### Engkoo

Parallel data mining from the web

#### Video:

http://video.sina.com.cn/v/b/37417609-1286528122.html

### Rapidly Changing Language

- Approximately 1.5 billion people speak English as a primary, secondary or business language
- China: The largest "English speaking" country with 250 million English learners and USD 60 billion annual expenses
- Problem: Live language: new words, new meanings

#### Key Insight:

With billions of translated web pages and sharable repositories of language data growing every day, the Internet holds the sum of human language knowledge



#### **Major Features:**





State-of-the-Art Machine Translation

(NIST OpenMT Winner)

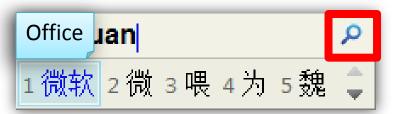
如果我们比其

If we walk slov Real-time Interactive Alignment

#### www.engkoo.com

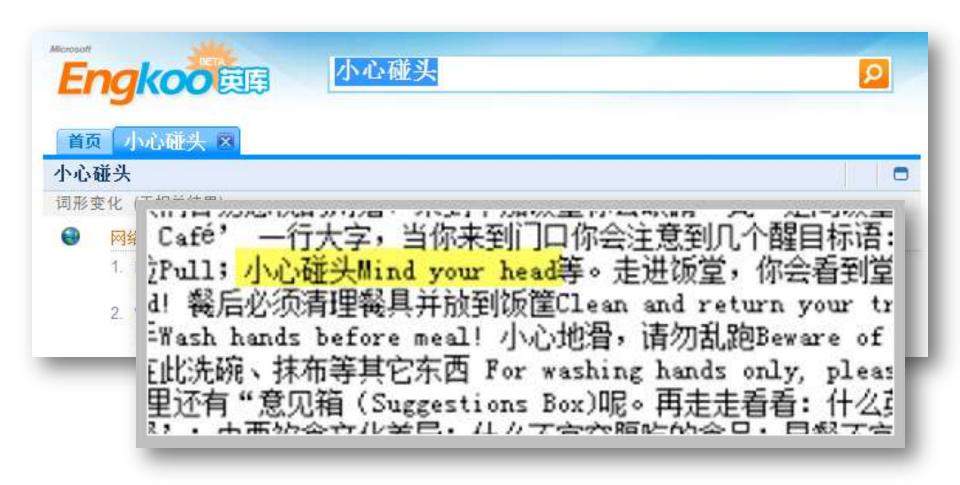
#### **Microsoft Products:**







## Massive Dictionary Mined from the Web



#### Fresh and Diverse Examples



1. Go ahead with times and open up the new phase of community health ser 与时俱进开创社区卫生服务新局面

http://www.ilib.cn/l-zgfybj.2003.11.html

Develop with the advance of the times <sup>€</sup>
 与时俱进

http://218.22.70.71/printtext.asp?id=62917

Keeping pace with the times and the Party mind line <sup>€</sup> 与时俱进与党的思想路线

http://www.ilib.cn/l-hbdxxb-zxsh.2003.01.html

 Marx and Engels are the models of keeping pace with the times 록 马克思恩格斯是与时俱进的典范

## Advanced Search with Sentence Analysis





#### 微软Bing在美国的份额继续上升



首页 潜规则 微软Bing在美国... 区

微软Bing在美国的份额继续上升

报告问题或瑕疵



计算机翻译

Microsoft Bing shares continue to rise in the United States

微软Bing在美国的份额继续上升

#### Sentences Classification



☑ 逐词释义

8

## **首页** mouse <a> ■</a> 例句 类别: 全部

全部 1. The **mou**口语 书面语 标题

down the oak-tree.

全部

全部 ▼

难度:

下了橡树。

来源

- The mouse squeaked in the corner. ●: 墙角处有老鼠的吱吱声。
- 3. The mouse whisked into its hole. ④ 这只老鼠急速地跑进洞去。
- 4. They can grow in all mouse strain. € 它们可以在所有的小鼠株内生长。
- 5. The mouse looked at her rather inquisitively. ◀ 那只耗子用疑问的眼光看看她。
- 6. The girl shrieked when she saw the mouse. € 那个姑娘一见耗子就吓得尖叫起来。
- 7. The mouse ran nimbly up the horse's leg. 《 那耗子灵活地顺着马腿爬上去。
- "Ahom!" said the Mouse with an important air 4



例句 类别: 技术 ▼ 来源: 全部 ▼ 难度: 全部 ▼

That represents the mouse cursor. 4:

它代表鼠标光标。

http://msdn2.microsoft.com/en-us/library/system.windows.forms.cursor.current.aspx

The user presses the mouse button. 4:

用户按鼠标按钮。

http://msdn2.microsoft.com/en-us/library/ms171542.aspx

The user releases the mouse button. 45

用户释放鼠标按钮。

http://msdn2.microsoft.com/en-us/library/ms171542.aspx

Release the mouse button to drop the text.

释放鼠标按钮以放下文本。

http://msdn2.microsoft.com/en-us/library/kddy153a(VS.80).aspx'

5. A Microsoft mouse or compatible pointing device is required.

需要Microsoft鼠标或兼容的指点设备。

http://msdn2.microsoft.com/en-us/library/ms143506.aspx

6. The controllable mouse carries on the image programming demonstration,

可控鼠标进行图象编程示例

# Learn Contextual Usage with Word Alignment

#### 每日一句

If we walk slower than the others we shall lag behind them.

如果我们<mark>比</mark>其他人走得慢,我们就会**落在**他们**后面**。

# Learn Contextual Usage with Word Alignment

#### 每日一句

If we walk slower than the others we shall lag behind them.

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# Learn Contextual Usage with Word Alignment

#### 每日一句

If we walk slower than the others we shall lag behind them.

如果我们比其他人<mark>走</mark>得慢,我们就会**落在**他们**后面**。

### Hints of Easy-Confused Words



- # physical
- # physique
- # phoenix
- S Felix



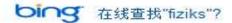
fizzes

filix

faikes

finis

fitios



## Knowlege Mining Pi

Adj~Noun (arduous~task) Adv~Adj (extremely~bad) 2. paraphrasing tokenizing: he could hardly afford to waste that turn on~light, switch on~light 他无法浪费那样的好时光。 laborious~task, hard~task skeleton parsing: (Tsub~he~afford) (ModAdv~h looply was and doorly whough a (Tobj~time~waste) (AdjAttrib) single word /// 类 #) (ModAdv~无 "he", "could", "hardly", "afford" etc. Parallel Sentence: 付光) "他","无法","浪费"etc. He could hardly afford to waste that golden time. ford to(无法) 2. single word with its POS 他无法浪费那样的好时光。 "he Pron", "could Verb", "hardly Adv" etc. "他 Pron", "无法 Adv", "浪费 Verb" etc. 3. collocation "Tsub~he~afford", "Tobj~time~waste" etc. "Tsub~他~浪费", "ModAdv~无法~浪费" etc. Web Linguistic Parsed Mined Mining Linguistic Parsing Data Data Knowledge Knowledge Multi-Mining level Indexing

1. word's idiomatic usage

Verb~Noun (decline~offer)

Verb~Adv (greatly~improve)

## WSJ Asian Innovation Award: Reader's Choice Award



### Bilingual Data (BD) in Engkoo



#### Mining BD from the Web

- From parallel pages
  - (Shi et al., ACL-06)
- From search results
  - (Jiang et al., IJCAI-07)
- Using parenthesis pattern
- From collective bilingual pages
  - (Jiang et al., ACL-09)

#### Parallel Page

http://support.microsoft.com/kb/914962/en-us

http://support.microsoft.com/kb/914962/zh-cn

This article lists problems that are fixed in Microsoft Windows Server 2003 Service Pack 2 (SP2). Service packs are cumulative. This means that the problems that are fixed in a service pack are also fixed in later service packs.

♠ Back to the top

本文列出了 Microsoft Windows Server 2003 Service Pack 2 (SP 2) 中修复的问题。 Service Pack 具有累积性。 这意味着在一个 Service Pack 中修复该问题还会在以后的 Service Pack 中修复。

This article contains a list of Microsoft k 全 回到顶端 updates that are contained in Microsoft

This article is primarily intended to help and maintaining a company's computer Windows Server 2003 SP2, the followin Microsoft 知识库 (KB) 文章列表。 answers:

本文描述的修复程序和 Microsoft Windows Server 2003 Service Pack 2 (SP 2) 中包含的更新的

http://support.microsoft.com/ph/31

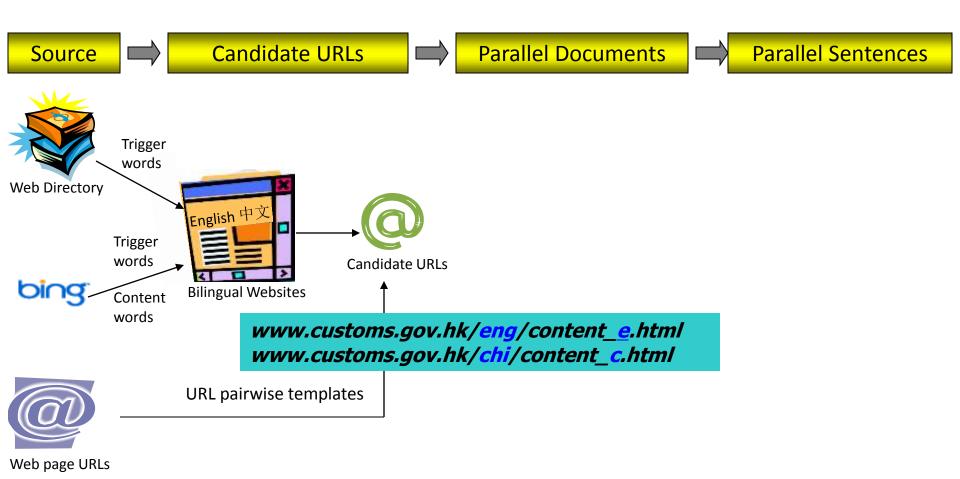
本文主要被为了帮助 IT 专业人员和支持和维护公司已经计算机系统中的公司 helpdesks。 所有其他 人对有疑问 Windows Server 2003 SP 2,下面的 Microsoft Web 站点可能是一个更好的站点,以 查找答案:

http://support.microsoft.com/ph/3198/



Web page

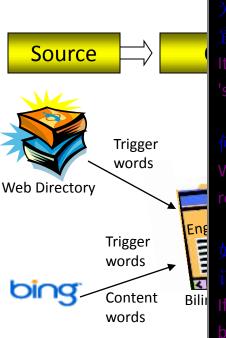
www.travel360degrees.com/article0022.htm Cached page



#### COURT OF FINAL APPEAL The Court of Final Appeal is the highest appellate court in the Hong Kong Special Administra **llel Sentences** It has jurisdiction in respect of matters conferred on it by the Hong Kong Court of Final Appe Ordinance, Cap. 484 and by any other law. It hears appeals on civil and criminal matters from the High Court (the Court of Appeal and N First Instance). Trigger **Parallel** 终审法院 hyperlinks 终审法院是香港特别行政区最高的上诉法院,根据香港法例 第484章《香港终审法院条例》》 赋予的权力,处理针对高等法院(上诉法庭及原讼法庭)的判决而作出的上诉及有关事项。

Web [

Web



为 使 婴儿 的 出生 纪录 有 足够 时间 送达 出生登记 处 , 婴儿 的 父母 宜于 婴儿 出生 两 星期 后 , 才 前往 出生登记 处 办理 手续 。
It would be preferable to attend the registry two weeks after the baby
's birth in order to allow time for the birth records to reach the registry.

可处 办理 登记 婴儿: 应 在 出生 区域 内 的 分区 登记处 办理 出生登记 手续 。 Vhere to register The birth of a child should be registered at the egistry of the district in which it occurred .

如 婴儿 是 在 抵达 医院 诊疗所 前 出生 , 则 其 父母 应 前往 生死 登 记 总 处 办理 出生登记 。

If the child was born before arrival at a hospital/clinic, the birth should be registered at the Births and Deaths General Register Office.

**URL** patterns matching

tences



allel Sentences

Web page URLs

### Mining BD from Search Results



Microsoft Research Asia

Translate this page

igroup.msra.cn · Mark as spam

微软亚洲研究院

Translate this page

Microsoft Research Asia English Website | 网站地图 最新发布 创新成果 热门下载

www.msra.cn · Cached page · Mark as spam

微软亚洲研究院

Translate this page

微软亚洲研究院 Microsoft Research Asia

www.msra.cn/rmc · Cached page · Mark as spam

#### Microsoft Research Asia Theory Workshop Translate this page

Organizers Andrej Bogdanov (Tsinghua University, andrejb@tsinghua.edu.cn) Dr. Wei Chen (MSR Asia, weic@microsoft.com) Cynthia Dwork (MSR Silicon Valley, dwork@microsoft.com) Shanghua Teng (Boston University / MSR Asia, steng@cs.bu.edu) The goal of the workshop is to enhance the communication between the nascent ...

research.microsoft.com/en-us/um/beijing/events/theory... · Cached page · Mark as spam

#### Microsoft Research Asia Family Day - Windows Live Translate this page

June 04 Microsoft Research Asia Family Day 上个月的wine down,公司把它推迟到今天,作为一次儿童节聚会,邀请公司的成员带上自己的家属,特别是那些有孩子的员工,让孩子们和爸爸妈妈一起开心一下 : ) 记个流水账//

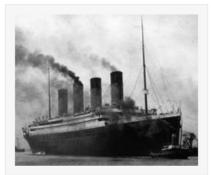
cloudsun.spaces.live.com/blog/cns!927F11B12223353A!260.entry · Cached page · Mark as spam

## Mining BD using Parenthesis Pattern

#### 泰坦尼克号邮船简介

[编辑本段]

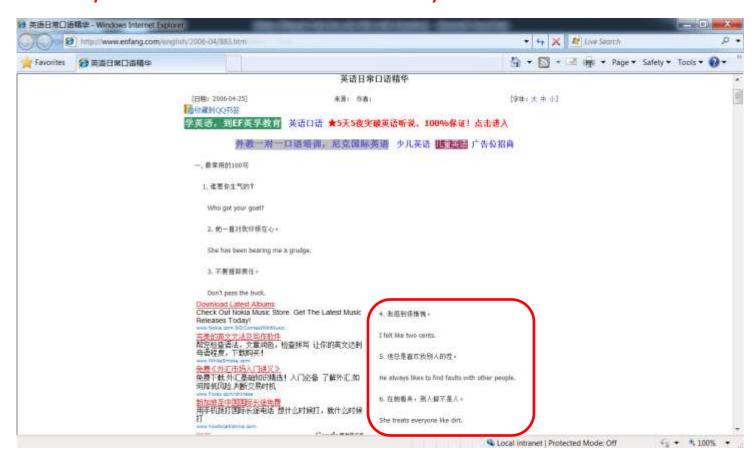
英国皇家邮船泰坦尼克号(RMS Titanic)是奥林匹克级邮轮的第二艘邮船,20世纪初,由英国白星航运公司(White Star Line)制造的一艘巨大豪华客轮。由位于爱尔兰贝尔法斯特(Belfast)的哈兰德与沃尔夫(Harland and Wolff)造船厂兴建。泰坦尼克号是当时世界上最大的豪华客轮,被称为是"永不沉没的船"或是"梦幻之船"。泰坦尼克号共耗资7500万英镑,吨位46328吨,长882.9英尺,宽92.5英尺,从龙骨到四个大烟囱的顶端有175英尺,高度相当于11层楼是当时一流的超级豪华巨轮。计划与姐妹船 奥林匹克号(RMS Olympic)和 不列颠尼克号(RMS Britannic 一道为英国白星航运公司的乘客们提供快速且舒适的跨大西洋旅行。



难而改编。

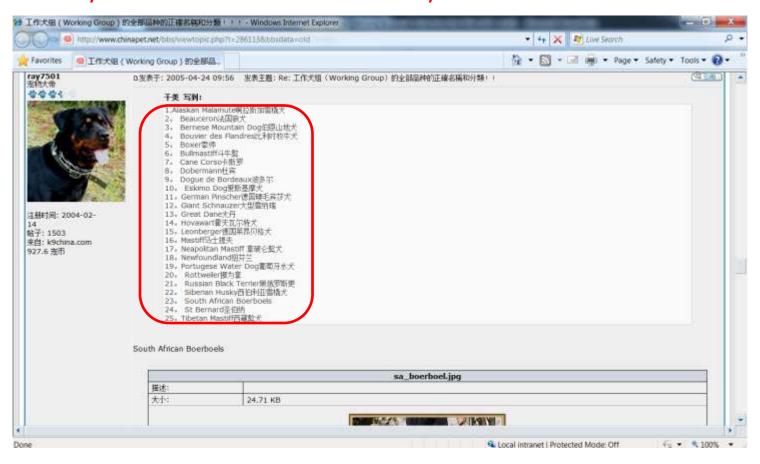
1912年4月10日,泰坦尼克号从英国南安普敦(Southampton)出发,途经法国 瑟堡-奥克特维尔(Cherbourg-Octeville)以及爱尔兰 昆士敦(Queenstown),计划中的目的地为美国的(New York),开始了这艘"梦幻客轮"的处女航。4月14日晚11点40分,泰坦尼克号在北大西洋撞上冰山(大约在41°43′55′.66″N 49°56′45′.02″W附近),两小时四十分钟后,4月15日凌晨2点20分沉没,由于缺少足够的救生艇,1500人葬生海底,造成了当时在和平时期最严重的一次航海事故,也是迄今为止最为人所知的一次海难。电影《泰坦尼克号》就是根据这一真实海

 Collective Bilingual Page (CBP): pages in which bilingual data appear collectively and are formatted consistently



Collective 4. 我感到很惭愧。 appear collectively I felt like two cents. afety \* Tools \* 📦 5. 他总是喜欢找别人的茬。 He always likes to find faults with other people. 6. 在她看来,别人都不是人。 She treats everyone like dirt. 7. 她真是厚脸皮。

 Collective Bilingual Page (CBP): pages in which bilingual data appear collectively and are formatted consistently



Collective Bilingual Page (CBP): pages in which bilingual data appear

collectively and are formatted consistently 1.Alaskan Malamute啊拉斯加雪橇犬 Beauceron法国狼犬 Bernese Mountain Dog伯恩山地犬 Bouvier des Flandres比利时牧牛犬 5。 Boxer拳师 6。 Bullmastiff斗牛獒 注册时间: 2004-02 Cane Corso卡斯罗 来自: k9china.com 927.6 完币 8。 Dobermann杜宾 Dogue de Bordeaux波多尔 10。 Eskimo Dog爱斯基摩犬 11。German Pinscher德国硬毛宾莎犬 24.71 KB ocal intranet i Protected Mode: Off

#### Mining Bilingual Data from CBPs

Identification of seed translation pairs



#### Mining Bilingual Data from CBPs

• Pattern: <number> <period> <English-term> <Chinese-term>

- 1.Alaskan Malamute啊拉斯加雪橇犬
- 2。 Beauceron法国狼犬
- 3。 Bernese Mountain Dog伯恩山地犬
- 4。 Bouvier des Flandres比利时牧牛犬
- 5。 Boxer拳师
- 6。 Bullmastiff斗牛獒
- Cane Corso卡斯罗
- 8。 Dobermann杜宾
- 9。 Dogue de Bordeaux波多尔
- 10。 Eskimo Dog爱斯基摩犬
- 11。German Pinscher德国硬毛宾莎犬

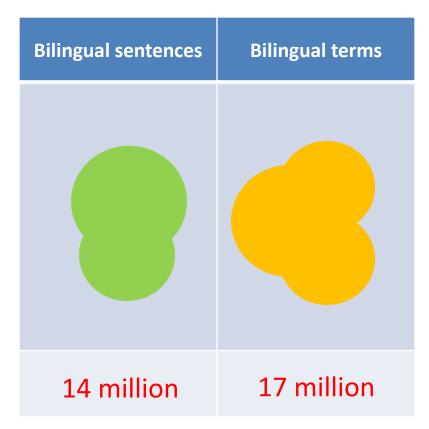
#### Mining Bilingual Data from CBPs

• Pattern: <number> <period> <English-term> <Chinese-term>

```
.Alaskan Malamute啊拉斯加雪橇犬
  Beauceron法国狼犬
  Bernese Mountain Dog伯恩山地犬
3。
   Bouvier des Flandres比利时牧牛犬
  Boxer拳师
 Bullmastiff斗牛獒
   Cane Corso卡斯罗
   Dobermann杜宾
   Dogue de Bordeaux波多尔
   Eskimo Dog爱斯基摩犬
11。「German Pinscher德国硬毛宾莎犬
```

### Results of BD Mining

- From parallel pages
  - (Shi et al., ACL-06)
  - About 6 million bilingual sentences
- From search results
  - (Jiang et al., IJCAI-07)
  - About 6 million bilingual terms
- Using parenthesis pattern
  - About 6 million bilingual terms
- From collective bilingual pages
  - (Jiang et al., ACL-09)
  - About 10.5 million bilingual sentences and 10.1 million bilingual terms



#### Summary

- Mine massive translation knowledge from the web to build a huge lexicon
- Build a search engine to provide dictionary explanation and example sentences
- Learn a SMT engine with the mined example sentences for translation references
- Apply NLP based search to enable advanced search
- Learn pronunciation with TTS
- Language-independent technologies extensible to other language pairs