama - Plays L

... Hammersmith in 1989, this is a careful examination of the role of pornography in our society and the way it affects **three** young **women** in ... Play. ... 4 men, 3 **women**. ... www.4-wall.com/plays/plays_l/lovelylucky.htm - 12k - <u>Cached</u> - <u>Similar pages</u>

CliffsNotes::Oedipus Trilogy - The Oedipus Trilogy: Study Help ...

... 3. In Antigone, who is the real main character ... and Ismene in their views of **women** in society. ... the following statement: Antigone is primarily a **drama** of politics ...



🕝 Internet

Semantic Search: Answers 2004

Amazon.com: Books: Macbeth (Dover Thrift Editions) [UNABRIDGED]

... witches's prophecies are deceptively clear: no man born of **woman** may harm ... Thus, the nature of **prophecy** becomes an integral part of the play's dynamic. ... www.amazon.com/exec/obidos/ tg/detail/-/0486278026?v=glance&st=* - 90k - Cached - Similar pages

[PDF] Microsoft PowerPoint - weikum-er2004

File Format: PDF/Adope Acropat - View as HTIVIL

... (on Web / Deep Web / Intranet / Personal Info) Which **drama** has a scene in which a **woman** makes a **prophecy** to a **Scottish nobleman** that he will become king? ... www.cs.fudan.edu.cn/er2004/news/ppt/ Towards%20a%20Statistically%20Semantic%20Web.pdf - Similar pages

[PDF] The Web of the Future

File Format. PDF/Adobe Acrobat - <u>view as HTML</u>

... large deviation theory? Which drama has a scene in which a woman makes a

prophecy to a Scottish nobleman that he will become king? ...

depend.cs.uni-sb.de/fileadmin/user_upload/ depend/teaching/WS04/pers/weikum.pdf - Similar pages

[PPT] The Web of the Future

🚞 2 Windows Explorer 👘

File Format. Microsoft Powerpoint 97 - View as HTML

... Which **drama** has a scene in which a **woman** makes a **prophecy**. to a **Scottish nobleman** that he will become king? Which professors from Saarbruecken (SB). ...

depend.cs.uni-sb.de/fileadmin/user_upload/ depend/teaching/WS04/pers/weikum.ppt - Similar pages

🚜 weikum@contact

C Microsoft PowerPoin...

🥝 Internet

🖉 Google Search: dram...

DE < 🖉 👫 20:33

Character Directory

🛃 Start

... none of **woman** born / Shall harm Macbeth' (4.1 ... The tensions of the play tighten with

👻 🌐 Gerhard Weikum - In...

Semantic Search: Answers 2016



drama with three women making a prophecy

Alle Bilder Maps

Suchoptionen Mehr 🔻

Ungefähr 50.100.000 Ergebnisse (0,42 Sekunden)

Videos

Three Witches - Wikipedia, the free encyclopedia https://en.wikipedia.org/wiki/Three_Witches - Diese Seite übersetzen

News

The Inree witches or weird Sisters are characters in William Shakespeare's play Macbeth (c. ... Shakespeare's witches are prophets who hail Macbeth, the general, early in the play, and ... In Holinshed, the future King Macbeth of Scotland and his companion Banquo encounter "three women in strange ... Dramatic role[edit].

Macbeth - Wikipedia, the free encyclopedia

macbeth /max beb is a tragedy written by william Shakespeare. Set mainly in Scotland, the ... The bloodbath and consequent civil war swiftly take Macbeth and Lady Macbeth into the realms of madness, and He and Banguo meet the three witches, who make exactly the same prophecies as in Shakespeare's version.

The Four Control Dramas from the Celestine Prophecy – Relationship ...

www.relationshipspecialists.com/.../the-four-control-dramas-from...

Diese Seite übersetzen The Celestine Prophecy's 4 Control Dramas ... And poor me's make us feel guilty and responsible for them. ... for his job; a father whose attention he wanted, but had to share with three other siblings; an aloof father. ... This article, written by Marilyn and Chuck, is reprinted with permission from Woman's Way Magazine.

Macbeth: Summary & Analysis Act IV Scene 1 | CliffsNotes

Prodded by his ambitious wife, Lady Macbeth, he murders King Duncan, becomes ... His attempts to defy the prophesy fail, however: Macduff kills Macbeth, and ... This scene can be roughly divided into three: the Witches' casting of a spell; the ... taken together, can be interpreted as making a complete monster: tongue, leg,

drama with three women making a prophecy							
W/ab	Bilder	Videos	Karten	Nows	Frkunden		

22.300.000 ERGEBNISSE Datum 👻 Sprache 🔻 Region -

Drama Prophecy Information - watch ... Diese Seite übersetzen www.watch-drama.com/anime/prophecy-detail *

Drama Title: Prophecy; ... While her first husband kept her at arm's length by a prophecy foretelling a woman of Wu ... which makes the three Taoist ...

The Four Control Dramas from the ... Diese Seite übersetzen lifemasteryradio.net/the-four-control-dramas-from-the-celestine... •

The Four Control Dramas from the Celestine Prophecy ~ The ... from Woman's Way. Magazine ... assisting millions of people in making positive and ...

The Prophecy (film series) - Wikipedia, ... Diese Seite übersetzen https://en.wikipedia.org/wiki/The Prophecy (film series) -

The Prophecy is an American fantasy horror-thriller ... of an Angel and a woman- with the ... expands out as a three-pronged hook ...

Films - Trivia - Reception - Home video - Characters

Ähnliche Suchvorgänge für drama with three women ma...

Old Woman Prophecy	Women's Mizuno Wave Prophecy
Wave Prophecy 4 Women's	Womens Mizuno Prophecy
Woman and Man Prophecy	90 Year Old Woman Prophecy

Three Witches - Wikipedia, the free ... Diese Seite übersetzen https://en.wikipedia.org/wiki/Weird Sisters -

The luture King Macbeth of Scotland and his companion banquo encounter. In women ... of prophecy by their necromantical ... Three Witches are ... Origins - Dramatic role - Analysis - Performance - Other representations



Semantic Search



girl, missy, young lady, young woman

Episode 3: Lessons Learned



Lesson #3: Go for grand challenge (even if there is no application in sight), and exemplify your research goals !

Episode 4: Knowledge Harvesting

2004 – now:

knowledge base with many entities automatically built from Web & text





History of Digital Knowledge Bases



Yago Knowledge Base



Episode 4: Lessons Learned



Lesson #4: Work with creative students ! Acquire new (math) skills as needed. ← Episode 2

Lesson #5: Learn from your failures ! Don't get disheartened.

← Episode 3

Lesson #6: Systems thinking (and experience) helps ! ← Episode 1 Make data and code publicly available.

Episode 4: Knowledge Harvesting

Bottom Line







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