HG2052
Language, Technology and the Internet

Text and Meta-Text

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Lecture 8

Text and Meta-text

- Revision of Web As Corpus
- Explicit Meta-data
  - Keywords and Categories
  - Rankings
  - Structural Markup
- Implicit Meta-data
  - Links and Citations
  - Tags
  - Tables
  - File Names
  - Translations

Revision of the Web as Corpus

- Direct Query: Search Engine as Query tool and WWW as corpus?
  (Objection: Results are not reliable)
  - Population and exact hit counts are unknown → no statistics possible.
  - Indexing does not allow to draw conclusions on the data.
  - ⊗ Google is missing functionalities that linguists / lexicographers would like to have.

- Web Sample: Use search engine to download data from the net and build a corpus from it.
  - known size and exact hit counts → statistics possible.
  - people can draw conclusions over the included text types.
  - (limited) control over the content.
  - ⊗ sparser data

Direct Query

- Accessible through search engines (Google API, Yahoo API, Scripts)
- Document counts are shown to correlate directly with "real" frequencies (Keller 2003), so search engines can help - but...
  - lots of repetitions of the same text (not representative)
  - very limited query precision (no upper/lower case, no punctuation...)
  - only estimated counts, often hard to reproduce exactly
  - different queries give wildly different numbers

Web Sample

- Extracting and filtering web documents to create linguistically annotated corpora (Kilgarriff 2006)
  - gather documents for different topics (balance!)
  - exclude documents which cannot be preprocessed with available tools (here taggers and lemmatizers)
  - exclude documents which seem irrelevant for a corpus (too short or too long, word lists,...)
  - do this for several languages and make the corpora available

Internet Corpora: Outline

1. Select Seed Words (500)

2. Combine to form multiple queries (6,000)

3. Query a search engine and retrieve the URLs (50,000)

4. Download the files from the URLS (100,000,000 words)

5. Postprocess the data (encoding; cleanup; tagging and parsing)

Sharoff, S (2006) Creating general-purpose corpora using automated search engine queries. In M. Baroni, S. Bernardini (eds.) WaCky! Working papers on the Web as Corpus, Bologna, 2006.

Internet Corpora Summary

- ➢ The web can be used as a corpus
  - ➢ Direct access
    - ∗ Fast and convenient
    - ∗ Huge amounts of data
    - ⊗ unreliable counts
  - ➢ Web sample
    - ∗ Control over the sample
    - ∗ Some setup costs (semi-automated)
    - ⊗ Less data
- ➢ Richer data than a compiled corpus
- ⊗ Less balanced, less markup

Explicit Metadata

- You can get information from metadata within documents
  - When they are accurate they are very good
  - They are often inaccurate
    - Sometimes deliberately deceitful
    - More often incomplete or out-of-date

Never attribute to malice that which is adequately explained by stupidity.

Hanlon's Razor

You have attributed conditions to villainy that simply result from stupidity

Robert A. Heinlein (1941) *Logic of Empire*

HTML Metadata

- Most document types contain metadata of some description:

```
<head>
  <title>CSLI LinGO Lab</title>
  <META HTTP-EQUIV="Content-Type" CONTENT="text/html; charset=iso-8859-1">
  <meta http-equiv="Content-Style-Type" content="text/css">
  <meta name="keywords" content="linguistic grammars online,
   LinGO, computational linguistics,
   head-driven phrase structure grammar, hpsg, natural language processing,
   parsing, generation, augmentative and alternative communication, aac,
   LinGO Redwoods, multiword expressions, MWE, grammar matrix">
  <meta name="description" content="This page provides information about
   the CSLI Linguistic Grammars Online (LinGO) Lab at Stanford
   University.">
```

- Should we also extract out this data, or is metadata too unreliable to consider using?

PDF Metadata

- Checkout this file (now look at earlier weeks)

```
InfoKey: Creator
InfoValue: xetex(k) 5.98 Copyright 2009 Radical Eye Software
InfoKey: Title
InfoValue: Lecture 11:Text and Meta-Text
InfoKey: Author
InfoValue: Francis Bond
InfoKey: Producer
InfoValue: GPL Ghostscript 8.71
InfoKey: Keywords
InfoValue: Language, Technology, Internet
InfoKey: Subject
InfoValue: HG2052/HG252: Language, Technology and the Internet
InfoKey: ModDate
InfoValue: D:20120315121040+08'00'
InfoKey: CreationDate
InfoValue: D:20120315121040+08'00'
PdfID0: 39bb293fa576c18e1ae64480cb8974
PdfID1: 39bb293fa576c18e1ae64480cb8974
```

```
NumberOfPages: 23
```

HTML Metadata

- HTML Metadata is generally considered unreliable
  - Authors don't see it, so they don't update it
  - As it is unseen, it is easy to lie in the MetaData

It wasn't long before webmasters with no scruples saw an opportunity to gain favour with the search engines by adding in keywords that did not pertain to the content of their pages. Various tactics were thought up to get ranked higher for certain keywords, and an entire industry sprang up to optimise search engine positioning. This was, in effect, cheating, and "keyword spamming" became a serious problem for search engines, who vainly attempted to add filters that would notice when a webmaster was loading up on the wrong keywords.

Keywords and Categories

- Sites with visible tags are more trustworthy/reliable
- Tags within blogs/photo cites
- Keywords in journals and conferences

Example tags from Science Professor

academia (109)
academic novels (9)
accounting nightmares (10)
administrative assistants (7)
adviser-student (69)
attempt at humor (18)
awards (7)
bizarre (56)
blogging (22)
books (23)
broader impacts (8)
career issues (27)
cats (19)
citations and citation index (19)

Rankings

- Another good source of meta-data is rankings/forums

  HG251
  Q A Solved

- Sentiment Analysis tries to judge whether text is favorable or unfavorable
  - Link text to rankings for data
  - Link posts to tags for usefulness in QA

hungry go where

```
Overall: 7  Recommend.
I spent about S$10 Per Person

    Food/Beverage: 6
    Ambience: 5
    Value: 9
    Service: 5

Cheap but not very cheerful                          10 June, 2010
```

Absolutely love this neighbourhood eatery, mainly because I have been eating here since I was a child, so it brings back many happy memories. Granted, service is kind of lacking but a cheap and yummy home-style meal can always be had. Must-haves for me are the Honey Pork (love the 3 or 4 little green peas they garnish it with), Ayam Buah Keluak, Bakwan Kepeting (meatball soup) and Sayur Lodeh. The Otak and Ngor Hiang are not bad too.

Links and Citations

- Citation frequency can be used to measure the impact of an article.
  - Simplest measure: Each article gets one vote – not very accurate.
- On the web: citation frequency = inlink count
  - A high inlink count does not necessarily mean high quality ...
  - ...mainly because of link spam.
- Better measure: weighted citation frequency or citation rank
  - An article's vote is weighted according to its citation impact.
  - This can be formalized in a well-defined way and calculated.

Structure

- Structural Markup gives useful cues
  - Words in headers are often good keywords
  - TableOfContents!

```
1 Review
1.1 Language Identification
1.2 Normalization
2 Text and Meta-text
2.1 Implicit Tags
2.1 Explicit Tags
```

Implicit Metadata

- You can get clues from metadata within documents
  - as they are non-intended, they tend to be noisy
  - but they are rarely deceitful

Tags

- Hypertext Anchors and other formatting gives phrase boundaries

```
whereas McCain is secure on the topic, Obama
<a>[VP worries about winning the pro-Israel vote]</a>

[NP [NP Libyan ruler]
<a>[NP Mu ʻammar al-Qaddafi]</a>] referred to
```

  Mainly NPs

- This can be very useful in restricting parser possibilities

Valentin I. Spitkovsky, Daniel Jurafsky, Hiyan Alshawi (2010) *Profiting from Mark-Up: Hyper-Text Annotations for Guided Parsing* ACL

Tables

- You can learn many things from Tables
  - for example, categories

Vehicle	Price	Manufacturer	Type	Rating
Raum	XXX	Toyota	Hatch-back	Solid
icw30	XXX	Hyundae	Station Wagon	Exciting
Corolla	XXX	Toyota	Station Wagon	Solid
Camry	XXX	Toyota	Sedan	Bland

Toyota $\subset$ manufacturer

File Names

- How to find definitions?
  - Look for files called `glossary`, `dictionary`, ...
- Is there an English version of this?
  - `http://nlpwww.nict.go.jp/wn-ja/index.ja.html`
  - `http://nlpwww.nict.go.jp/wn-ja/index.en.html`

Translations

- A translation into another language can be seen as markup

Bracketed Glosses

GPS
通用 回解诀者
２８附录：（通用 回解诀者》（ＧＰＳ）计算机程序解决・・河内塔。
{2069:corpus0.txt}

SomeThoughtsConcerningEducation
教育漫话
笔者在认真阅读洛克的教育著作《教育漫话》
（ＳｏｍｅＴｈｏｕｇｈｔｓＣｏｎｃｅｒｎｉｎｇＥｄｕｃａｔｉｏｎ）、
《关于理解的指导》以及《贫穷儿童劳动学校计划》
（ＰｌａｎｏｆＷｏｒｋｉｎｇＳｃｈｏｏｌｆｏｒＰｏｏｒ ...
{25094:corpus0.txt}

Cross-lingual Disambiguation

(1) *I*$_1$ *saw*$_2$ *the kid*$_3$ *with a telescope*$_4$

(2) ϕ_1 望遠鏡 $_4$ で 子供 $_1$ を 見た $_2$
bouenkyou de kodomo wo mita
NULL telescope with child ACC see-past
With the telescope, I saw the kid.

- We can disambiguate the PP attachment: ***de*** only modifies verbs
- We can disambiguate the verb ***see/saw***: ***mita*** is only "see"
- We can resolve the zero pronoun: It must be the speaker.

Query Data

AOL user 2708:

- revenge tactics
- the woman's book of revenge
- dirty tricks for chicks
- ...
- locatecell.com
- what can i do to an old lover for revenge
- mean revenge tactics
- death records in hampstead

Wikipedia Redirections

- Alternative names (*Edison Arantes do Nascimento* → *Pelé*).
- Abbreviations (*DSM-IV* → *Diagnostic and Statistical Manual of Mental Disorders*).
- Alternative spellings or punctuation. (*Colour* → *Color*; *Al-Jazeera* → *Al Jazeera*).
- Likely misspellings (*Condoleeza Rice* → *Condoleezza Rice*).
- Plurals (*Greenhouse gases* → *Greenhouse gas*).
- Related words (*Symbiont* → *Symbiosis*).
- Representations using ASCII characters (*Kurt Goedel* and *Kurt Godel* → *Kurt Gödel*).

Unfortunately redirects are rarely typed (so we don't know the relation, but have to infer it).

Cross Wikipedia Links

en Forensic linguistics

ca Lingüística forense

cs Forenzní lingvistika

de Forensische Linguistik

es Lingüística forense

nl Forensische taalkunde

no Forensisk lingvistikk

tr Adlî dil bilimi

zh 司法语言学

Deliberately Deceit: Phishing

- Phishing is a way of attempting to acquire information such as usernames, passwords, and credit card details by masquerading as a trustworthy entity in an electronic communication.
- Communications typically pretend to be from social web sites, auction sites, online payment processors or IT administrators.
- Phishing is typically carried out by e-mail spoofing, linking users to a fake website whose look and feel are almost identical to the legitimate one.
- Phishing is an example of social engineering.
- A phishing technique was described in detail in 1987, and (according to its creator) the first recorded use of the term *phishing* was made in 1995.

From my own spam box

System Administrator s28407548@tuks.co.za via srs.ieee.org
to undisclosed recipients

You have exceeded the storage limit on your mailbox.

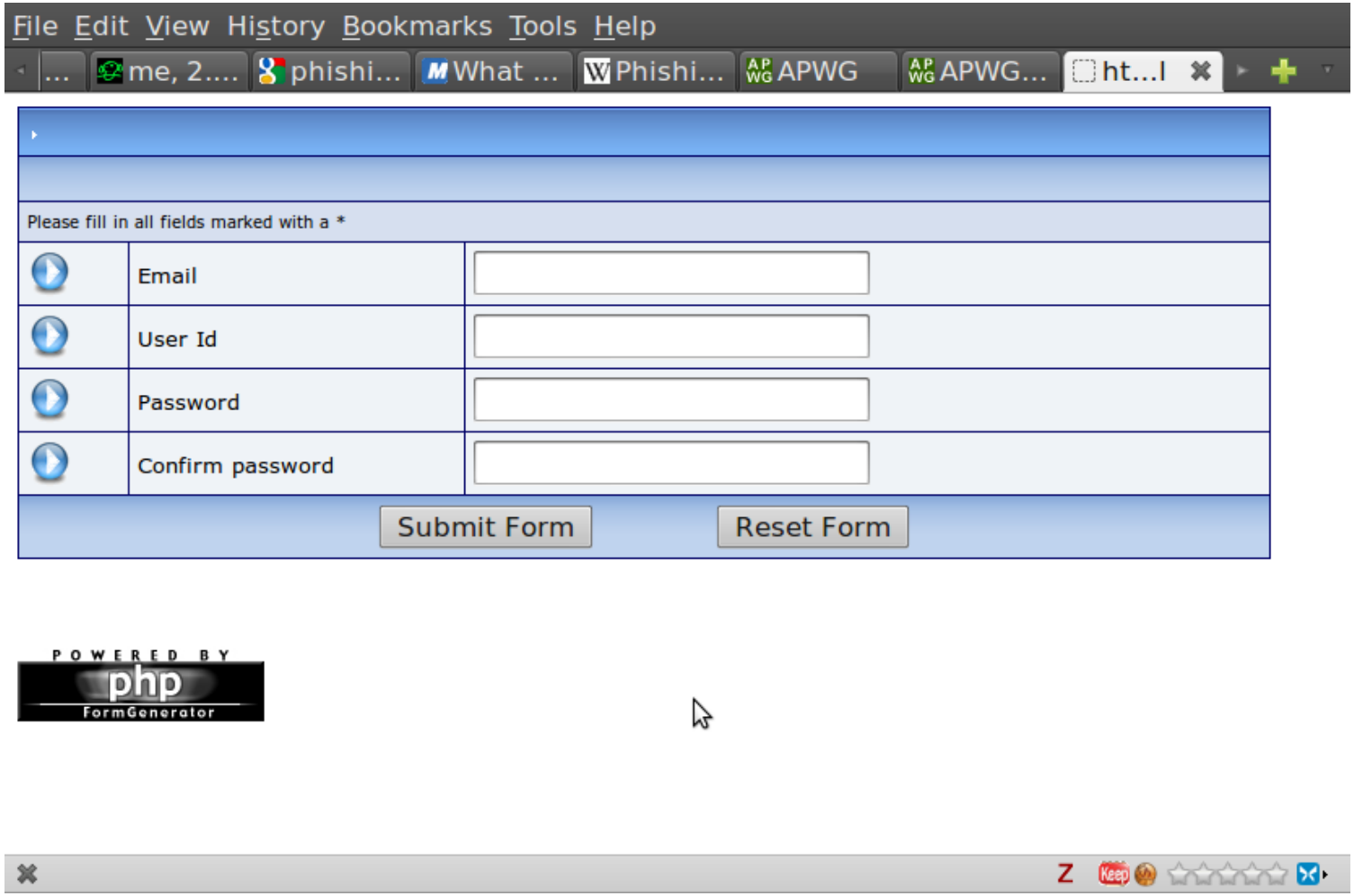
You will not be able to send or receive new mail until
you upgrade your email quota.

Click the below link and fill the form to upgrade your
account.

http://millerofficetrailers.com/forms/use/hepldesk/form1.html

System Administrator
192.168.0.1

The fake form



Some Distinguishing Features

- Surprisingly many grammatical mistakes
- Spoofed URLs
- Ultimatums
- Weird misspellings: `NTU.edu.org`

Why is this important?

- The 1990s started a revolution in empirical linguistics
  - New insights come from Data Mining large text collections
    - Corpus Linguistics
    - You can do with a computer what you can't do with paper
  - New tools come from supervised Machine Learning
- Annotation is expensive and tedious to do
- We want to get annotation for free
- People appreciate clever ideas
- In Singapore multiple-languages can serve as annotation, ...