

#### Outline

#### Background

- Data Set
- Pipeline

#### **Predefined Queries**

- Preprocessing
- IR & IE methods

**Non-defined Queries** 

**Demonstration** 

**Problems** 

**Future Directions** 

#### Data Set



#### Data set provided by:LANIC

- Latin American Network Information Center(LANIC)
- Affiliated and supported by the Institute of Latin American Studies of the University of Texas at Austin.
- Lanic hosts extensive digital content on Latin America through its Collection

#### "Castro Speech Database"

- \* 2,000 interviews, speeches and press conferences, from 1959-1996
- Structured data
- Based on the records of Foreign Broadcast Information(FBIS)

```
-DATE-
19641101
-YEAR-
1964
-DOCUMENT TYPE-
SPEECH
-AUTHOR-
F. CASTRO
-HEADLINE-
CASTRO SEES PROGRESS IN REVOLUTIONARY SPIRIT
-PLACE-
CTC-R THEATER IN HAVANA
-SOURCE-
HAVANA DOMESTIC RADIO
-REPORT_NBR-
FBIS
-REPORT_DATE-
19641103
-TEXT-
CASTRO SEES PROGRESS IN REVOLUTIONARY SPIRIT
```

#### Focus Topics

- Social Development
- \* Education
- Medical Domain
- Agriculture
- \* Industry
- \* Why:
  - \* Social development goes hand in hand with the historical, political and ideological situation of the time.

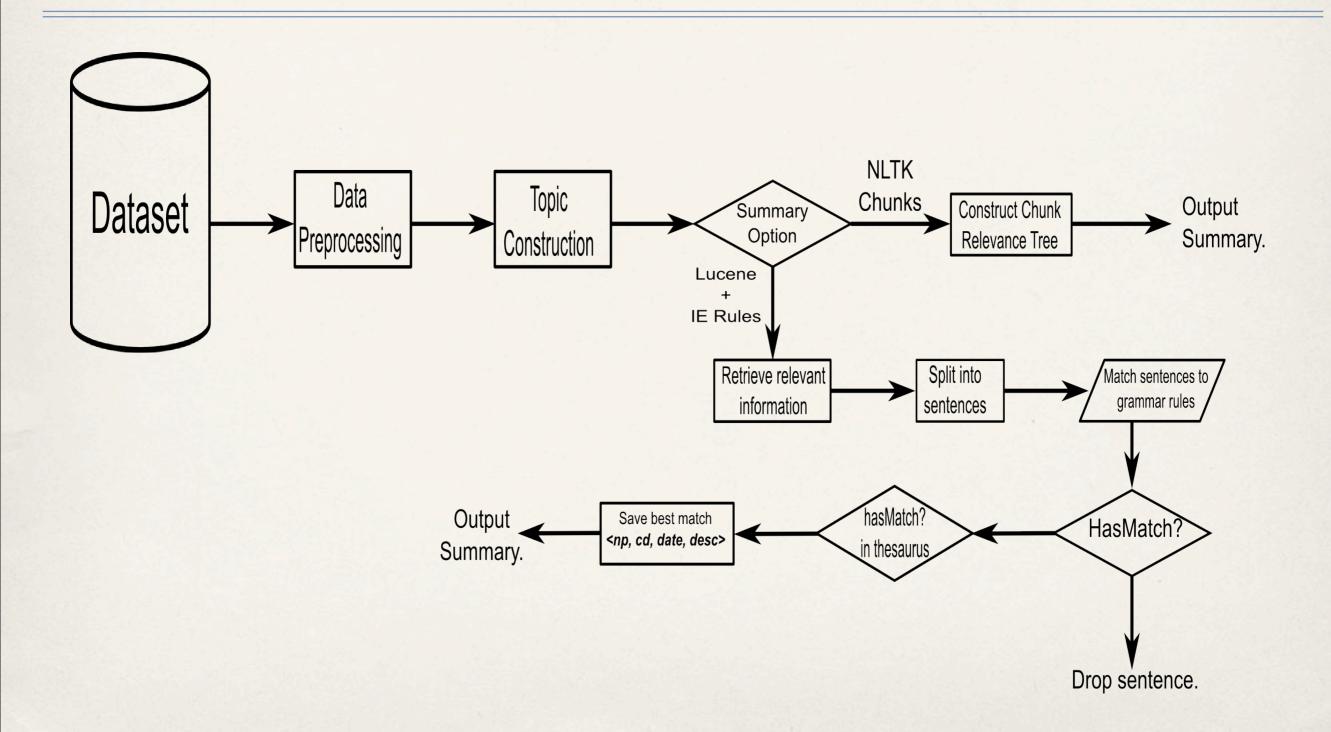
#### Historical Facts in data set:

- Progress of Cuban social development throughout 4 decades (50's-90's)
- Gradual nationalization of the industry
- External Policy and relations
- Grains of communist ideology and its impact to internal and external policy
- Phases of the economic embargo imposed by the different US presidents and governments

#### Goal

- \* Direct accessible primary sources for historical research
- Categorized & summarized statistical data of actual facts and figures of Cuban social development(predefined-query)
- Search and query for specific terms through non-defined query
- \* Parallel access to the original speeches for double checking

#### Pipeline





### Data Pre-processing

#### Document File

The interest with which this congress has been received and the high degree of participation to which we have referred constitute a concrete expression of the community of interests being increasingly manifested among the workers of the world. We can point out that the congress we are pleased to inaugurate today is the congress of the large majority of the organized trade union movement on an international level.

This is the first time that a congress of this type has been held outside of Europe and the fact that it is being held in Cuba — a country which is struggling for development in the midst of continued threats, slanderous campaigns and a rigorous economic blockade; a country whose enemies have tried to isolate and banish from the rest of the peoples of the world - gives it a solidary significance that our people and government profoundly appreciate.

We, of course, do not ignore the heterogeneity of the political, philosophical and religious positions assembled in this hall, the existing diversity of opinions among many of the organizations present here; and the fact that this congress has the peculiarity of assembling union leaders from socialist countries, union leaders who are active in capitalist countries, labor leaders active in highly industrialized states and leaders from the largely underdeveloped and economically backward areas of the world. There is a great variety of circumstances and opinions. Under such conditions, could it be possible to find a common language? We believe it is possible, that it is necessary and, still more, indispensable.

#### Paragraph Files

The interest with which this congress has been received and the high degree of participation to which we have referred constitute a concrete expression of the community of interests being increasingly manifested among the workers of the world.

RegEx

This is the first time that a congress of this type has been held outside of Europe and the fact that it is being held in Cuba - a country which is struggling for development in the midst of continued threats, slanderous campaigns and a rigorous economic blockade

We, of course, do not ignore the heterogeneity of the political, philosophical and religious positions assembled in this hall, the existing diversity of opinions among many of the organizations present here; and the fact that this congress has the peculiarity of assembling union leaders.

#### POS - Paragraphs Files

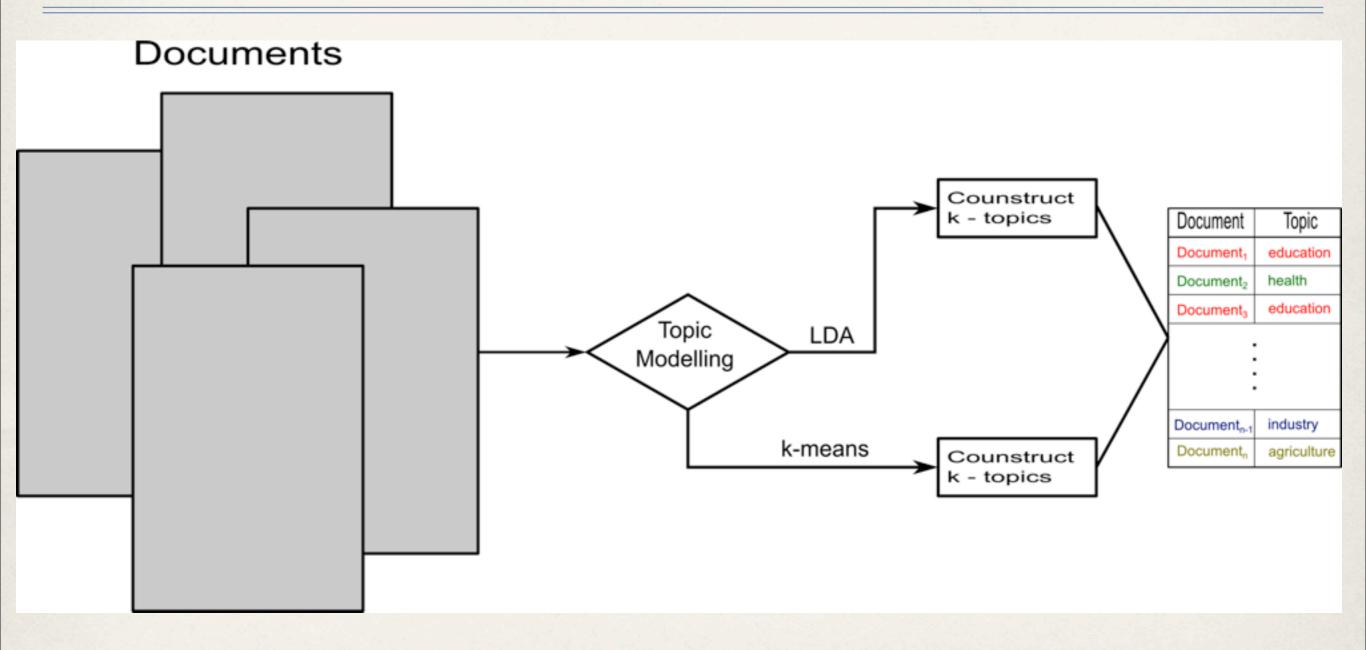
The DT interest NN with IN which WDT this DT congress NN has VBZ been VBN received VBN and CC the DT high JJ degree NN of IN participation NN to TO which WDT we PRP have VBP referred VBN constitute NN a DT concrete JJ expression NN of IN ......



This\_DT is\_VBZ the\_DT first\_JJ time\_NN that\_WDT a\_DT congress\_NN of IN this\_DT type\_NN has\_VBZ been\_VBN held\_VBN outside\_IN of IN Europe\_NNP and\_CC the\_DT fact\_NN that\_IN it\_PRP is\_VBZ being\_VBG held\_VBN in\_IN Cuba\_NNP a\_DT country\_NN which\_WDT .......

We\_PRP, of\_IN course\_NN, do\_VBP not\_RB ignore\_VB the\_DT heterogeneity\_NN of\_IN the\_DT political\_JJ, philosophical\_JJ and\_CC religious\_JJ positions\_NNS assembled\_VBN in\_IN this\_DT hall\_NN, the\_DT existing\_VBG diversity\_NN of\_IN ........

# Document Categorization



#### LDA Topic Modelling Tool

- "Latent Dirichlet Allocation"
- \* Generative probabilistic model for collection of data
- \* Each document is a random mixture of corpus-wide topics
- \* Each word is drawn from these topics

## LDA Topic Modelling Tool

- LDA puts "topical" words together
- Word probabilities are maximized by dividing the words among the topics.

```
Console
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<120> LL/token: -8.74284
<130> LL/token: -8.75137
<140> LL/token: -8.75303
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             10
                           school education million schools future years center peasants thousands level
             10
                           area sugarcane sugar people children time plan rice water cane
             10
                           country applause teachers plans planted pupils areas services polyclinic persons
                           land production students work room consumption increase roads peasant number
<150> LL/token: -8.74535
<160> LL/token: -8.7518
<170> LL/token: -8.75169
<180> LL/token: -8.76955
<190> LL/token: -8.77968
                           development year teachers planted percent grade revolution part increase town
             10
                           school education million time future road years center persons things
             10
                           country sugarcane area sugar people children areas plan rice peasant
             10
                           applause production plans pupils services day roads province el shouts
                           schools land students work cane room consumption conditions polyclinic present
<200> LL/token: -8.77418
Total time: 1 seconds
Mallet Output files written in /home/evi/Downloads ---> /home/evi/Downloads/output_state.gz , /home/evi/Downloads/output_topic_keys
Csv Output files written in /home/evi/Downloads/output_csv
Html Output files written in /home/evi/Downloads/output html
PROCESS COMPLETE
Time :6.437
```

Blei.D. (2009) "Topic Models" Computer Science Department, Princeton University <a href="http://videolectures.net/mlss09uk">http://videolectures.net/mlss09uk</a> blei tm/

### Document Categorization - I

tf-idf for comparison.

- Cluster documents, using kmeans.
- \* Tanimato distance, for document similarity.

$$f(A,B) = \frac{A \cdot B}{|A|^2 + |B|^2 - A \cdot B}$$

$$A \cdot B = \sum_{i} (A_i \wedge B_i) \qquad |A|^2 = \sum_{i} (A_i)$$

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#### tf-idf for comparison.

Document	19590103
cantillo	0.03271093930539276
santiago	0.024037028819946824
military	0.020506722190177733
rego	0.01833223516715711
batista	0.014500865040818081
coup	0.01424331669904718
colonel	0.014101872594346063
republic	0.014037788432747023
colombia	0.01209614894565306
urrutia	0.012085910953024004
piedra	0.011890818179504653
uprising	0.011372718162631608
garrison	0.011303225966340738

## Document Categorization - I

- Cluster documents, using kmeans.
- Tanimato distance, for document similarity.

$$f(A,B) = \frac{A \cdot B}{|A|^2 + |B|^2 - A \cdot B}$$

$$A \cdot B = \sum_{i} (A_i \wedge B_i) \qquad |A|^2 = \sum_{i} (A_i)$$

#### tf-idf for comparison.

Document	19590	103			
santi Docume	ent	19590109-1			
milit peace		0.026927216822081632			
rego weapons		0.02164912406813786			
batis army		0.01897175376127404			
coup republ	lic	0.017527101158547692			
colon revolu	utionaries	0.014883394830339243			
repub ambiti	ion	0.014367622595955983			
colom commar	nd	0.013430331653104356			
urrut rebel		0.013107237258996804			
piedr <sub>merit</sub>		0.011867782182669795			
upris guns		0.011608839986122712			
garri fought		0.011145819973216523			
duty		0.010724390184021722			

#### Main thematic centers of speeches

- \* Education
- Medical Domain
- \* Agriculture
- Industry
- Ideology
- External Policy

#### Retrieval using Lucene

- Query operations using lucene:
  - Full text,
  - Date ranges,
  - Indexing of data files, etc.
- \* Sample query:

TEXT: health institutions DATE: [19800101 TO 19900101] CATEGORY: Health

#### IE: Grammar Patterns

- Grammatical patterns that capture statistical data
  - "By 1985 we will have nearly 20,000 physicians"
- Patterns that capture dates
  - "In 1970 the production of sugar cane has doubled"
- Patterns that capture numbers

"We had constructed more than 3,000 farms"

#### **Specific Rules:**

- \* IN+CD+RPR+MD+VB+RB +CD+NNS
- \* IN+CD+DT+NN+IN+NN+NN +VB+VBD
- \* PRP+VB+VBD+JJR+IN+CD

#### **Evaluation Results**

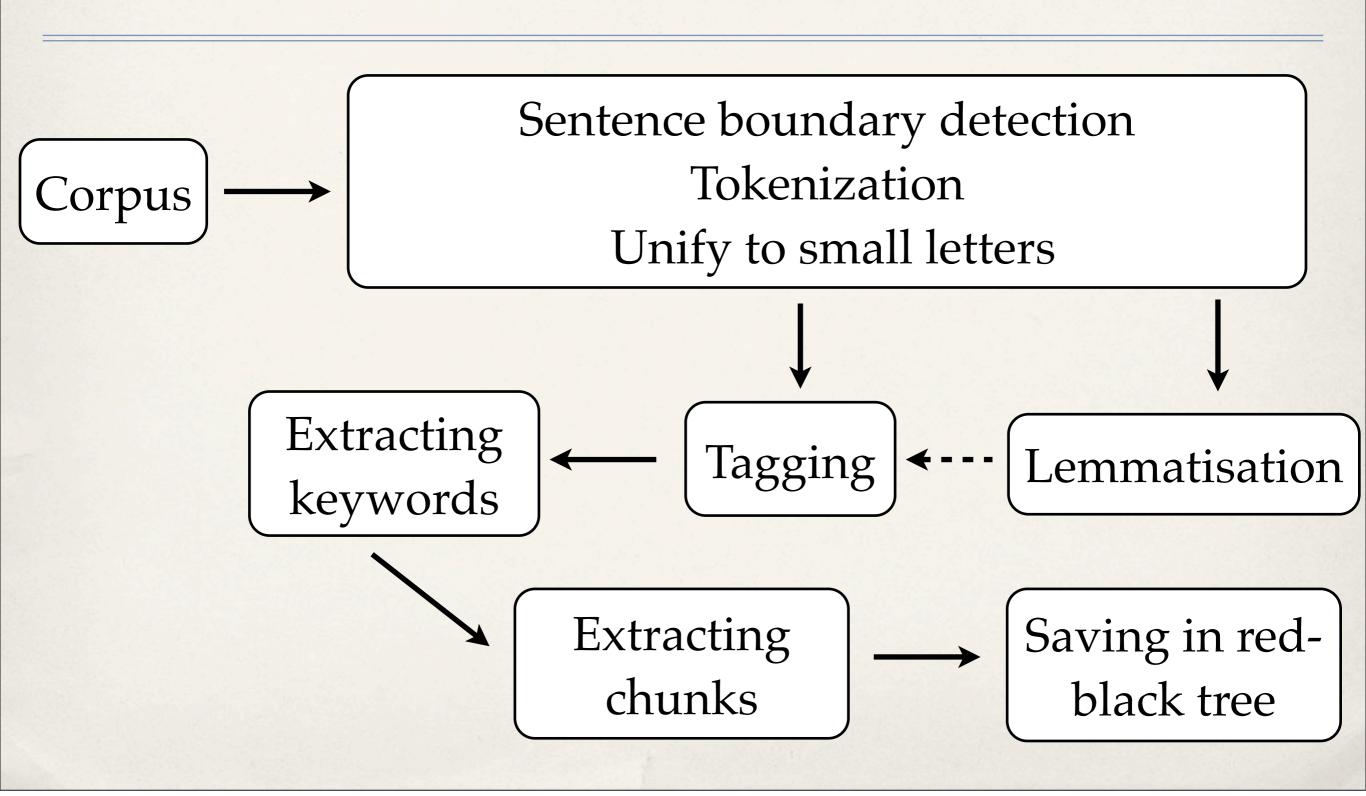
Category	Summary Objects	Correct	Not Correct	Precision
Education	pupils, schools, students, teachers, statesman, specialist, technician, scholarship, triumph, professor, job	77	43	0.64
Health	home	1	0	1.0
Industry	wage, growth	1	1	0.5
Agriculture	cane, mill, trucks, ranch, petroleum, plant, rice	18	3	0.85

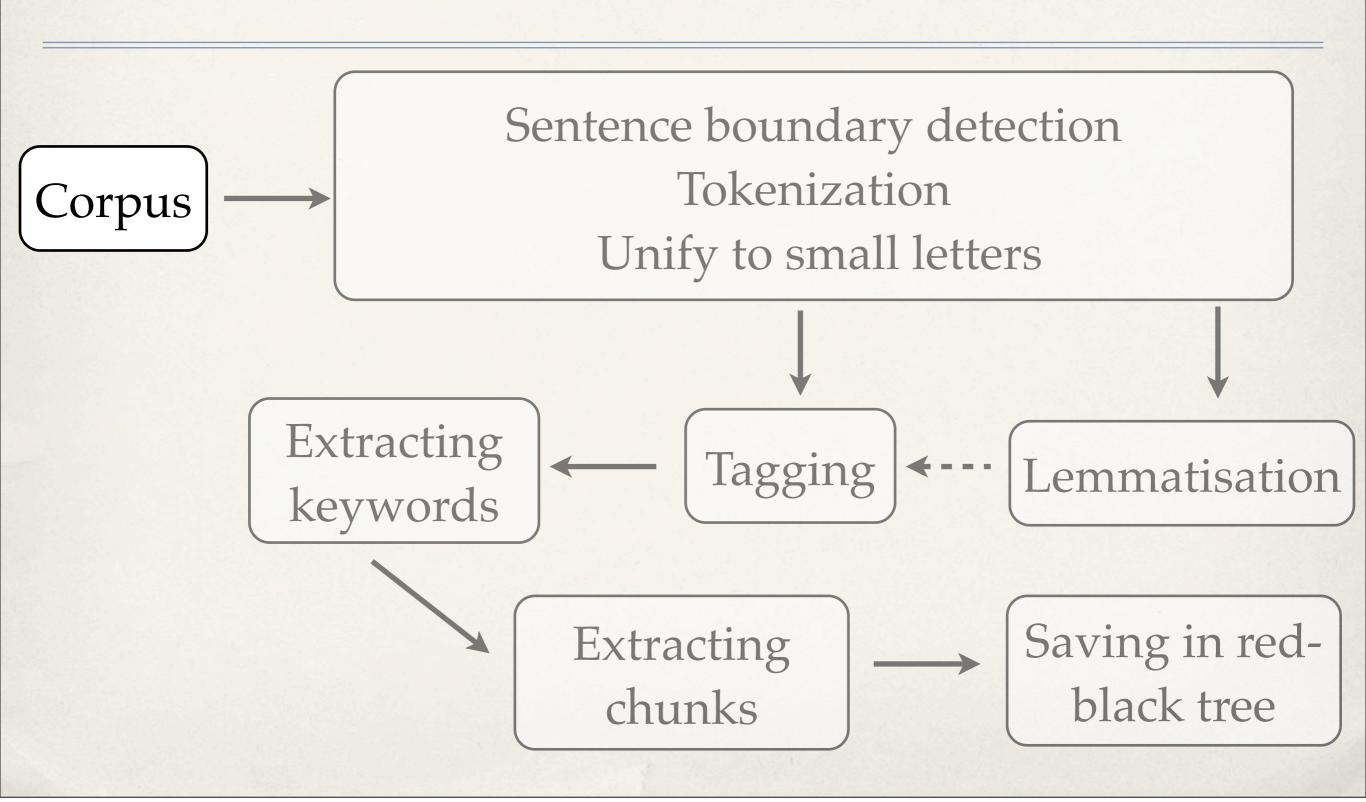


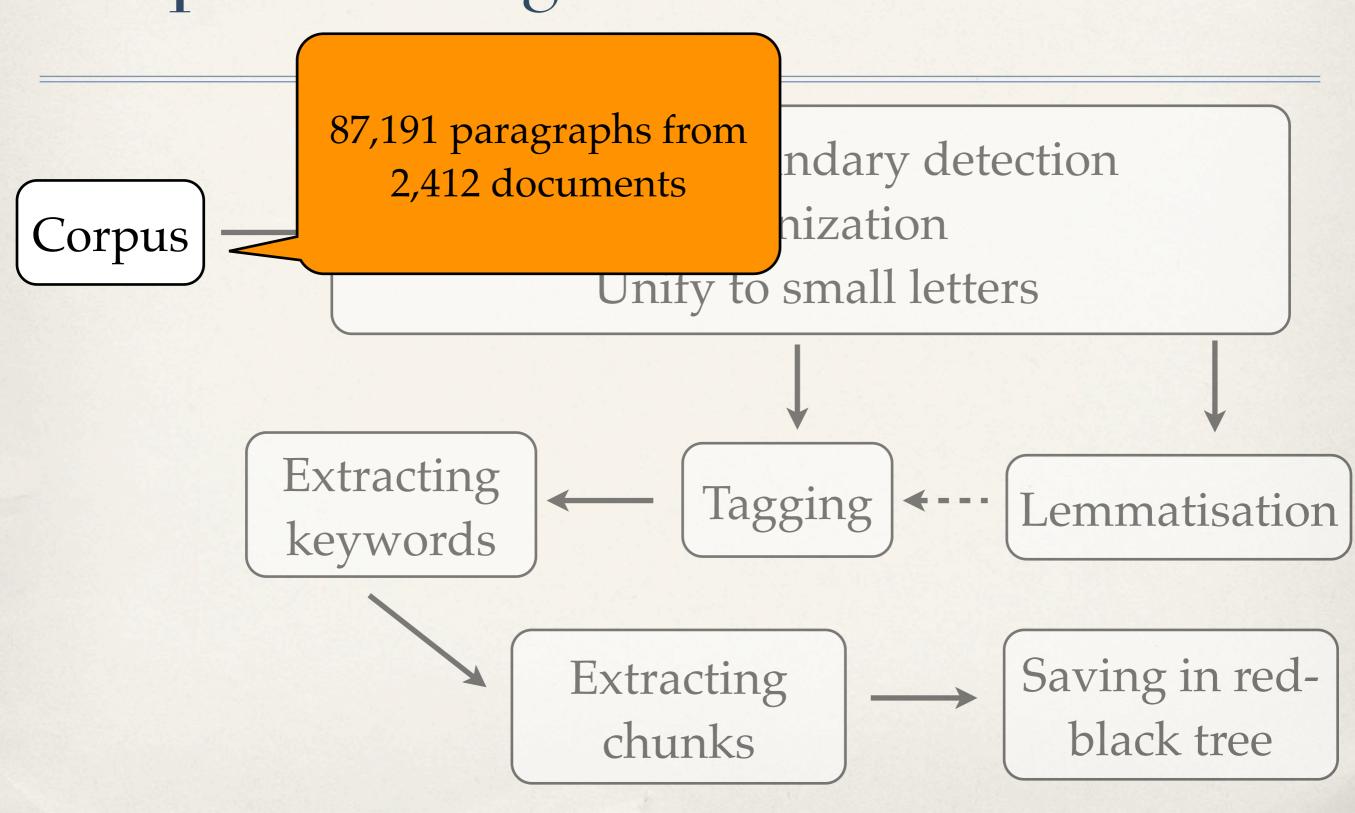
### Goal

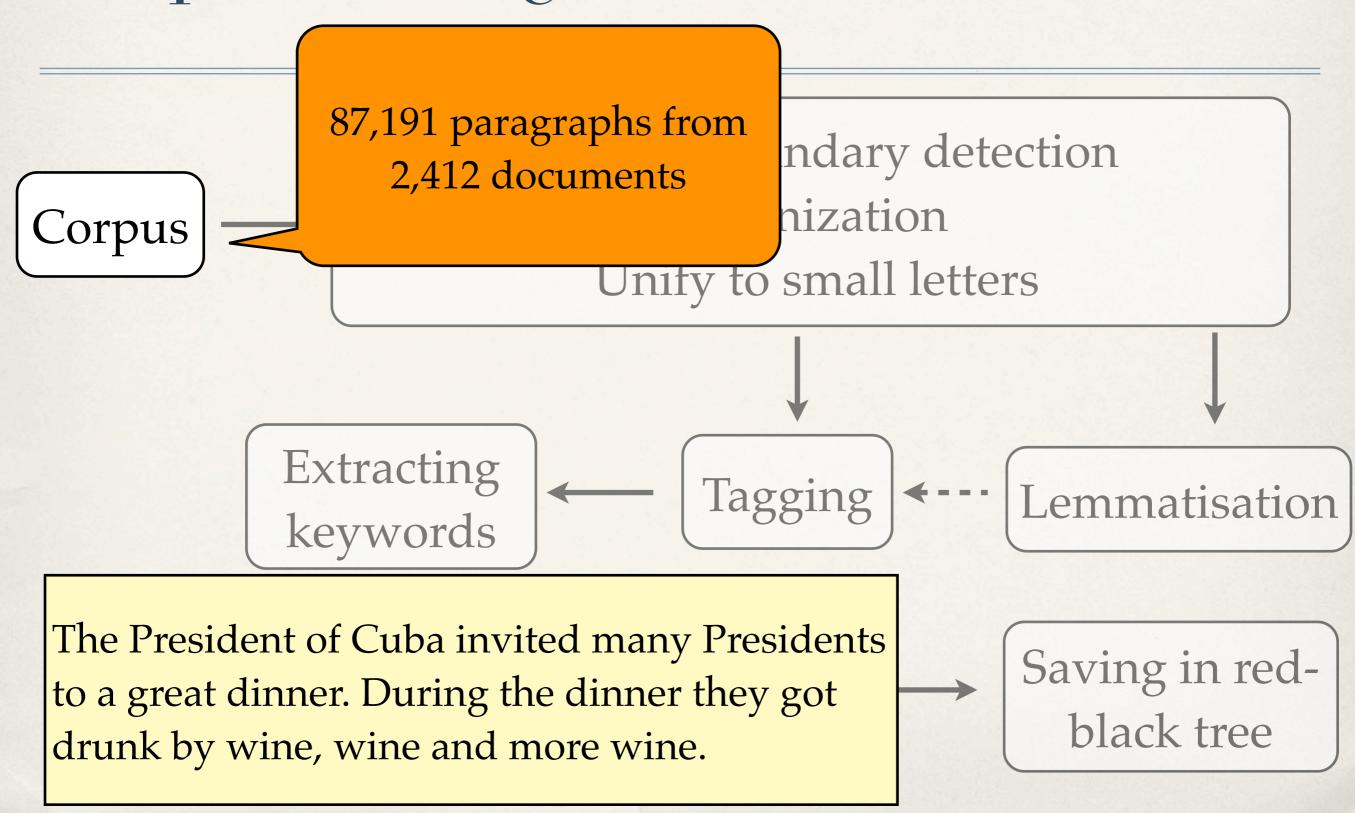
#### Goal

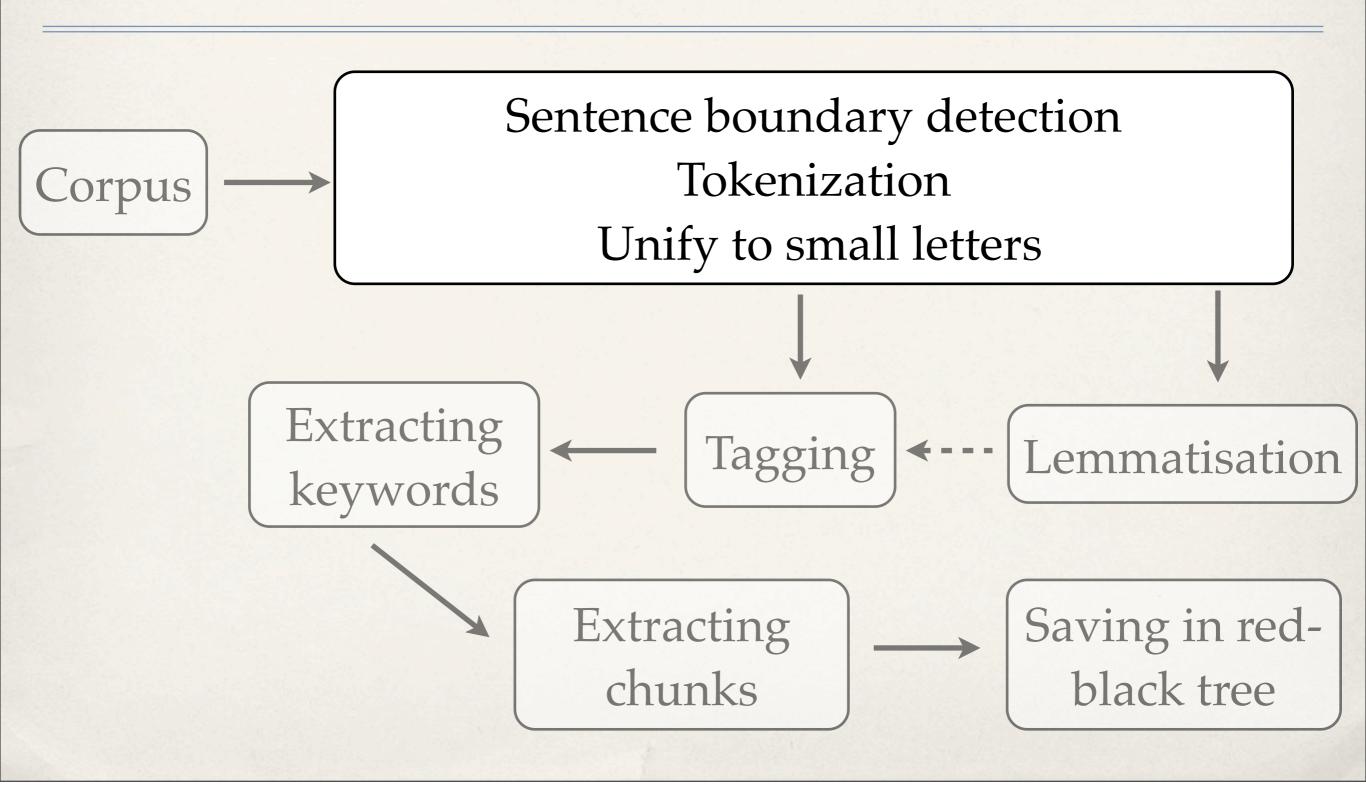
- Provide information for every query
  - \* sufficient much information to be informative
  - \* sufficient little information to deal with

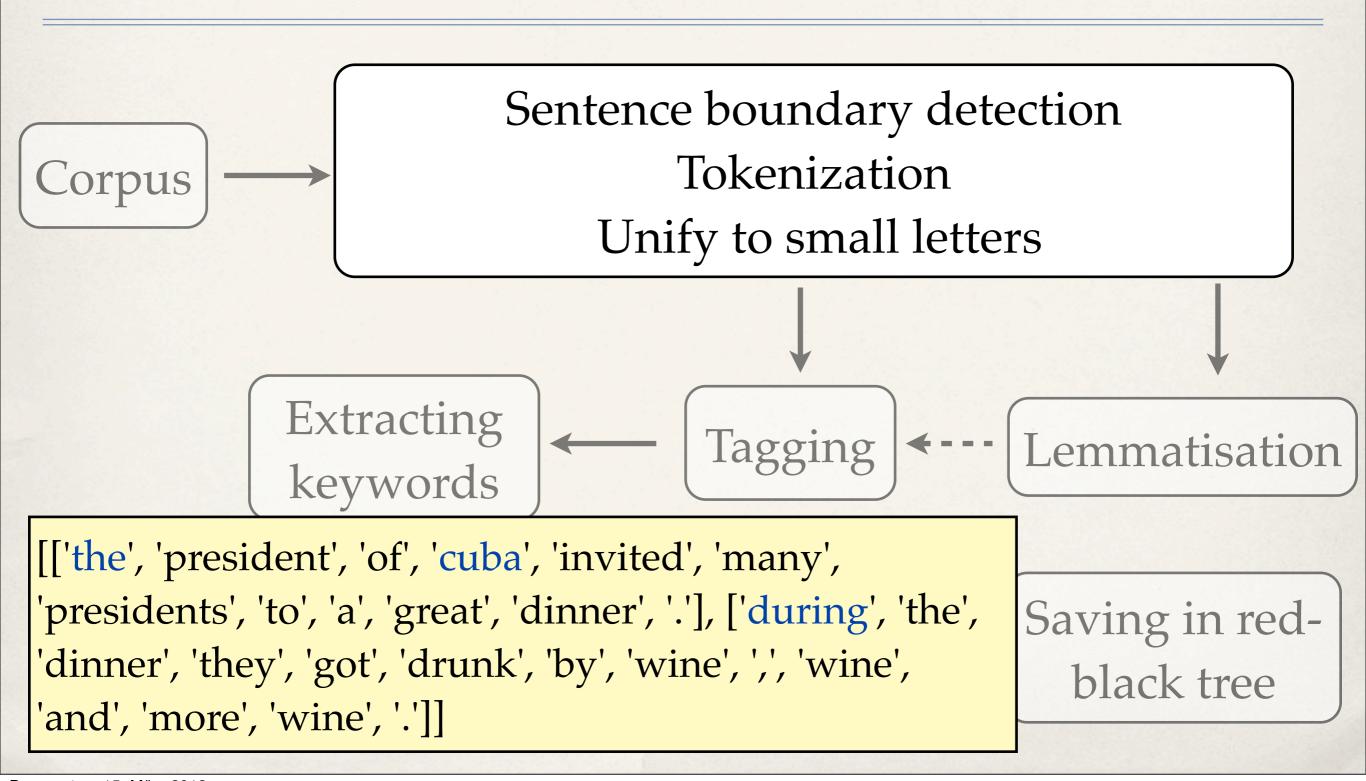


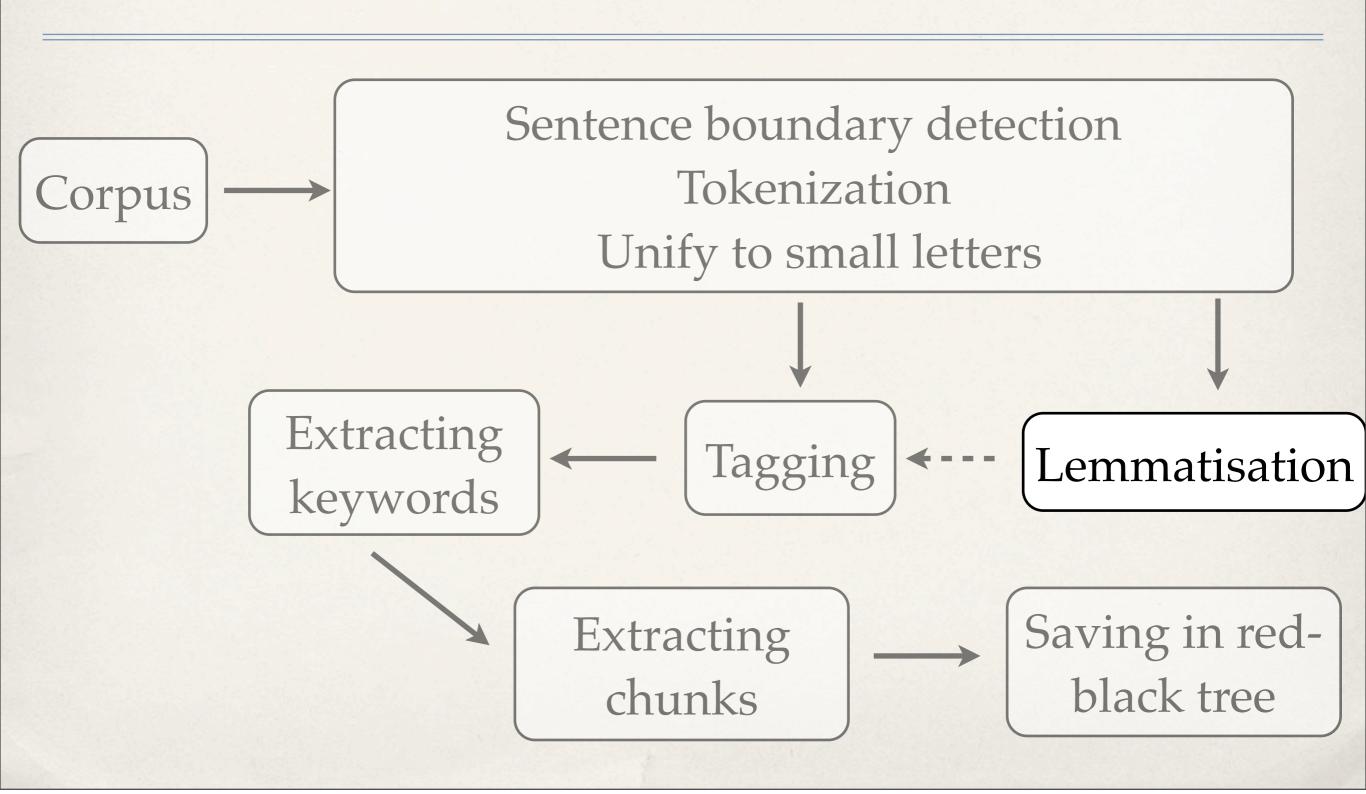


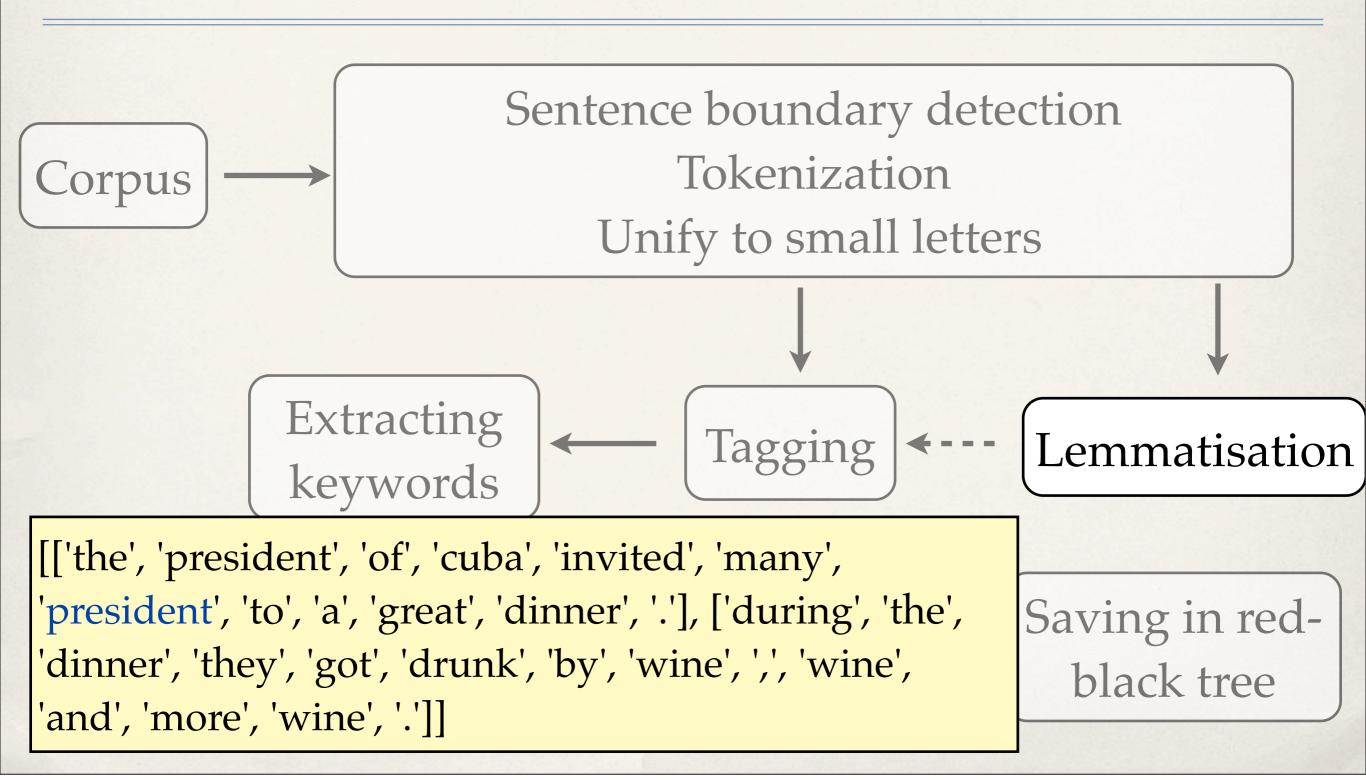


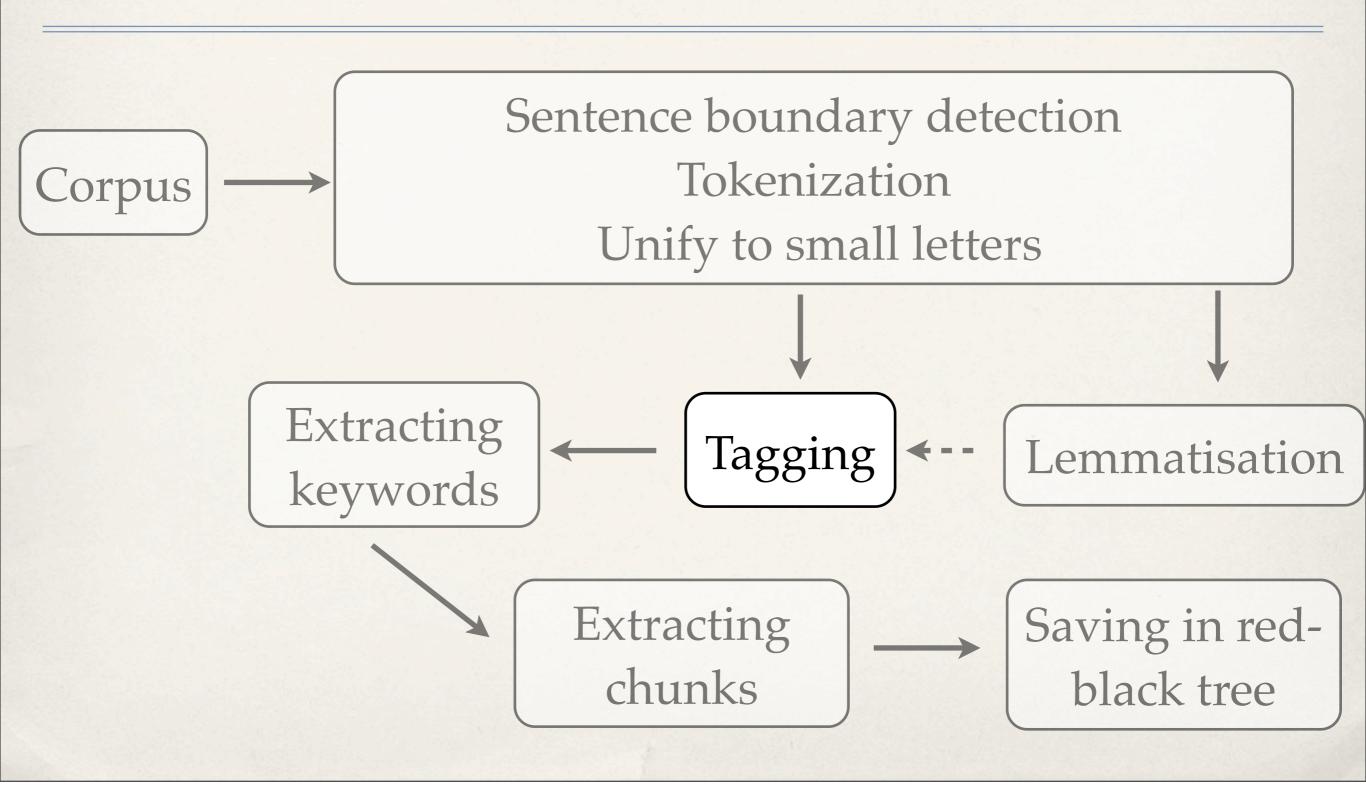


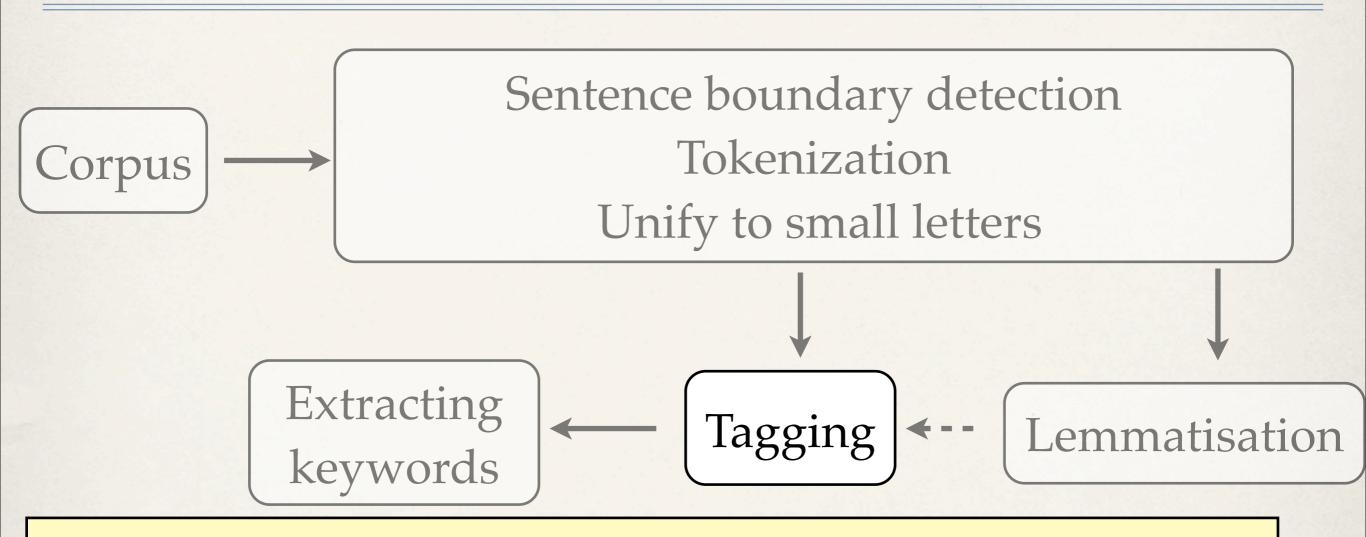






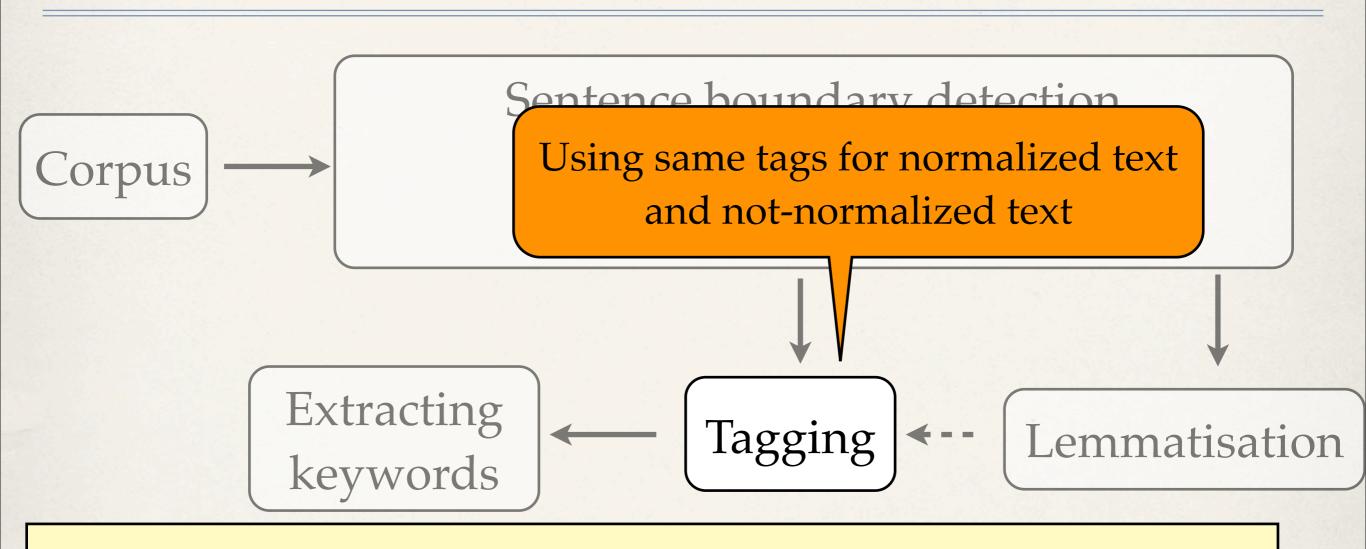






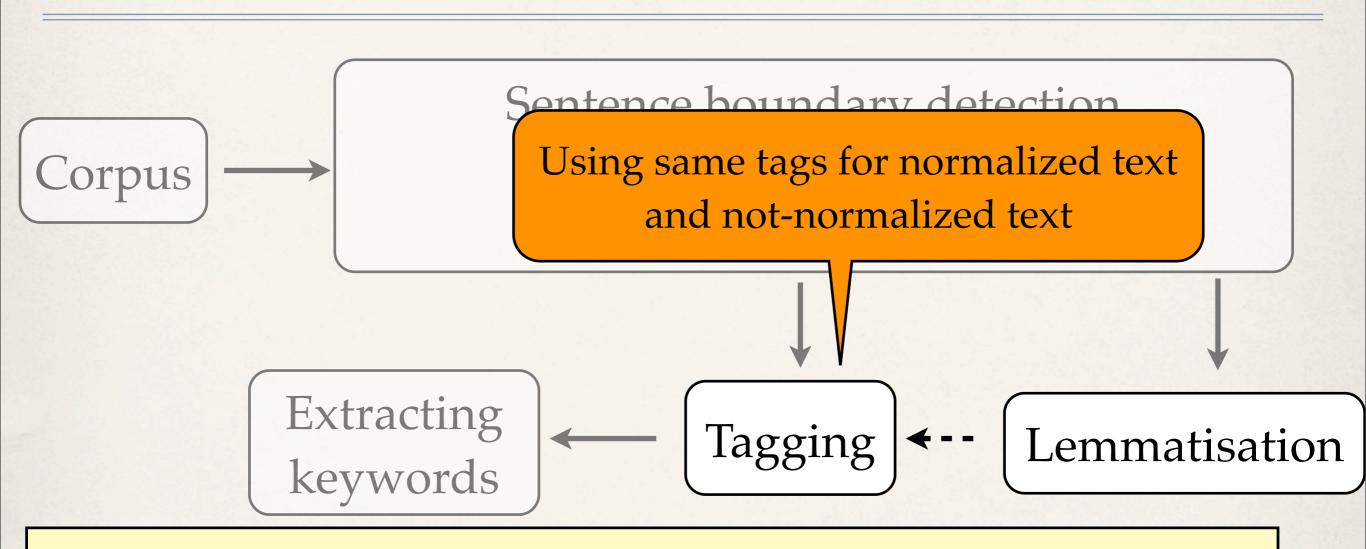
[[('the', 'DT'), ('president', 'NN'), ('of', 'IN'), ('cuba', 'NN'), ('invited', 'VBN'), ('many', 'JJ'), ('presidents', 'NNS'), ('to', 'TO'), ('a', 'DT'), ('great', 'JJ'), ('dinner', 'NN'), ('.', '.')], [('during', 'IN'), ('the', 'DT'), ...]]

Donnerstag, 15. März 2012



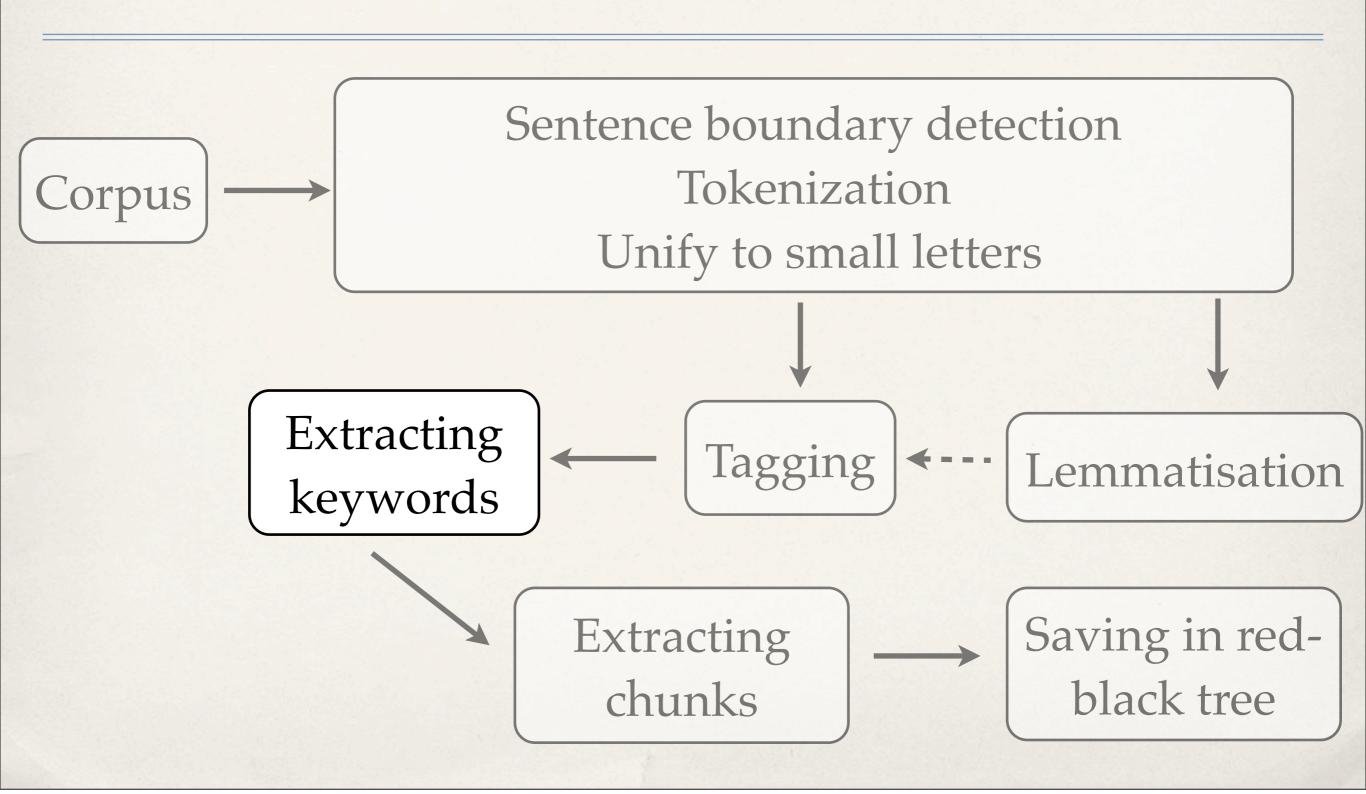
[[('the', 'DT'), ('president', 'NN'), ('of', 'IN'), ('cuba', 'NN'), ('invited', 'VBN'), ('many', 'JJ'), ('presidents', 'NNS'), ('to', 'TO'), ('a', 'DT'), ('great', 'JJ'), ('dinner', 'NN'), ('.', '.')], [('during', 'IN'), ('the', 'DT'), ...]]

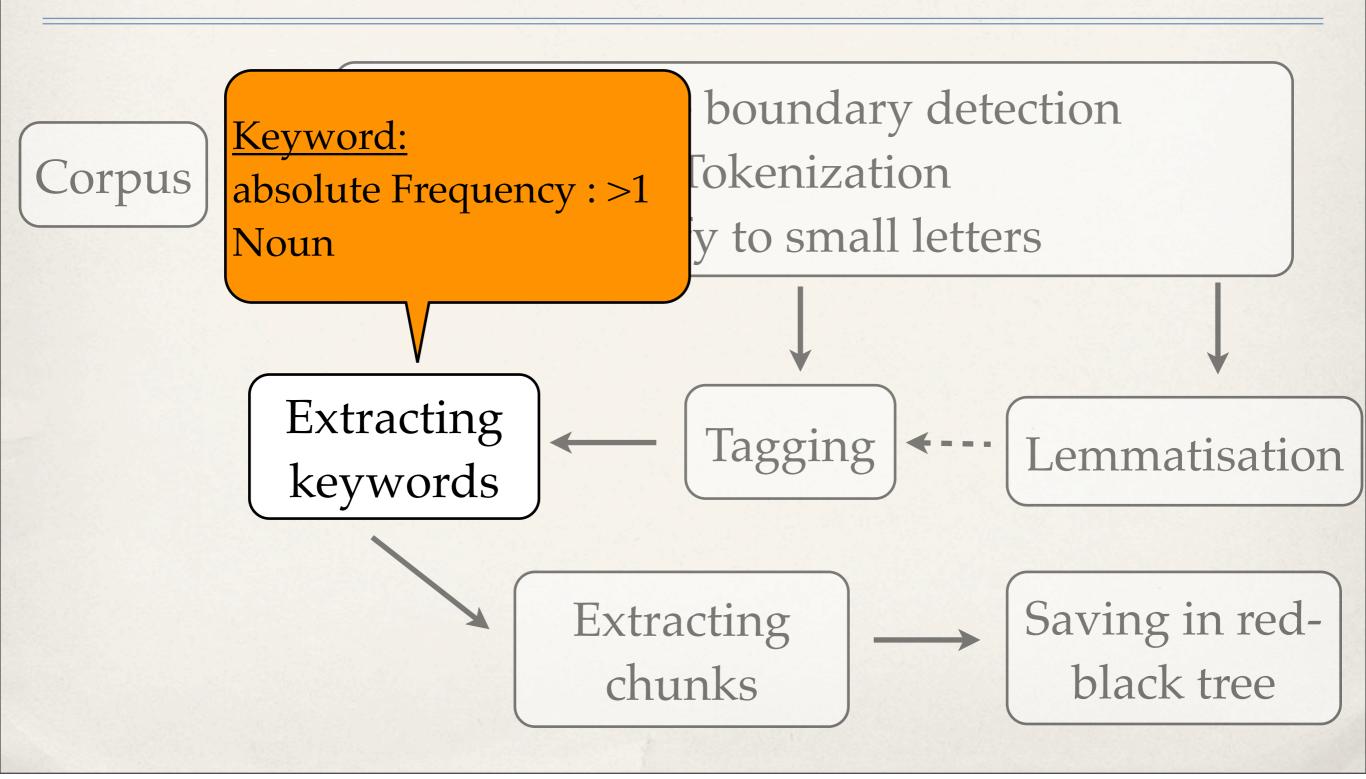
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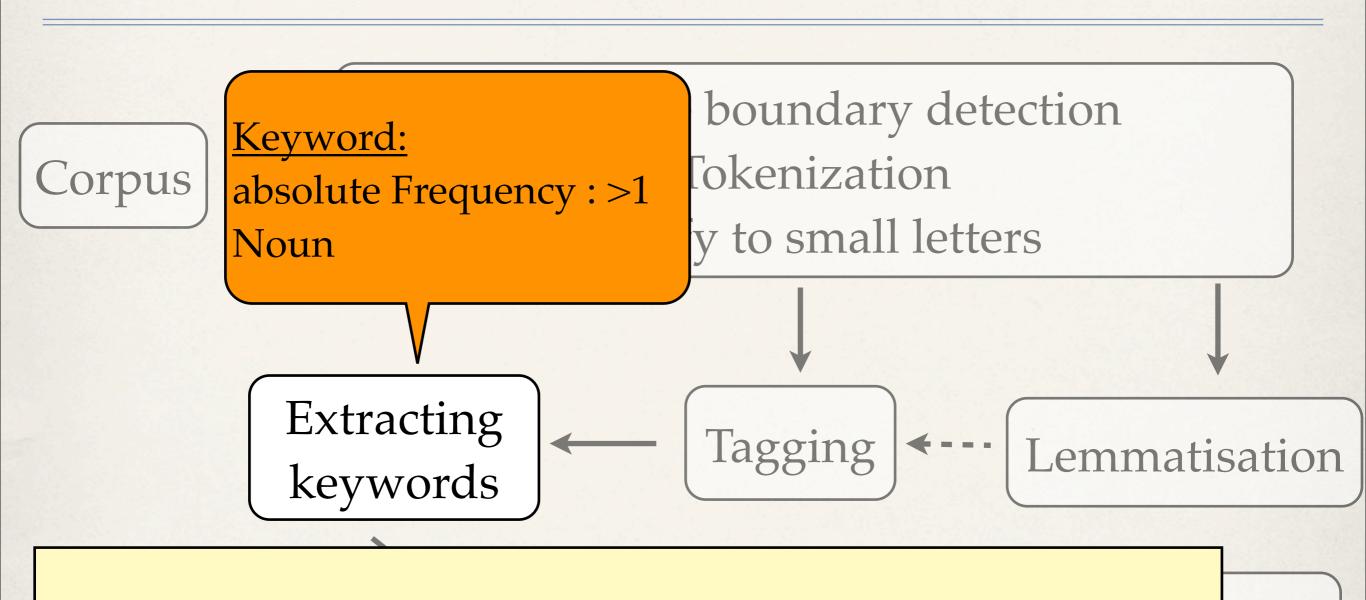


[[('the', 'DT'), ('president', 'NN'), ('of', 'IN'), ('cuba', 'NN'), ('invited', 'VBN'), ('many', 'JJ'), ('president', 'NNS'), ('to', 'TO'), ('a', 'DT'), ('great', 'JJ'), ('dinner', 'NN'), ('.', '.')], [('during', 'IN'), ('the', 'DT'), ...]]

d-

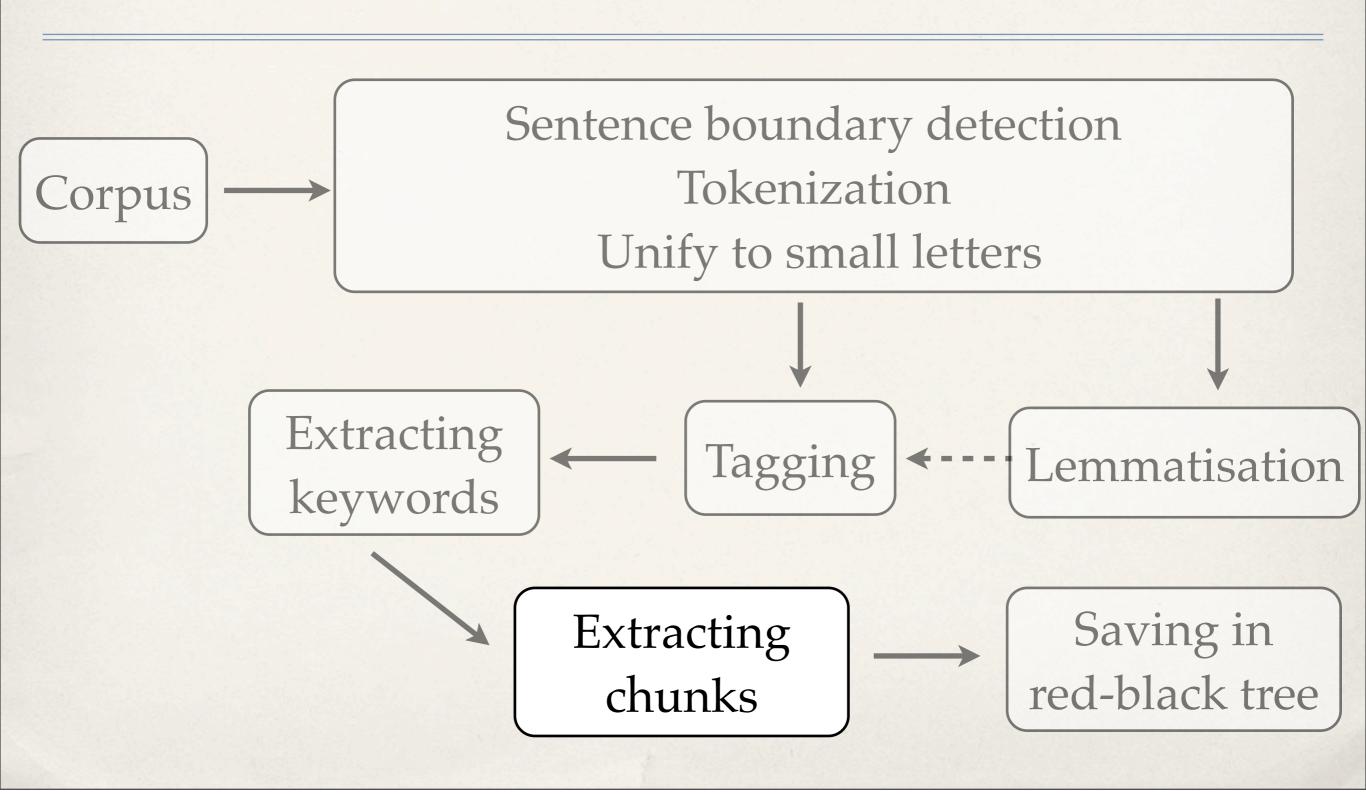


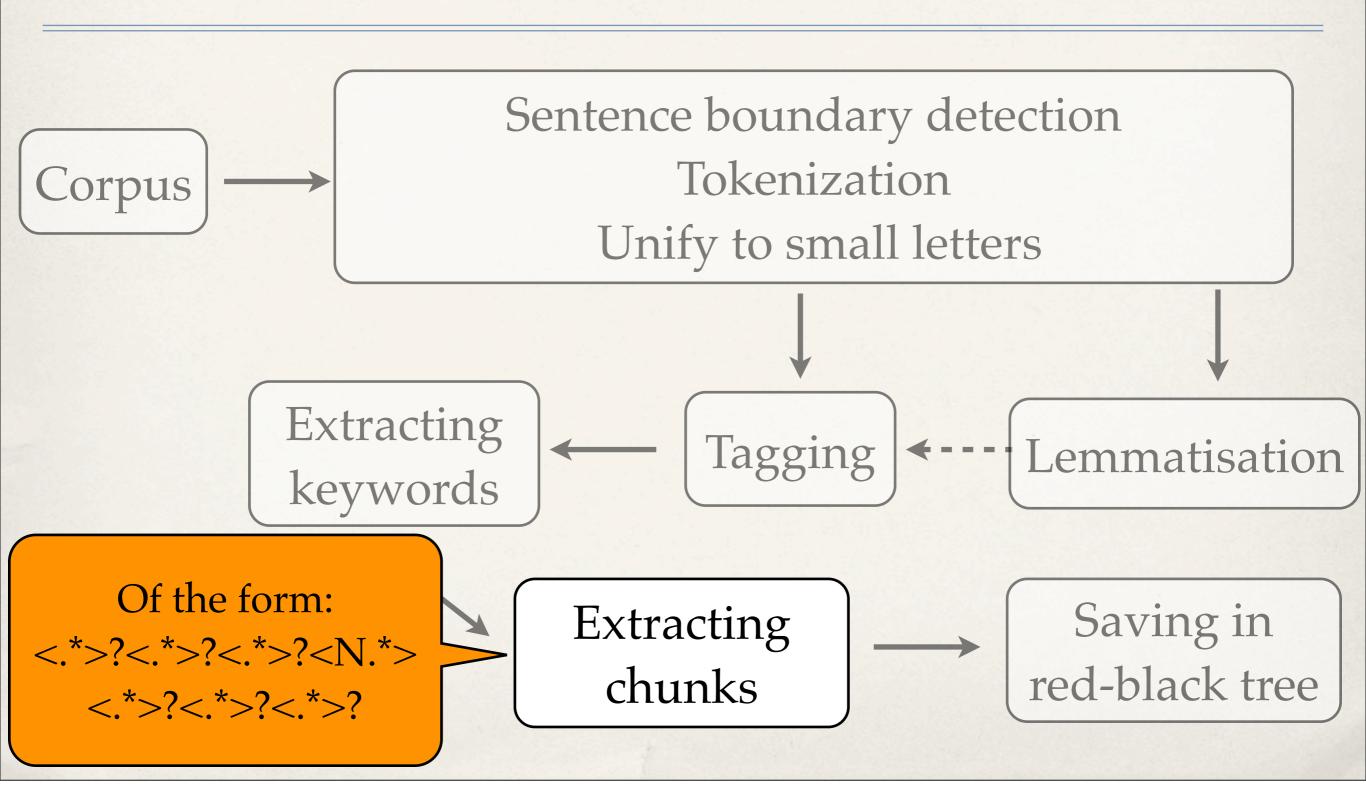




[['dinner', 0.091], ['president', 0.091], ['wine', 0.136]]

redree





Donnerstag, 15. März 2012

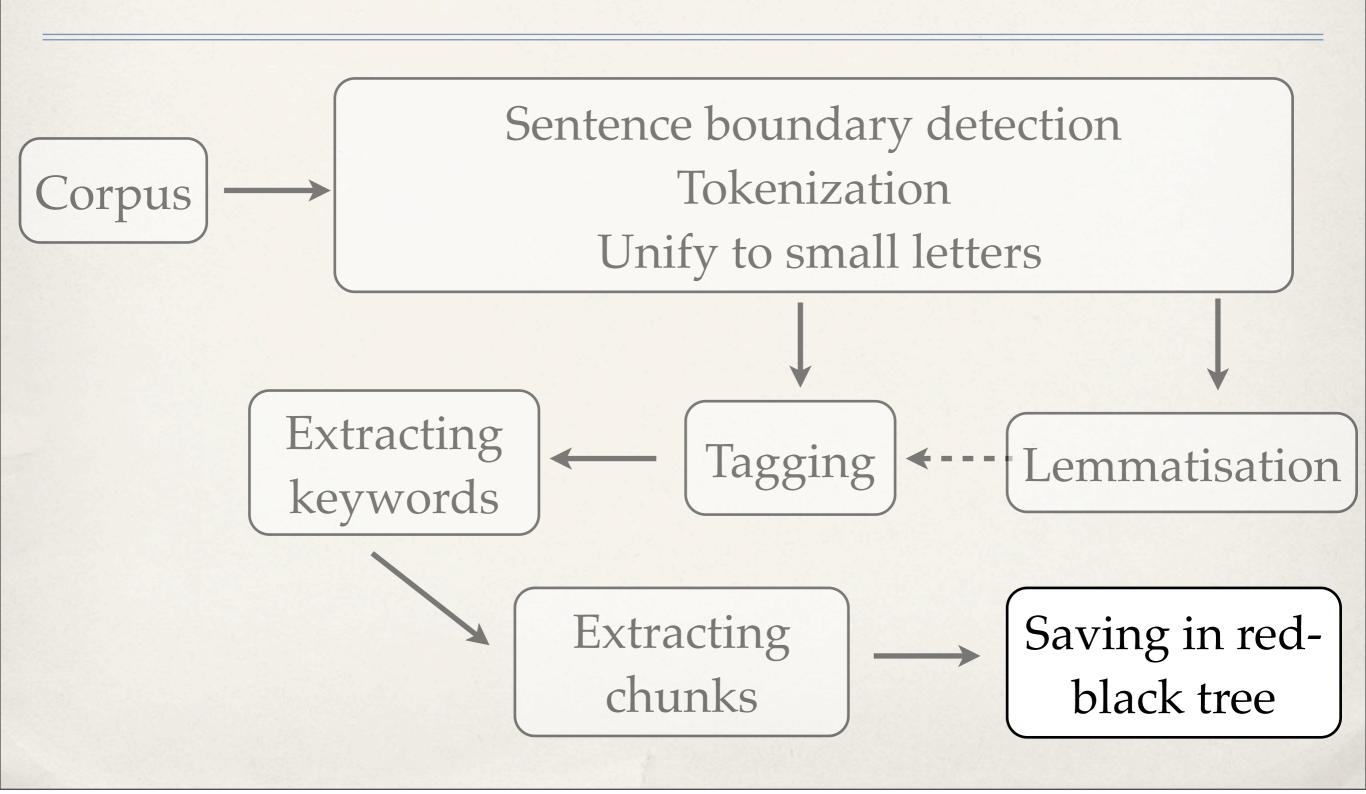
```
[during_IN the_DT dinner_NN they_PRP got_VBD drunk_NN]
[to_TO a_DT great_JJ dinner_NN ._.]
[the_DT president_NN of_IN cuba_NN invited_VBN]
[cuba_NN invited_VBN many_JJ presidents_NNS to_TO a_DT great_JJ]
[by_IN wine_NN ,_, wine_NN and_CC more_JJR wine_NN]
[wine_NN and_CC more_JJR wine_NN ._.]
[got_VBD drunk_NN by_IN wine_NN ,_, wine_NN and_CC]

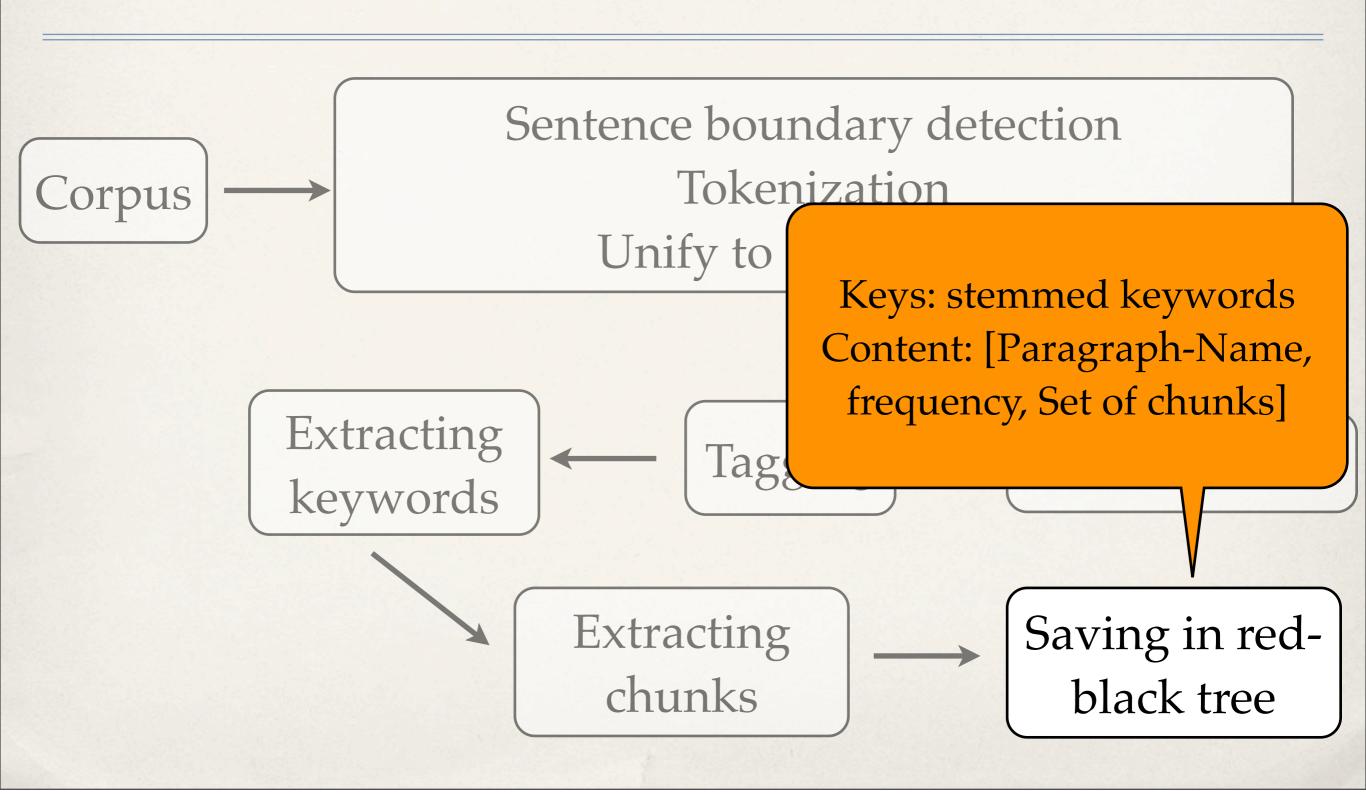
Reywords
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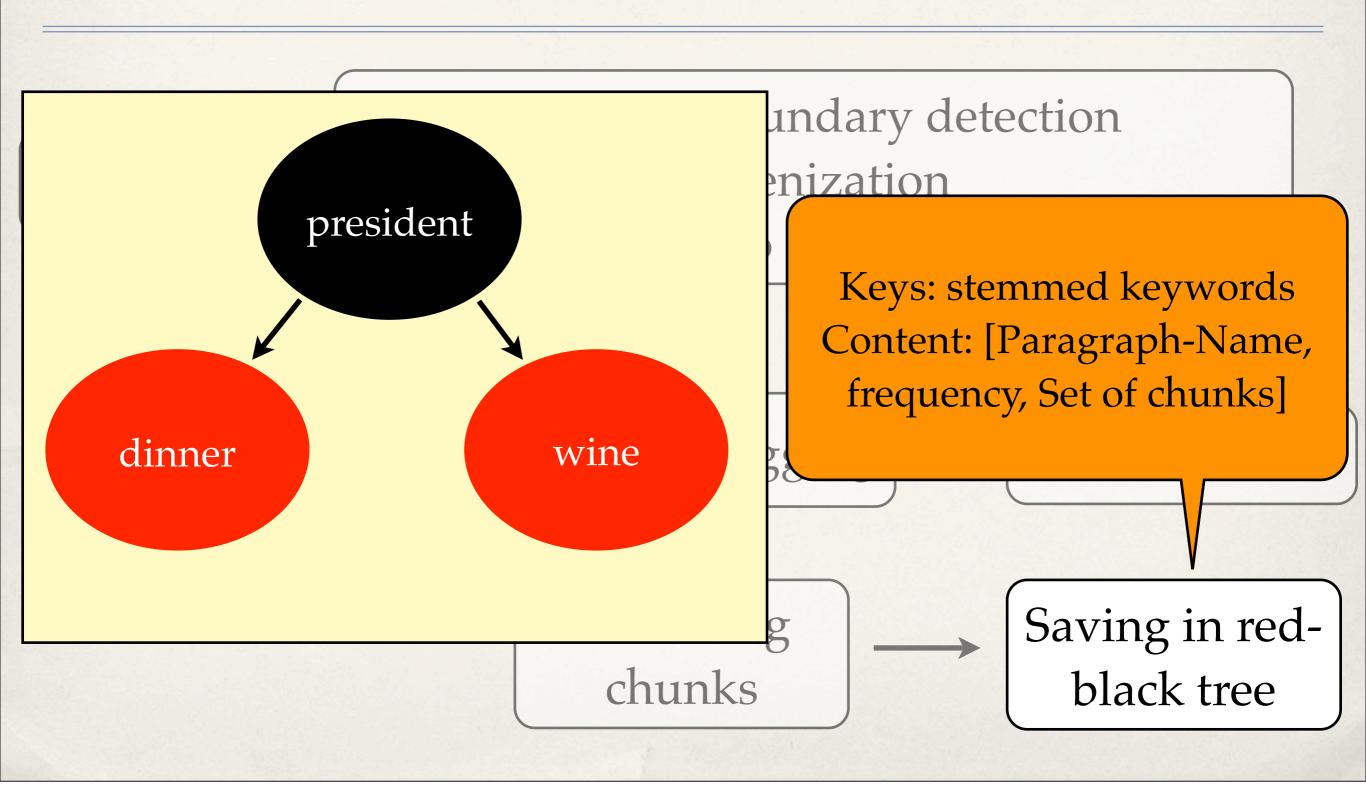
Of the form:
<.\*>?<.\*>?<.\*>?<N.\*>
<.\*>?<.\*>?

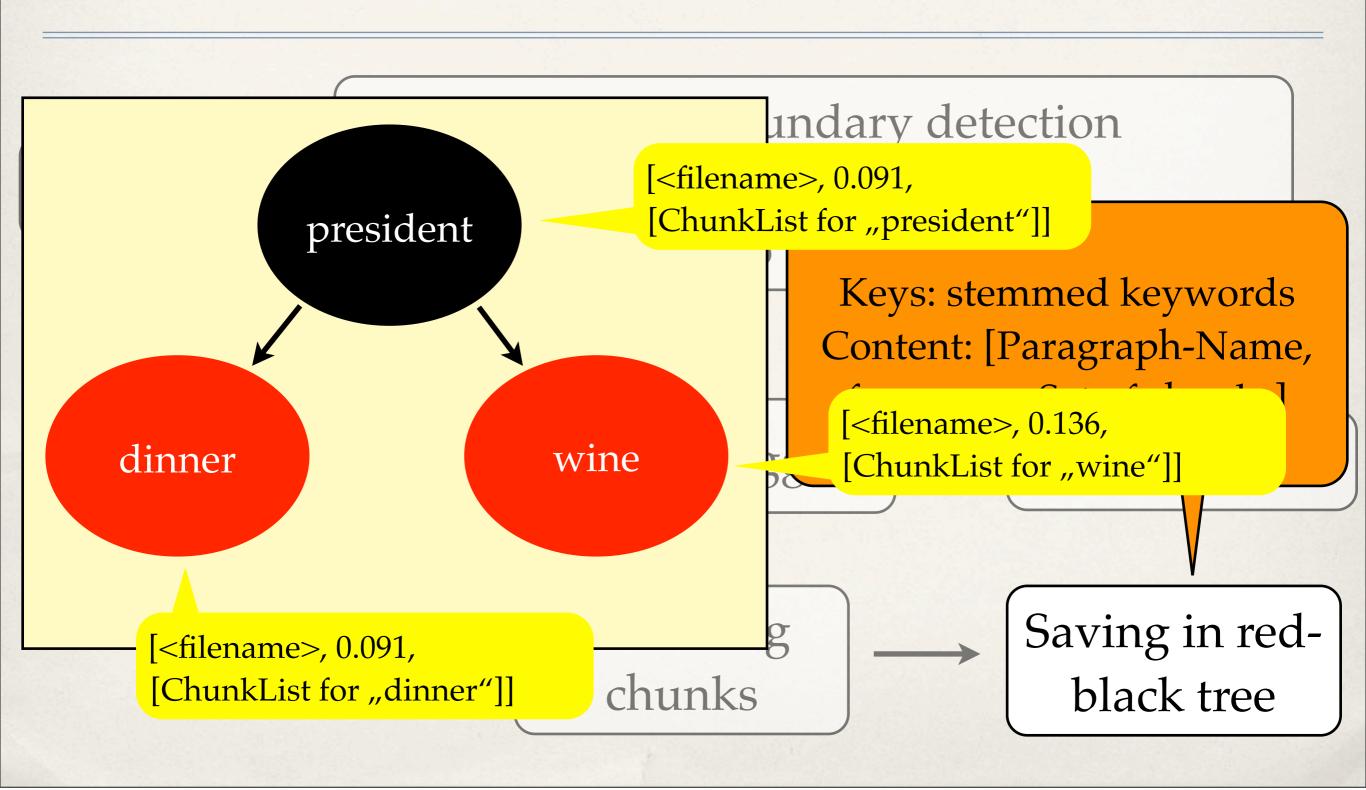
Extracting chunks

Saving in red-black tree

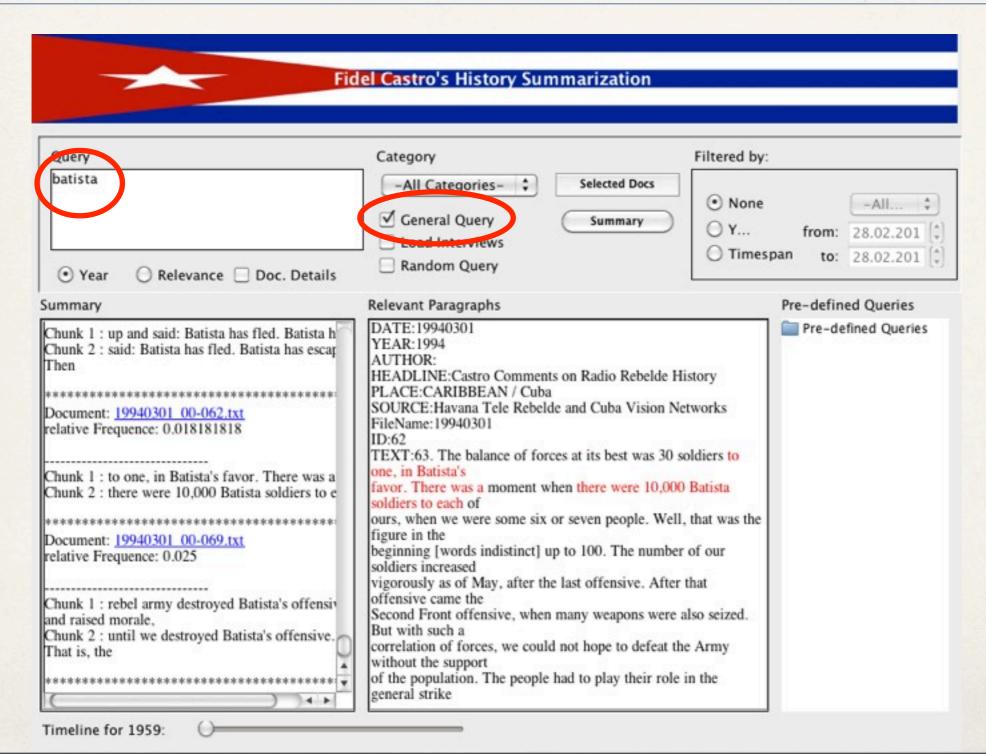


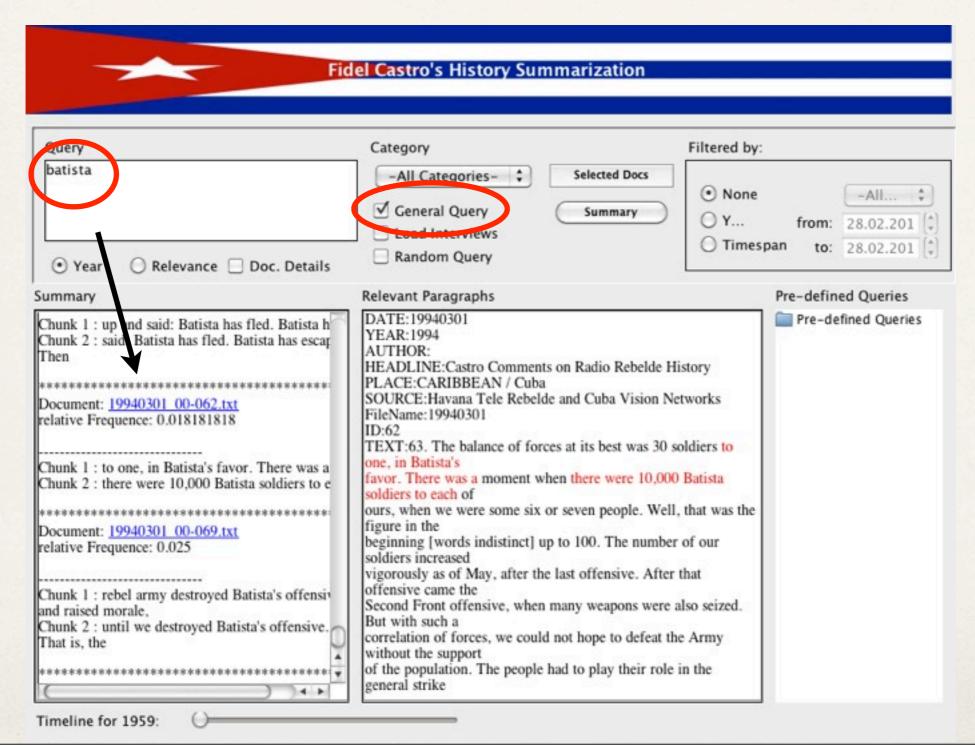


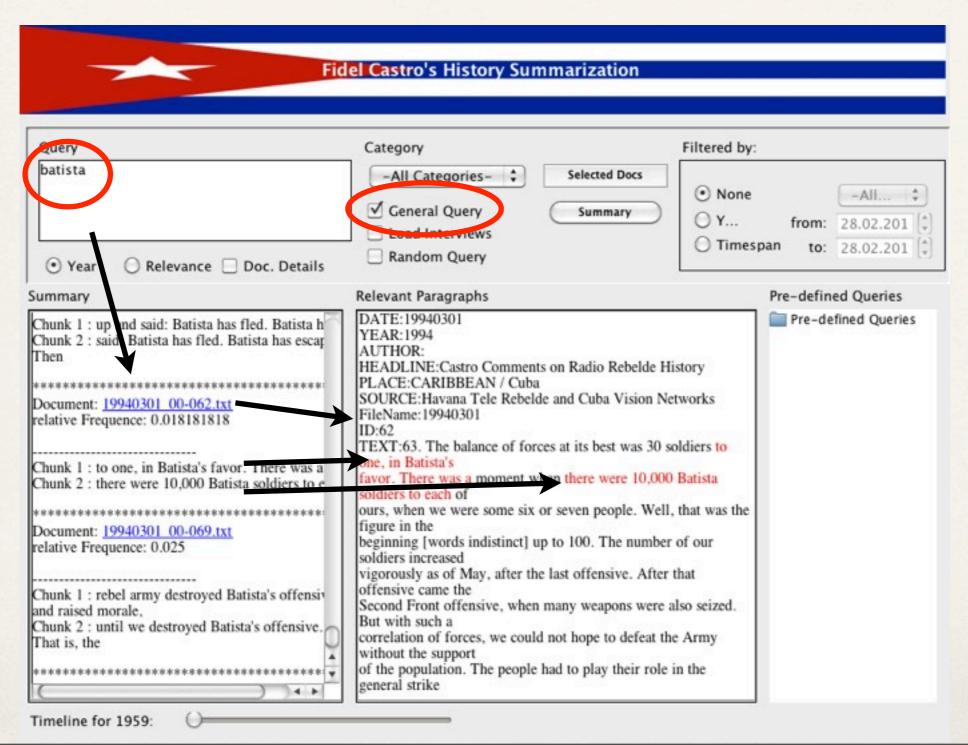




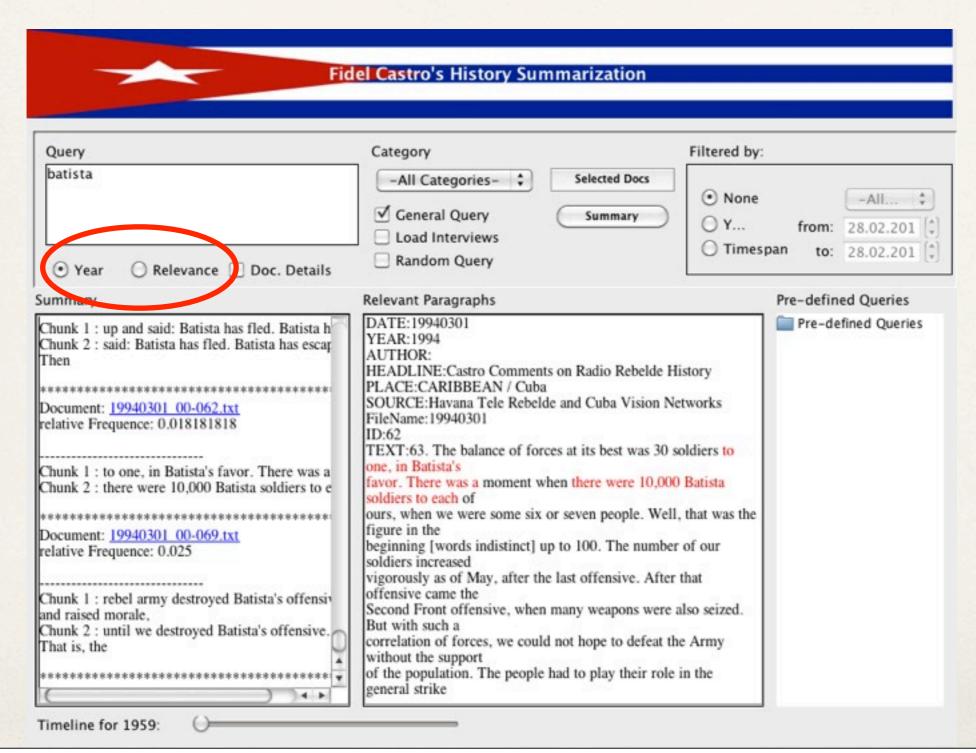
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Year	-All Categories -   Selected Docs  ✓ General Query  Load Interviews  Random Query	<ul> <li>None</li></ul>
Summary	Relevant Paragraphs	Pre-defined Queries
Chunk 1 : up and said: Batista has fled. Batista h Chunk 2 : said: Batista has fled. Batista has escar Then  ***********************************	DATE:19940301 YEAR:1994 AUTHOR: HEADLINE:Castro Comments on Radio Rebelde History PLACE:CARIBBEAN / Cuba SOURCE:Havana Tele Rebelde and Cuba Vision Networks FileName:19940301 ID:62 TEXT:63. The balance of forces at its best was 30 soldiers to one, in Batista's	
Chunk 1 : to one, in Batista's favor. There was a Chunk 2 : there were 10,000 Batista soldiers to e	favor. There was a moment when there were 10,000 soldiers to each of	No. of the last of
Document: 19940301 00-069.txt relative Frequence: 0.025	ours, when we were some six or seven people. Well, that was the figure in the beginning [words indistinct] up to 100. The number of our soldiers increased vigorously as of May, after the last offensive. After that	
Chunk 1 : rebel army destroyed Batista's offension and raised morale, Chunk 2 : until we destroyed Batista's offensive.	offensive came the Second Front offensive, when many weapons were But with such a	85 80 99
That is, the	correlation of forces, we could not hope to defeat the without the support of the population. The people had to play their role general strike	2000

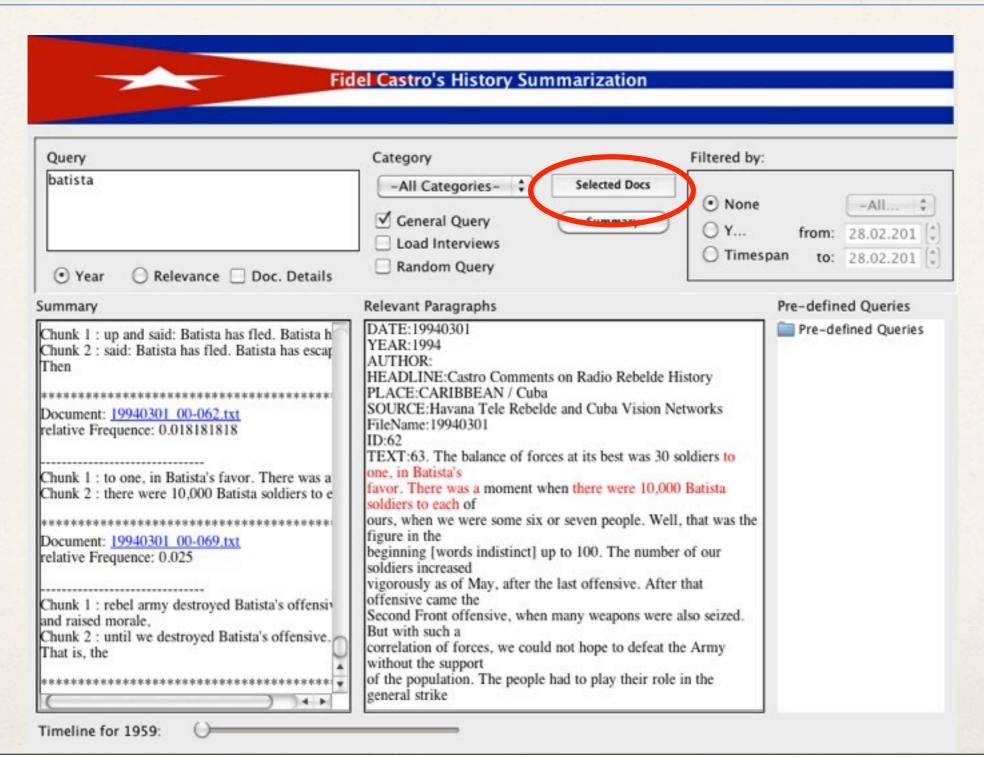






Query	Category	Filtered by:
batista	-All Categories - \$ Selected Docs  ✓ General Query Summary  □ Load Interviews □ Random Query	<ul> <li>None</li></ul>
Year	Relevant Paragraphs	Pre-defined Outres
Chunk 1: up and said: Batista has fled. Batista has chunk 2: said: Batista has fled. Batista has escap Then  ***********************************	DATE:19940301 YEAR:1994 AUTHOR: HEADLINE:Castro Comments on Radio Rebelde PLACE:CARIBBEAN / Cuba SOURCE:Havana Tele Rebelde and Cuba Vision FileName:19940301 ID:62 TEXT:63. The balance of forces at its best was 3 one, in Batista's favor. There was a moment when there were 10,6 soldiers to each of ours, when we were some six or seven people. W figure in the beginning [words indistinct] up to 100. The num soldiers increased vigorously as of May, after the last offensive. Af offensive came the	Pre-defined Queries  e History  Networks  o soldiers to  ooo Batista  Vell, that was the ober of our







#### Problems

- Not precise results on categories like "industry" due to mismatches on thesaurus data
- Emphasis on extraction of only statistical data information-domain specific
- Information about communist ideology and external policy needs more preprocessing e.g filter thesaurus data

#### Problems

- No consistent format in the speeches
  - indistinct passages used both [] or ()
  - \* 1994-1996 used completely different format
- Topic categorization
  - especially in speeches with mixed topics
  - In ideology & external relation related speeches

#### Future Work I

- Extension of project to extract and summarize more topics (ideology, external relations, specific historical events)
- Use of different methods for capturing more data e.g NER Recognizer
- Export data in a relational database for faster & more efficient function of the engine
- Addition of more features in the Querying Tool
- \* Timeline connected to summarization tool

#### Future Work II

- \* Extension of summarizing to capture different data sets important for historians
  - Diaries of historical personalities
  - Letters
  - Interviews, Newspaper archives

#### References

- \* Blei.D. (2009) "Topic Models" Computer Science Department, Princeton University
- Blei D.M, Ng, Jordan "Laten Dirichlet Allocation", Journal of Machine Learning (2003) 993-995
- \* Topic Modelling Tool:
  - http://code.google.com/p/topic-modeling-tool