



دانشگاه کردستان

# Temporal Information Retrieval

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دلنیا وفازاده - بهار سرسیفی

خرداد ۹۷

# فہرست

- Application Of Temporal IR
- Temporal Relevance
- Temporal Tagging
- Temporal Information Extraction
- Temporal Scope
- Temporal Similarity vs Textual Similarity
- Temporal Intervals
- Conclusion

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# ماشین Wayback

- ❖ یک ابزار جست‌وجوی آرشیو وب که توسط آرشیو اینترنت فراهم شده است.
- ❖ هدف آرشیو اینترنت **حفاظت** از مجموعه‌ی اسناد دیجیتال می‌باشد.
- ❖ ماشین Wayback این امکان را فراهم می‌کند که صفحات وب ذخیره شده در آرشیو بازبازی شده و در دسترس قرار گیرند.
- ❖ کاربر نیاز اطلاعاتی خود را با مشخص کردن **URL** صفحه‌ی وب مورد نظر ارائه می‌دهد.
- ❖ نتایج بازبازی به صورت **تقویمی** به نمایش در می‌آید.

# ماشین Wayback

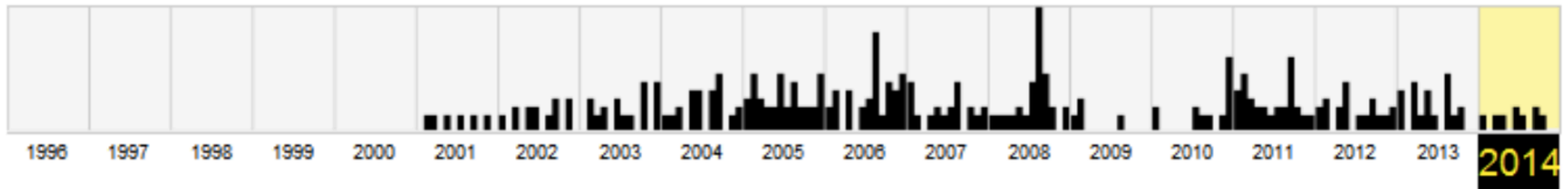


<http://www.sigir.org>

BROWSE HISTORY

<http://www.sigir.org>

Saved **315 times** between **February 22, 2001** and **October 19, 2014**.



JAN

FEB

MAR

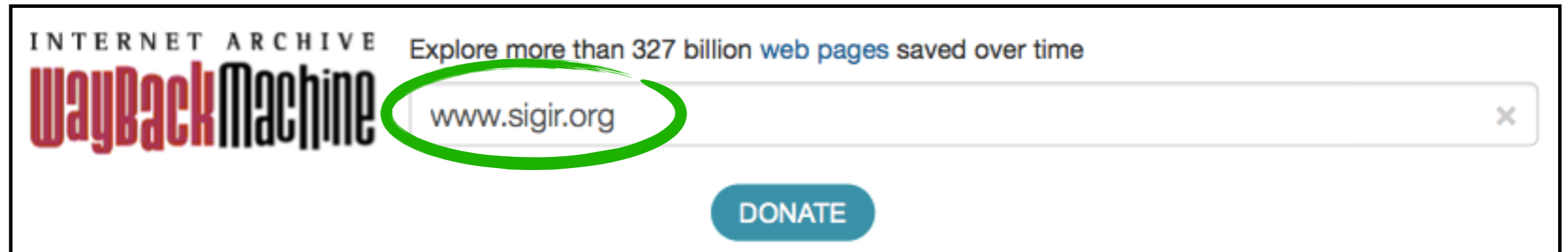
APR

	1	2	3	4						1										1	2	3	4	5		
5	6	7	8	9	10	11				2	3	4	5	6	7	8				6	7	8	9	10	11	12
12	13	14	15	16	17	18				9	10	11	12	13	14	15				13	14	15	16	17	18	19
19	20	21	22	23	24	25				16	17	18	19	20	21	22				20	21	22	23	24	25	26
26	27	28	29	30	31					23	24	25	26	27	28					23	24	25	26	27	28	29

# ماشین Wayback

❖ معایب:

✓ وارد کردن URL به صورت query برای کاربر آسان نیست.



✓ روش ساده‌ای برای مرتب‌سازی نتایج جست‌وجو وجود ندارد.

# جست‌وجوی آرشیو اخبار گوگل

❖ به کاربران این امکان را می‌دهد که آرشیو اخبار را با **query** کلیدواژه‌ها و بازه‌ی زمانی جست‌وجو کنند.

❖ نتایج جست‌وجو با توجه به ارتباط و یا زمان رتبه‌بندی می‌شوند.

❖ **عیب:**

❖ تأثیر تکامل واژگان





Search

About 28 results (0.16 seconds)

Web

**1 Jan 2001 – 31 Dec 2004**

Images

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[Clergy abuse threatens to tarnish pope's legacy | UTSanDiego...](#)

San Diego Union Tribune - Sep 11, 2002

11, 2002, then Cardinal Joseph Ratzinger of Germany, left, now **Pope Benedict XVI**, is seen with late Pope John Paul II during mass in St. Peter's Basilica at ...

[Pope John Paul II to be beatified in...](#) KATU

[Pope John Paul II credited with...](#) WWL

[all 7 news articles »](#)

[CNS STORY: Vatican officials, Catholics on the street talk...](#)

Catholic News Service - Jul 25, 2002

14 just minutes after **Pope Benedict XVI** signed a decree recognizing the miracle needed to beatify Pope John Paul. "This is what the whole world was waiting ...

Top Stories

All news

Blogs

[Pope at Vatican meeting on Legionaries of Christ | UTSanDieg...](#)

San Diego Union Tribune - Nov 30, 2004

(AP Photo/Plinio Lepri, File) — AP By The Associated Press VATICAN CITY — **Pope Benedict XVI** took part Friday in a Vatican meeting over the fate of the ...

[Scandal-plagued Legionaries accept...](#) San Diego Union Tribune

[Vatican Ends Probe of Legionaries - CBS...](#) CBS News

[Abuser's Catholic order awaits Vatican...](#) San Diego Union Tribune

[Texarkana Gazette](#)

[all 5 news articles »](#)

Any time

Past hour

Past 24 hours

Past week

Past month

2010

2009

2008

2006

2005

Archives

Custom range...

[... -Line Publications-Jewish Political Studies Review...](#)

Jerusalem Center for Public Affairs - Sep 9, 2004

**Pope Benedict XVI** had decided to return to Israel in the year 2008, ... [13] On becoming



# The Redaction Archive

2. "Kennedy authorizes DOD to review proposals for deployment of a  
Jan 28, 1961; Kennedy Administration

جستجو برای دوره زمانی  
ویرایش

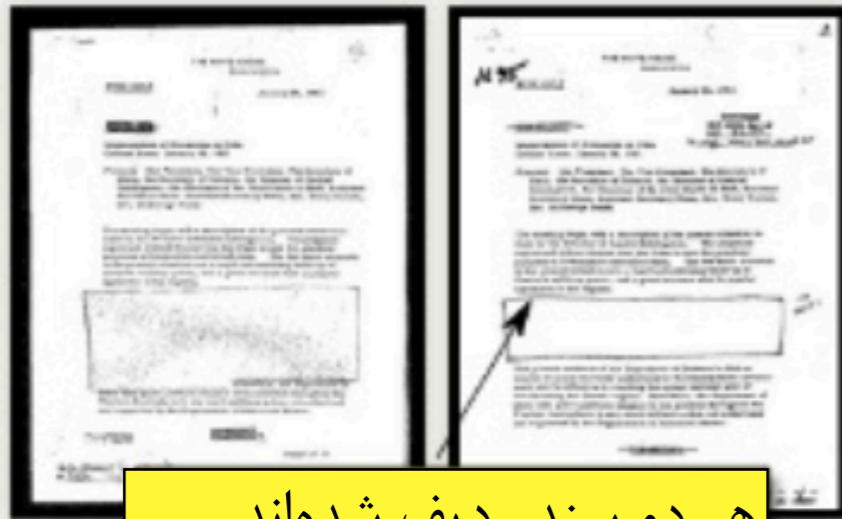
خلاصه و تاریخ اسناد

Redaction 1 / 6

اولین ویرایش از ۶ تا ویرایش  
این سند. برای دیدن جزئیات  
بیشتر کلیک کنید.

1982

1995



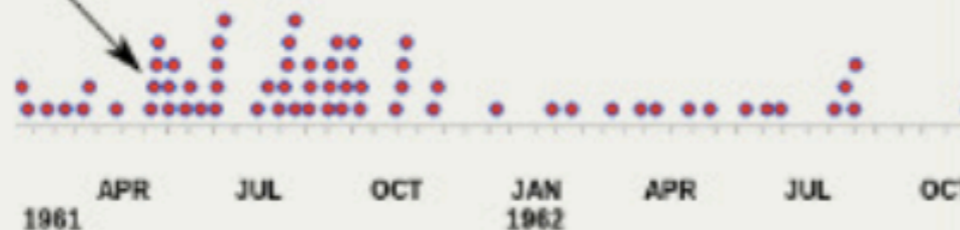
هر دو سند ردیف شده‌اند.  
جهت بزرگنمایی کلیک کنید.

Cuba by the Director of [redacted] ment  
expressed without dissent was that Cuba is now for practical  
purposes a Communist-controlled state. The two basic  
elements in the present situation are a rapid and continuing  
build-up of Castro's military power, and a great increase also  
in popular opposition to his regime. The present estimate  
of the Department of Defense is that no course of action  
currently authorized by the United States Government  
will be effective in reaching the agreed national goal of  
overthrowing the Castro regime. Meanwhile, the  
Department of State sees grave political  
position throughout the Western hemisphere  
military action not authorized and supported by the  
Organization of American States. -2- After considerable  
discussion, the following proceedings were authorized by the  
President: 1. 2. The Defense department,

متن همراه با ویرایش  
برجسته شده

Report Invalid

جدول زمانی اسناد.  
جهت جلو رفتن کلیک کنید.



جهت یابی.  
بالا و پایین جهت حرکت درون  
اسناد.  
راست و چپ جهت رفتن به  
داکیومننت بعدی.



# تحلیل و شناسایی در طول زمان

❖ نمایش و فیلتر کردن اطلاعات می‌تواند در نمایش آسان زمان اطلاعات مفید باشد.

❖ **Koen و Bender** اخبار را با مقالات افزوده‌ای که به‌طور خودکار با اطلاعات زمانی از اسناد استخراج شده‌اند، غنی می‌کنند.

❖ **Matthews** جست‌وجوگر زمان را به عنوان سیستمی تعریف می‌کند که اکتشاف خطر زمان

Contact Us T: 516 650 8545 E: Benderexec@aol.com

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محوری را روی بایگانی اخبار انجام می‌دهد.



Led by Alan Bender who is a former marketer with over 20 years specializing in marketing talent acquisition nationwide

## تحلیل و شناسایی در طول زمان

- ❖ **Odijsk** سیستمی را ارائه کرد که تکنیک‌های جستجوی چهره و تجسم تعاملی را برای رسیدن به درک عمیق‌تر از بخش‌های مرتبط مجموعه ترکیب می‌کند.
- ❖ در سیستم آن‌ها محور زمان نقش مرکزی را ایفا می‌کند، که اجازه می‌دهد نتایج مختلف را با انتخاب بازه‌های زمانی مختلف اصلاح کنیم.
- ❖ نیاز است که ترکیبی از الگوریتم‌های مختلف زمان آگاه به کار گرفته شود.
- ❖ یکی دیگر از کاربردهای محبوبی که از تکنیک‌های بازیابی زمان محور اطلاعات استفاده می‌کند خوشه‌بندی نتایج جستجو است.

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# Temporal Relevance

❖ یک جنبه کلیدی است که مرتبط بودن سند را با query تعیین می کند.

❖ اطلاعات زمانی هنوز به عنوان یک واژه کلیدی متنی ساده، توسط IR رایج مورد استفاده قرار می گیرد.

❖ هدف بازیابی اطلاعات زمانی:

✓ برطرف کردن نیازهای زمانی

✓ ترکیب و پیوند مفاهیم مرتبط با اسناد با مفاهیم مرتبط با زمان

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# Temporal Tagging

## Addressed types of **temporal expressions**

### TimeML standard:

- ▶ dates (“May 1, 2015”, “today”)
- ▶ times (“9 pm”, “last night”)
- ▶ durations (“three years”)
- ▶ set expressions (“twice a day”)

### Dates and Times may be:

- ▶ explicit (“May 1, 2015”)
- ▶ implicit (“Christmas 2012”)
- ▶ relative (“last night”)
- ▶ underspecified (“Monday”)



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# Temporal Information Extraction

temporal information is frequent

## Greece Makes 'Good Progress' in Payment Talks

By Maria Petrakis and Natalie Sep 20, 2011 10:39 PM GMT+0200 [ADD TO QUEUE](#)

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Evangelos Venizelos, Greece's finance minister, listens to an aide.

Sept. 20, 2011

Tsion, Bloomberg

Greek Finance Minister Evangelos Venizelos made "good progress" in a second round of talks with the European Union and International Monetary Fund aimed at staving off default, the EU said.

The telephone meetings **tonight**, **yesterday**, and **next** week were intended to discuss proposals that Greece would meet its debt reduction targets and to clear the way for a sixth installment of rescue funds. The EU statement said a "full mission" will return to Athens **next** week in discussions in coming days at the IMF's annual meeting in Washington.

Staying in the euro area is an "irreversible and fundamental national choice," Venizelos said in a statement. He also acknowledged that Greece's financial data and economic structure are a problem for the euro zone. "We are determined to tackle our problems and for all," he said.

The EC **earlier today** said that the Greek government's plan to pay for Greece is on track to be released **next month** by Finance Minister George Papandreou.

The EC **earlier today** said that the Greek government's plan to pay for Greece is on track to be released **next month** by Finance Minister George Papandreou.

News articles

# Temporal Information Extraction

temporal information is frequent

## 1979 Soviet invasion

[edit]

**October 31, 1979** - Informants to the Afghan Armed Forces in the inner circle of advisors under Soviet premier Brezhnev, relayed information for them to undergo maintenance cycles for their tanks and other crucial equipment.

Meanwhile, telecommunications links to areas outside of Kabul were severed, isolating the capital. With a deteriorating security situation, large numbers of Soviet airborne troops and began to land in Kabul.

**December 25,** Amin moved the offices of the president to the Tajbeg Palace, believing this location to be more secure from possible threats.

According to Colonel General Tukharinov and Merimsky, Amin was fully informed of the military movements, having requested Soviet military assistance to northern Afghanistan.

**December 17,** General and General Dmitry Chiangov met with the commander of the 105th Airborne Division and locations for Soviet troops.

**December 27, 1979,** dressed in Afghan uniforms, including KGB and GRU special force officers from the Alpha Group and Zenith Group, occupied major governmental, military and media buildings in Kabul, including their primary target - the Tajbeg Presidential Palace.



That operation was completed by 19:00 hr. The KGB-led Soviet Zenith Group destroyed Kabul's telecommunications hub, paralyzing Afghan military command.

**19:15,** assault on Tajbeg Palace. At 19:15, planned, president Hafizullah Amin was killed. Simultaneously, other objectives were destroyed.

**December 28, 1979** - The operation was completed.

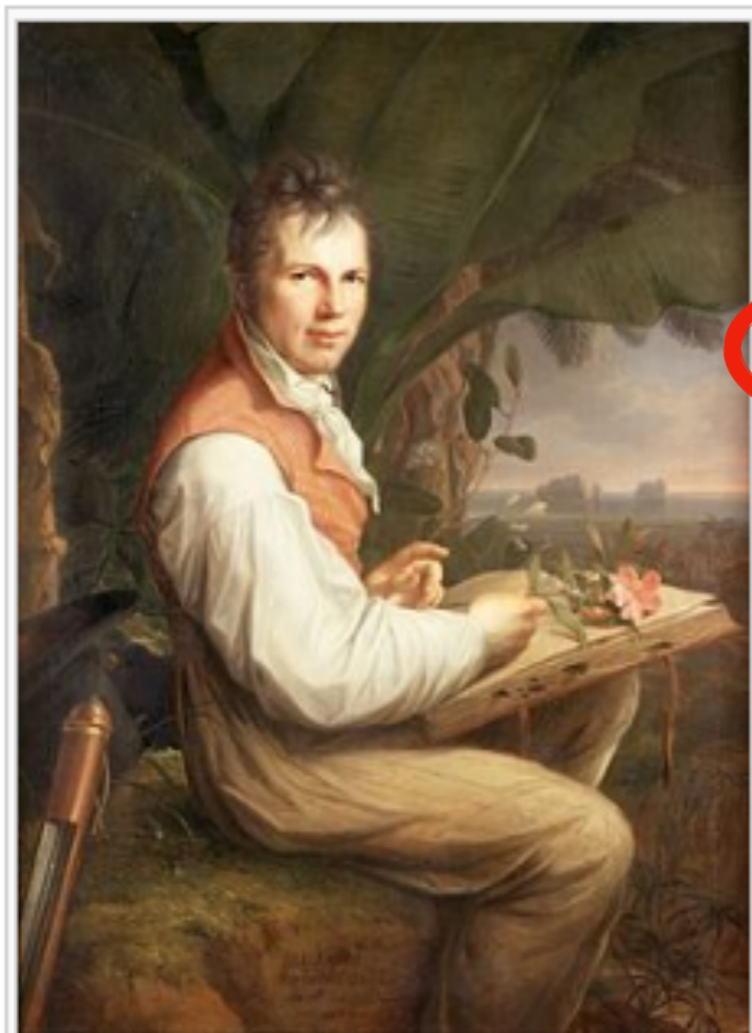


Narrative documents



# Temporal Information Extraction

temporal information is frequent



A portrait by Friedrich Georg Weitsch, 1806

## Travels and work in Europe

In 1794, Immanuel Kant was admitted to the famous Weimar society and contributed to the new periodical, *Die Horen*, a philosophical allegory entitled *Die Lebenskraft, oder der rhodische*. In the summer of 1790, he paid a short visit to ... in the ... 1792 and 1797, he was in Vienna; in 1795, he made a geological and mineralogical tour through Switzerland and Italy. He had obtained in the meantime official employment by appointment as assessor of mines at Berlin. In February 29, 1792, he was appointed to the state was regarded by him as only an apprenticeship to the service of science, he fulfilled its duties with such conspicuous ability that not only did he rise rapidly to the highest post in his department, but he was also entrusted with several important diplomatic missions. The death of his mother, November 19, 1796, now the bent of his ... and several ... connections, he waited for an opportunity to fulfil his long-cherished dream of travel.

Biographies

# Temporal Information Extraction

اطلاعات زمانی نرمالسازی می‌شوند.  
same semantics —> same value

“heute”, “aujourd’hui”, “today”, “June 8, 2016” —> 2016-06-08

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# Time & Temporal Scope

❖ زمان یک بعد همیشه حاضر در تقریبا هر مجموعه‌ای از اسناد است.

✓ کتابخانه‌های دیجیتال، داستان‌های خبری، وب، tweets ...

document temporal scope



❖ اسناد

✓ Meta-Level : ایجاد، زمان انتشار، ...

✓ Content-level : دوره‌های زمانی که در متن به آن‌ها اشاره شده است.

query temporal scope



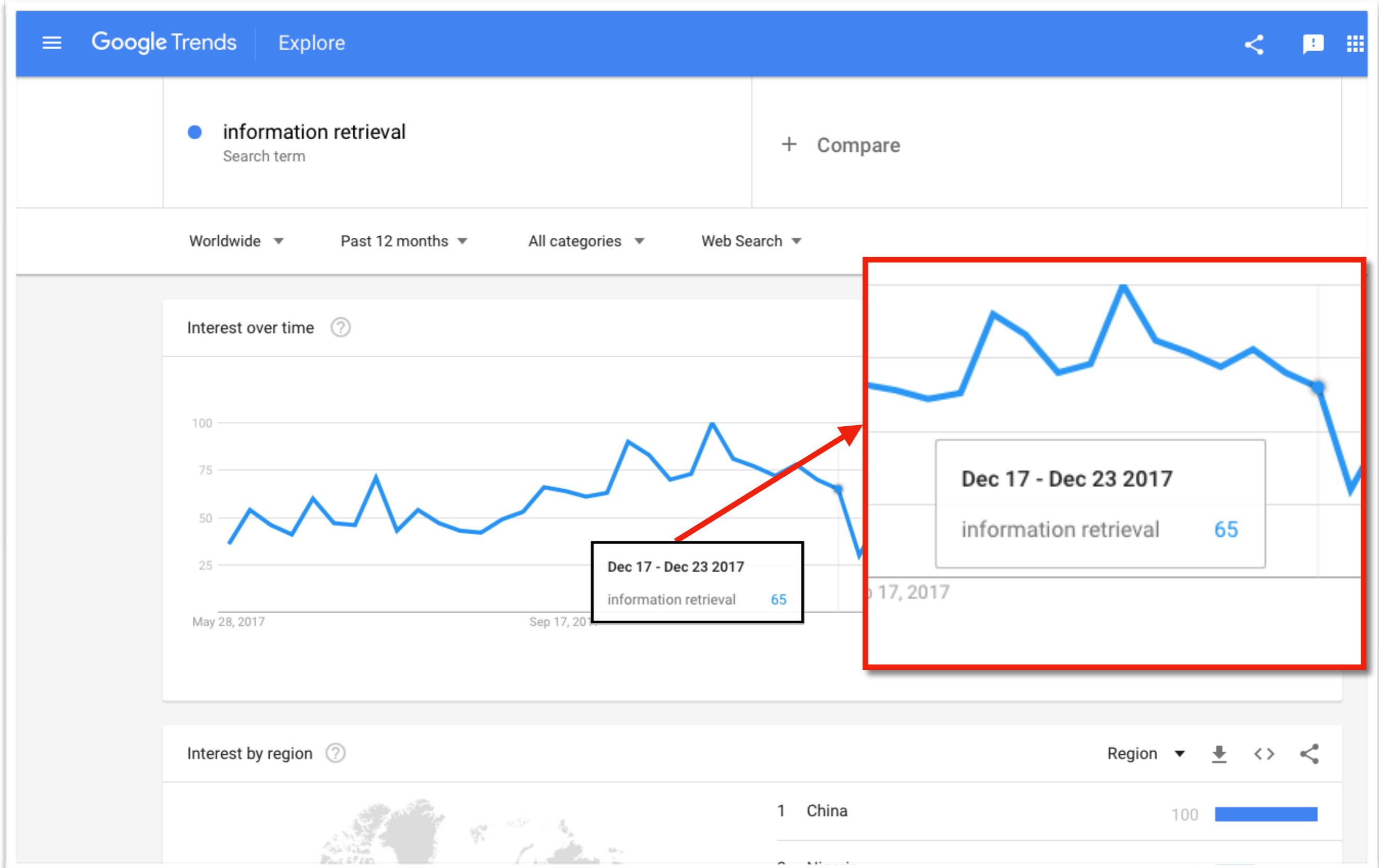
❖ Queries

✓ Meta-Level : زمان انتشار (مانند Google Trends)

✓ Content-level : دوره‌های زمانی که در query به آن‌ها اشاره شده است.



# Google Trends



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# Temporal Similarity vs Textual Similarity

## Textual Similarity ❖

✓ شباهت براساس آمار مدت زمان

✓ برای پرس و جوهای زمانی مناسب نیست:

- "results elections 2008"

- "results elections last year"

✓ "last year" و "2008" مدت زمان در نظر گرفته شده‌اند و به صورت دقیق در اسناد جستجو می‌شوند.

## Temporal Similarity ❖

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# Temporal Intervals

❖ فواصل زمانی از لحاظ معنایی غنی هستند:

✓ **Synonymy:**

- "2014" = "last year" = "the year after 2013"

✓ **Polysemy:**

- "every friday", "yearly", "super bowl"

# Temporal Intervals

- ✓ **Algebraic structure** (to correlate temporal scopes):
  - Overlapping
  - Containment
  - Distance

❖ ما می توانیم از این ویژگی ها برای بهبود مدل های IR استفاده کنیم.

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# Conclusion

- ❖ مدلی برای حوزه‌های زمانی اسناد و queryها
- ❖ معیاری جدید برای شباهت در حوزه‌های زمانی
- ❖ یک Ranking Model تشکیل شده از امتیازهای زمانی و متنی
- ❖ یک ارزیابی تجربی از پیشرفت‌های اثربخش در مقایسه با رتبه‌بندی فقط به صورت متنی

**Thanks For Your Time**