

Creating Specialized and General Corpora Using Automated Search Engine Queries

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Outline

- 1 Introduction
- 2 Building a specialized corpus
 - Background
 - The procedure in detail
 - Conclusions on specialized corpus building
- 3 Building a BNC
 - DIY manual
 - Analysing macrostructure (composition)
 - Analysing microstructure (lexicon)
- 4 Conclusions

Introduction

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- Some relevant work:
 - Ghani and colleagues' CorpusBuilder project
 - Corpus comparison work, e.g., Rayson and Garside 2000

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- POS taggers, indexers, etc.

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- Uses: technical translation, terminography, populating ontologies. . .

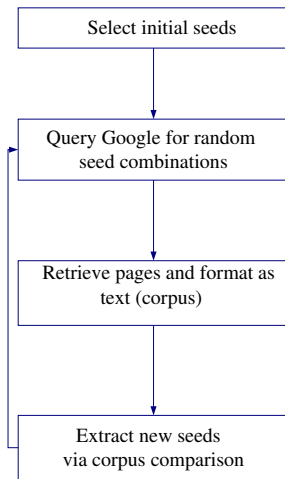
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- Languages: English, Italian, Japanese, Spanish, German, French, Danish. . .

The basic idea



Example

- 7 seeds: *black sabbath, led zeppelin, deep purple, motorhead, rainbow, judas priest, iron maiden*

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"deep purple" motorhead rainbow
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- 20 documents per query

Document retrieval and processing

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- Filtering and cleaning (“boilerplate removal”) is more tricky

Cleaning with a standard HTML formatter

Blackmore's Night Latest News
Ritchie Blackmore's Bio
Blackmore's Night Band Bios
Blackmore's Night Tour Info
Blackmore's Night Merchandise
Blackmore's Night Photo Gallery
Blackmore's Night Audio Clips

...

Register for
Blackmores Night
Email Updates!
Just enter your
email address in
the box below and
click the 'Sign up' button!

...

RITCHIE BLACKMORE A MUSICAL HISTORY...

1967 - RITCHIE BLACKMORE - who has previously played with such bands as the Outlaws, Screaming Lord Sutch, and Neil Christian & The Crusaders - is invited by ex-Artwoods/The Flowerpot Men keyboardist Jon Lord (who was invited by The Searchers ex-drummer, Chris Curtis) to form a new band. Other musician's would be auditioned from a Melody Maker ad in Deeves Hall in Hertfordshire.

1968- In February, the group would form as Roundabout, consisting of the three (with Chris Curtis on vocals) along with Dave Curtis on bass and Bobby Woodman on drums. After only a month of uncompromising rehearsals, BLACKMORE and LORD would be the only two remaining,

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- Look for stretch that maximizes the quantity:
 $N(TOKEN) - N(TAG)$

Finn's BTE heuristic: why it (mostly) works

TAG TAG TOKEN TOKEN TAG TAG TAG
TOKEN TAG TAG
TOKEN TAG TAG
TAG TOKEN TOKEN TOKEN TOKEN TOKEN TOKEN TOKEN
TOKEN TAG TOKEN TOKEN TAG TOKEN TOKEN TOKEN
TAG TAG
TOKEN TOKEN TOKEN TOKEN TOKEN TOKEN TOKEN TOKEN
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TAG TAG TAG TAG TAG
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Cleaning with Finn's heuristic

- RITCHIE BLACKMORE - who has previously played with such bands as the Outlaws, Screaming Lord Sutch, and Neil Christian & The Crusaders - is invited by ex-Artwoods/The Flowerpot Men key bordist Jon Lord (who was invited by The Searchers ex-drummer, Chris Curtis) to form a new band. Other musician's would be auditioned from a Melody Maker ad in Deeves Hall in Hertfordshire. 1968 - In February, the group would form as Roundabout, consisting of the three (with Chris Curtis on vocals) along with Dave Curtis on bass and Bobby Woodman on drums. After only a month of uncompromising rehearsals, BLACKMORE and LORD would be the only two remaining, bringing in vocalist Rod Evans (formally of the groups M15 and Maze), bassist Nick Simper (ex-Johnny Kidd & the Pirates) and drummer Ian Paice. In April, the band would change its name to DEEP PURPLE, and forego the name Concrete God. Using Vanilla Fudge as its model, the group records an album and is signed to EMI in the United Kingdom and Tetragrammation (Bill Cosby's label) in the United States. A few months later, the band performs its first major UK performance at the Sunbury Festival. In September, the band would release the first single from the album, "Hush", which reaches #4 on the US charts. The album, itself, Shades of Deep Purple, would reach the Top 25. In December, the band would release their rendition of Neil Diamond's "Kentucky Woman" a single which would also experience considerable chart success. 1969 - Early in the year, the band would release The Book of Taliesyn which would feature a revival of Ike and Tina Turner's "River Deep, Mountain High." In July, the band would release their self-titled album, Deep Purple. Shortly thereafter, their record label would go under and Rod Evans and Nick Simper would both leave the band. They would be replaced by singer Ian Gillan and bassist Roger Glover, who were both previously members of the group, Episode Six. The two would add a dynamic chemistry to the band, complimenting BLACKMORE, who was quickly rising as one of the most omnipotent British lead guitarists around. In September, the band would perform what many believed to be their most adventurous album to date, Concerto For Group And Orchestra, which featured The Royal Philharmonic Orchestra at the Royal Albert Hall in London. 1970 - By August, the band's newest album, Deep Purple In Rock, would stay on the UK charts for over a year, and hit #4. To this day, the album remains a landmark of sorts in heavy rock, with Gillan

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Further filtering

- Pre-HMTL-Stripping: Minimum and maximum size, e.g., 5-200 Kb (Fletcher's suggestion, confirmed by my experiments)

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- Post-Boilerplate-Removal: Minimum number and proportion of function/frequent words (Zipf's law to the rescue!)

Example continued: size of retrieved corpus

- Raw: 12MB
- Removing HTML etc.: 2.8MB
- After boilerplate-removal and Zipfian filtering: 1.3MB, 281 documents, ~217K words

New seed extraction

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- Use extracted terms as new seeds to build a larger corpus
- Reference corpus: you can build your own from the Web (see below)!
- For all your word statistics needs, there is the UCS package:
`http://www.collocations.de`

Example continued

Top 100 words found with Log-Likelihood Ratio (using the Brown as a reference corpus) as new seeds, for example:

band	ozzy
album	osbourne
metal	bands
rock	music
dio	release
tour	guitar
live	song
iommi	drummer
released	albums
heavy	blackmore

Example continued

Some words that would have been in seeds if we had not performed boilerplate-removal / Zipfian filtering:

alice	modblog
avg	news
bestel	pantera
click	picture
floyd	reviews
hendrix	slayer
min	t-shirts

Example continued: the second round

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- 1150 pages retrieved
- ~3.6M words (after filtering)
- Top 20 words by Log-Likelihood Ratio:

band	songs
album	ozzy
rock	live
sabbath	released
metal	release
music	bands
guitar	purple
tour	vocals
song	bass
black	albums

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- What is a specialized corpus? Which kinds of specialization “work”/”do not work”?
- Other kinds of specialization: study of genre, personal prose, everyday domains, child-directed prose, etc.

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Biting the bullet. . .

- Crawling, cleaning, annotating, managing and maintaining your own indexed version of the web.
- Obviously, the “ideal” solution.
- But obviously a lot of work!
- A shortcut: building a BNC for language X using BootCat

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- But the advantage of morphologically rich languages:
we can use verbs only to get descriptive fragments

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`http://www.google.com/search?q=picture+extent+raised+events&lr=lang_en`
- All retrieved examples contain connected text (2000-5000 words)

Step 3: Downloading

- Maintain the list of top 10 URLs for each query
- This is an open source corpus—
We are free to distribute the list of URLs
- Download available pages (direct or from the Google cache)
- Currently we have I-DE, I-EN, I-RU, I-ZH (+I-RO, I-UA)

Step 4: Post-processing

- Unify page encoding (6 encodings for Russian)
- Convert pages to plain text (using Lynx)
- Remove navigation frames/boilerplates
- Filter out duplicates and near duplicates
- Language-dependent morphosyntactic processing (tokenisation, lemmatisation, POS tagging, parsing, word sense disambiguation, . . .)
- Indexing in CWB

Validation

- We have 45,000 documents—
a random snapshot of the Internet for language X
- How random is the procedure?
- What is there: benchmarking the macro- and
microstructure

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- 200 documents – $\sigma = \pm 5\%$, 90% confidence (c=1.645) OR
- 1500 documents – $\sigma = \pm 1\%$, 99% confidence (c=1.946)

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- **Authorship: corporate: 44% (22%), male: 23% (28%), female: 4% (13%), unknown: 7% (0%), multiple: 19% (23%)**

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- **Domain:** life: 14% (27%), politics: 12% (19%), commerce: 13% (8%), natsci: 3% (4%), **appsci: 29% (7%),** socsci: 16% (17%), arts: 2% (7%), leisure: 11% (11%)

I-EN vs. BNC

More in BNC	LL-score	More in I-EN	LL-score
was	1251.29	your	303.43
had	953.62	Posted	278.37
he	928.66	Web	262.23
she	912.82	program	255.15
er	909.30	Internet	228.45
her	795.37	site	217.36
Yeah	623.65	Click	201.91
it	580.80	Center	192.76
erm	578.10	online	189.36
his	496.03	Bush	177.53
I	415.54	email	177.42
said	398.64	information	174.04
Oh	385.29	New	168.38

BNC vs. Reuters; I-EN vs. Reuters

More in BNC	LL-score	More in Reuters	LL-score
you	6005.14	say	8559.54
I	5271.42	percent	4513.35
she	3334.57	million	2364.29
be	2411.89	market	1982.47
do	1610.71	billion	1518.25
they	1502.79	bank	1468.84
your	1282.15	company	1258.34
can	1191.74	newsroom	1240.37
what	1090.53	share	1214.84
my	1023.56	tuesday	1199.25

More in I-EN	LL-score	More in Reuters	LL-score
you	4343.16	say	12154.94
I	2797.67	percent	3424.40
your	2731.17	million	2103.23
or	1845.60	market	1943.17
my	1262.80	bank	1574.68
can	965.08	billion	1270.30
this	899.29	newsroom	1254.03
use	729.11	share	1193.56
me	719.46	its	1175.01
do	687.78	company	1125.64

How random: I-EN1 vs. I-EN2

- Collect two English Internet corpora 100 MW each
- From two different sets of seeds

More in I-EN2	I-EN1	I-EN2	LL-score	More in I-EN1	I-EN2	I-EN1	LL-score
I	5296.93	6634.12	143.14	tea	17.18	105.07	70.47
June	135.33	380.78	120.60	Christmas	26.66	87.28	34.21
Posted	201.62	455.60	99.64	dog	40.82	101.77	27.17
book	313.75	545.32	62.09	and	21990.16	22902.93	24.01
Definitions	5.16	57.78	51.45	Tea	3.95	29.70	22.37
blog	26.24	105.42	50.74	Speaker	10.33	42.36	21.00
that	8573.25	9555.52	47.98	PST	8.47	37.95	20.34
think	494.23	737.16	47.02	Feb	17.43	54.51	20.21
References	14.92	76.95	45.66	dogs	20.72	59.18	19.46

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- 4 100 MW corpora (EN, DE, RU, ZH) available now
`http://corpus.leeds.ac.uk/internet.html`

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- 4 100 MW corpora (EN, DE, RU, ZH) available now <http://corpus.leeds.ac.uk/internet.html>
- 3 1-billion word corpora (English, German, Italian) by spring 2006.