Opinion mining on experience feedback: A case study on smarphones reviews

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Opinion mining on experience feedback

A case study on smartphones reviews

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Opinion mining and sentiment analysis

Context

- People give more importance to the experience feedback they found on internet
- Social interactions have a strong and immediate impact on purchase behaviour
- There is a huge amount of experience feedback available on internet

Tasks

- Document level: "What's the overall opinion about this organization in latest news?'
- Sentence level: "What are the positive tweets about this film?'
- Aspect level: "My clients are they satisfied with the food and service?"

Motivations

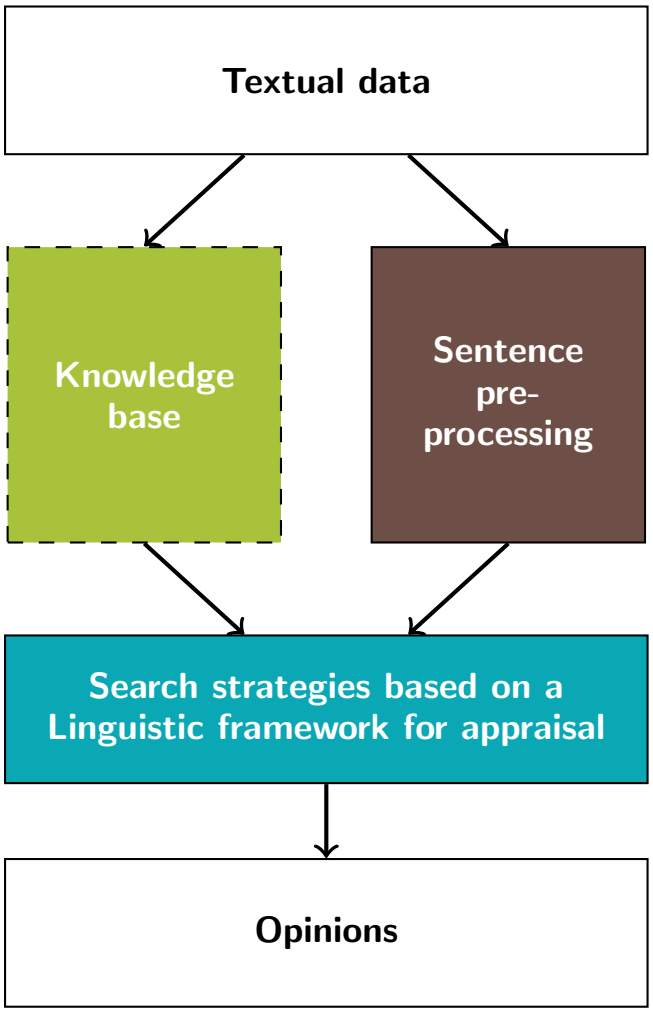
Objective:

- To **qualifiy** experience feedback from **customer reviews**

Constraints:

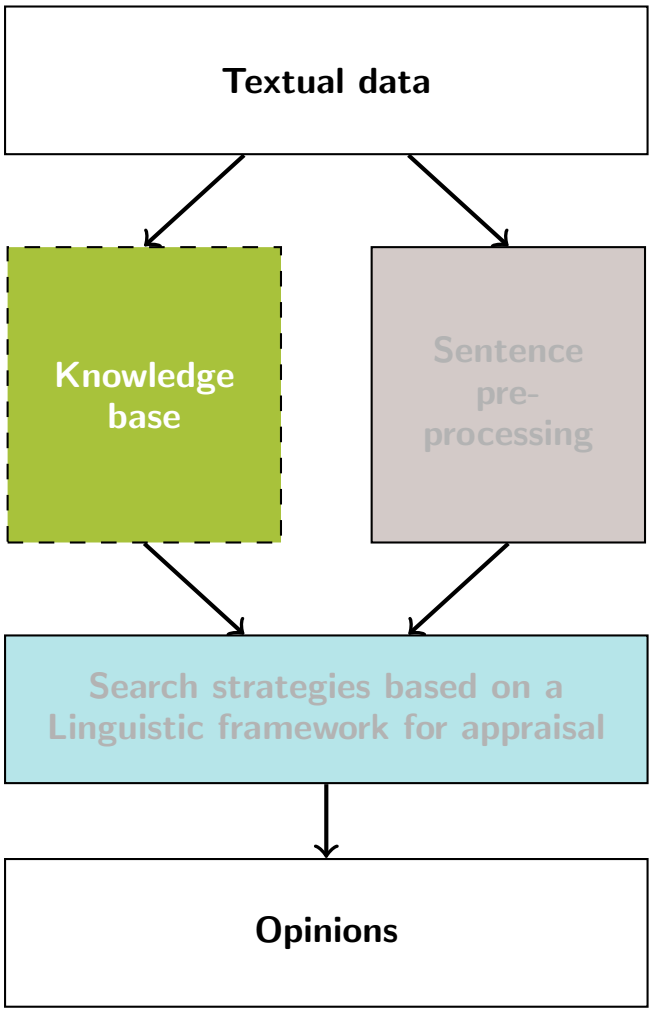
- Customer reviews could be about **anything**
- The whole analysis process must be deployed in a **short period**:
  - No ressource for annotating a learning dataset
  - No supervised learning algorithms

A 3-step approach to find relevant opinions



- A knowledge base to **define a relevant perimeter**
- Sentence pre-processing to **add information**
- A linguistic framework to **structure search strategies**

First step: A knowledge base

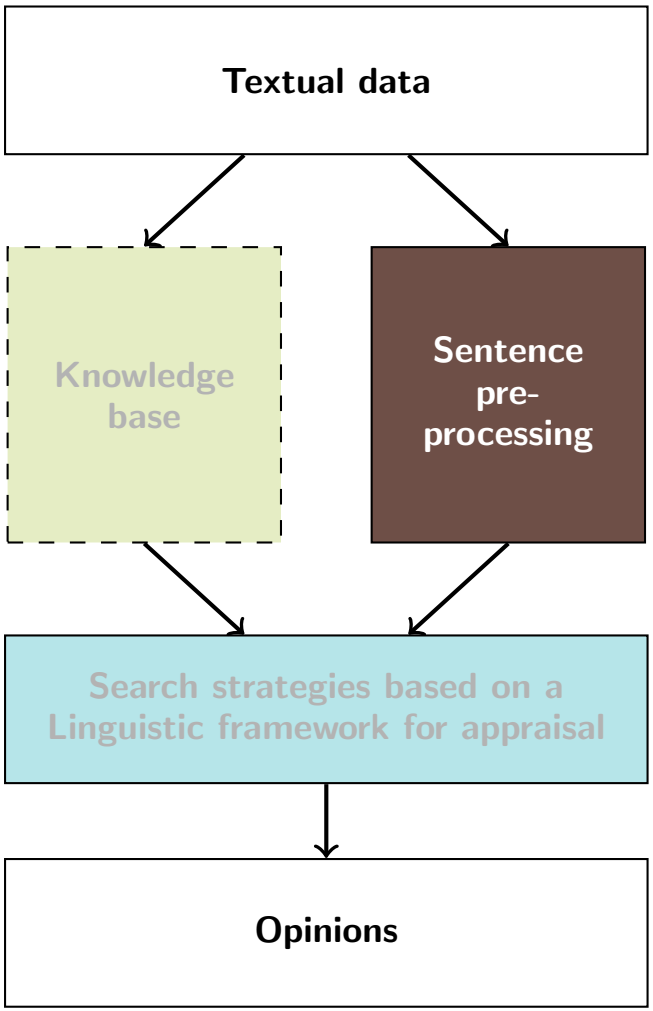


The knowledge base is composed of:

- An **aspect-lexicon** which defines the relevant perimeter to extract opinions
- Sentic* **polarity lexicon** to access word polarity

*E. Cambria and A. Hussain. Sentic Computing: A Common-Sense-Based Framework for Concept-Level Sentiment Analysis. Cham, Switzerland: Springer (2015)

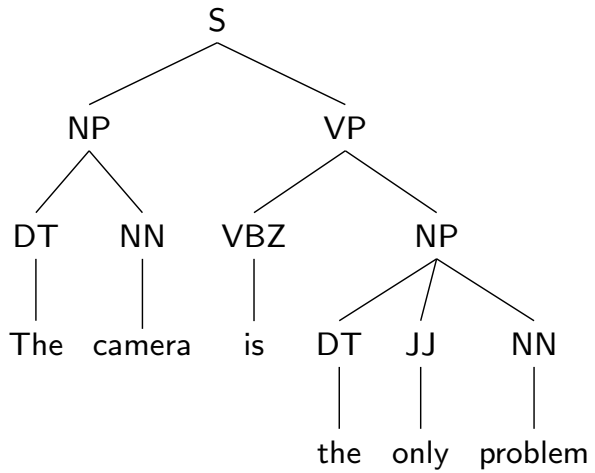
Second step: Sentence pre-processing



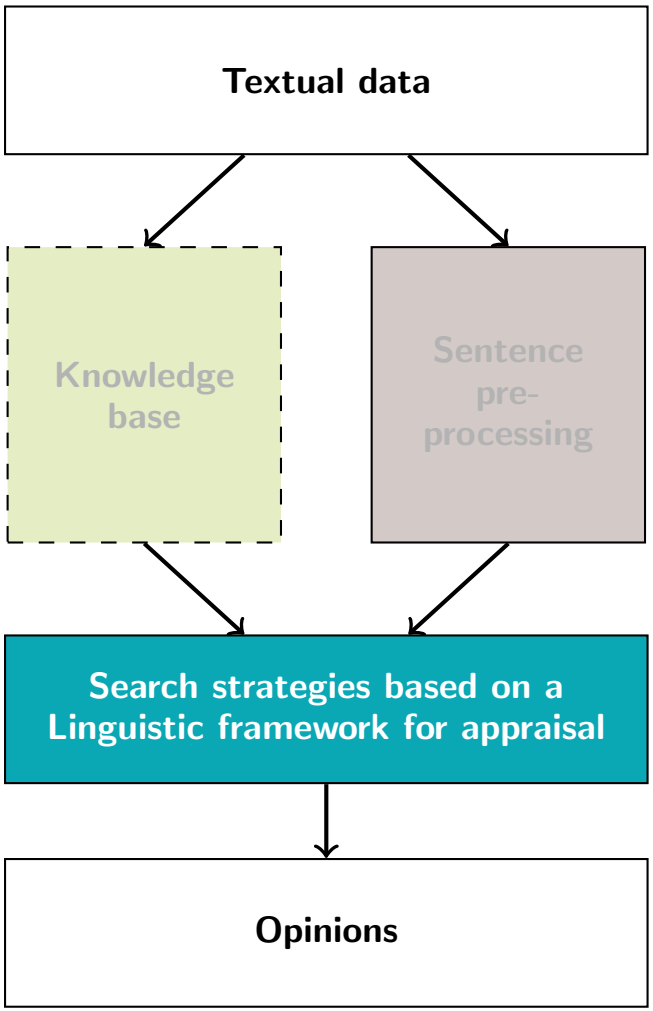
Lexical analysis and transformations

- Character cleaning
- Full stop detection
- Tokenization

Constituency-based syntactic analysis



Third step: Search strategies

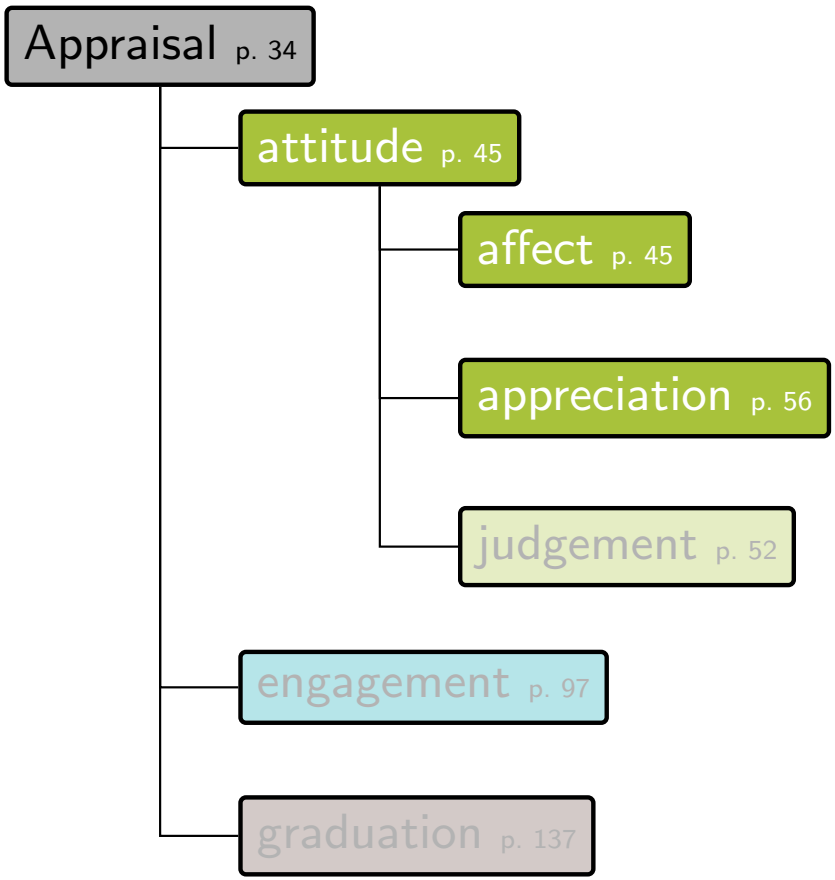


In order to extract opinions:

- A breadth-first search is performed on **the parse tree**
- Automata detect appraisal patterns defined in the **linguistic framework**
- If a pattern is found, a **specific rule** is applied to extract the opinion

Linguistic framework for appraisal

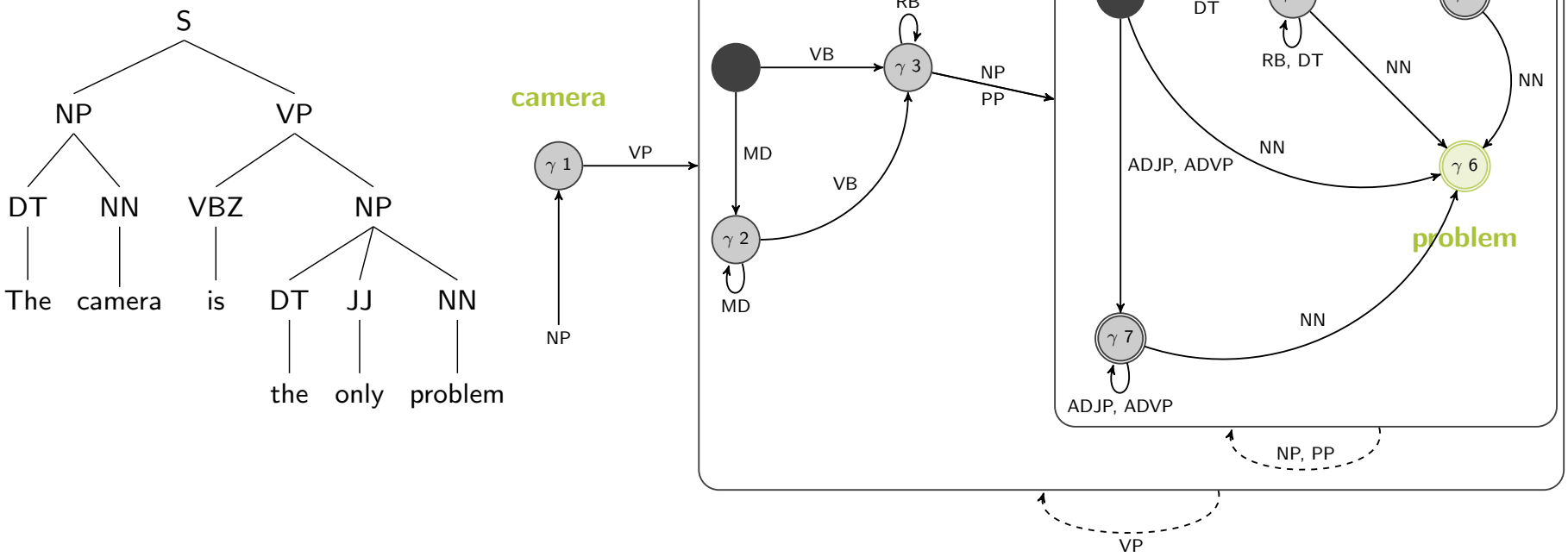
The language of evaluation, James R. Martin and Peter R. R. White



- **Affect** as:
  - a mental process: "I **like** this phone"
  - a mental state: "I'm very **happy** with this phone"
- **Appreciation** as:
  - qualification: "The camera is the only **problem**"
  - presence/absence: "This phone **hasn't** got a camera"
  - behavior: "The battery **heats up** a lot"
- **Judgement** deals with attitudes towards behaviour (social esteem or social sanction)

Search strategies: an example

"The camera is the only problem" (Appreciation by qualification)



Experiment

Our dataset contains:

- 40,160 comments about 382 smartphones in 81,431 sentences for a total size of 3.5 Mo.
- 368 technical specifications from 8 manufacturer websites.
- A knowledge base with keyword for smartphone's related concepts.

Our validation set contains :

- 708 opinions in 527 comments about 6 smartphones.
- Annotations are a consensus between 3 reviewers.

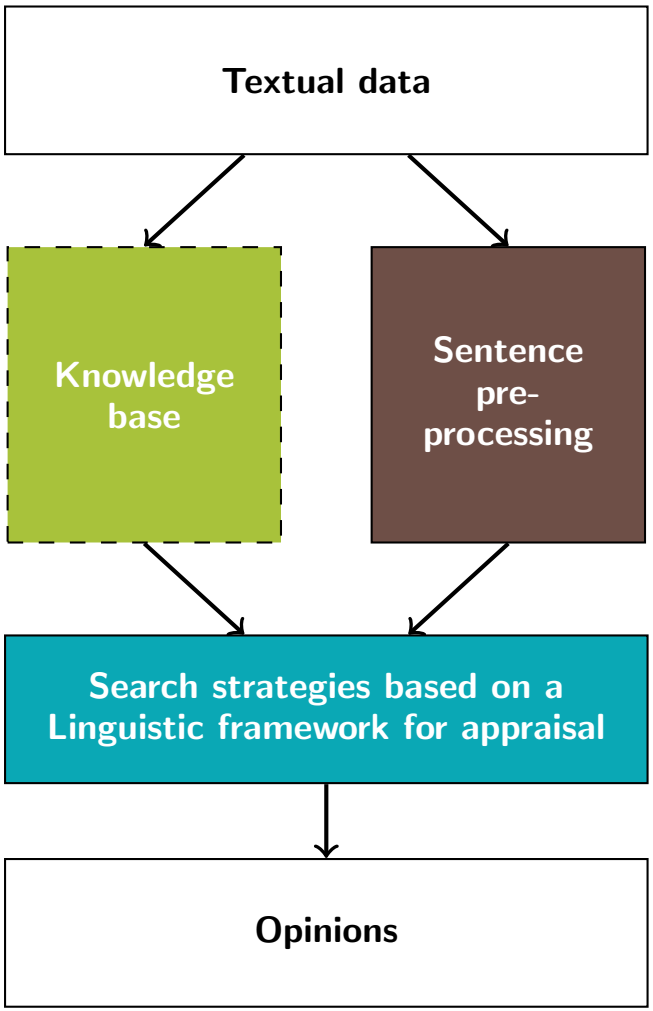
They are available for download: http://goo.gl/YCC5We

Results

Dataset	Appreciation Detection			Detection with Polarity Eval.		
	Precision	Recall	F-Measure	Precision	Recall	F-Measure
Galaxy S5	0.87	0.62	0.72	0.82	0.59	0.69
HTC Desire 310	0.90	0.50	0.64	0.82	0.48	0.60
HTC One (M8)	0.82	0.43	0.56	0.80	0.43	0.56
iPhone 6	0.83	0.50	0.62	0.77	0.47	0.59
Lumia 1320	0.90	0.68	0.78	0.86	0.68	0.76
XPERIA C	0.87	0.66	0.75	0.76	0.62	0.68
Average	**0.87**	**0.57**	0.68	**0.81**	**0.55**	0.65

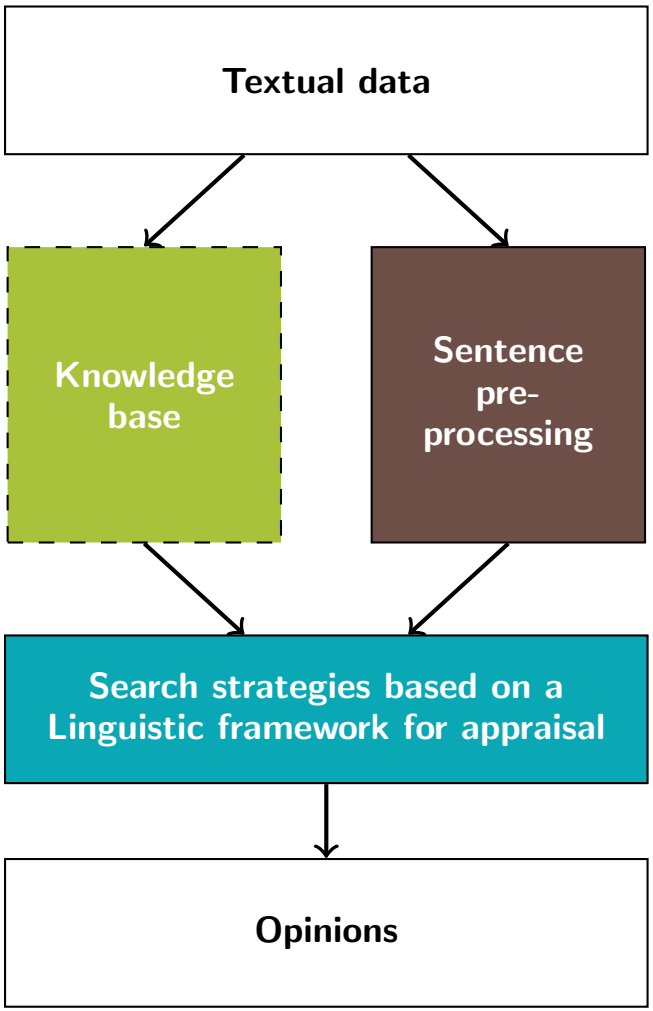
- Good **average precision** to find appreciation and qualify their polarity
- **Recall** have to be improved to find more opinions:
  - Affect extraction is not yet implemented
  - Constituency-based syntactic analysis cannot handle complex sentences

Future work



- Manage **context-based knowledge**
- Handle complex sentences with **dependency-based syntactic analysis**
- Find new rules fitted to **affect**, **judgement** and **engagement**

Conclusion



- **Semantic ressources** to define a semantic relevant perimeter
- NLP techniques for data preparation and **syntactic analysis**
- Use of a sound **language framework** for appraisal in English
- **Search strategies** to find relevant opinions with their polarity