

SLOT FILLING

Slot Filling (SF) is the task of extracting values (*fills*) for specific named attributes (*slots*) for a given entity from unstructured text (see “Examples per:employee_or_member_of”).

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Sadia Profit Rises on Higher Foreign, Domestic Demand (Update2)

By Carlos Caminada - July 30, 2008 19:19 EDT

July 30 (Bloomberg) -- Sadia SA, Brazil's second-biggest foodmaker, said second-quarter profit rose 9.6 percent as higher demand boosted sales and allowed the company to increase prices.

Net income rose to 119.9 million reais (\$76.8 million) from 109.4 million reais a year earlier, Concordia, Brazil-based Sadia said today in a statement on the Brazilian stock regulator's Web site. Net sales rose 28 percent to 2.58 billion reais.

Stronger demand for Sadia's products, such as poultry, smoked ham and chicken nuggets, allowed it to boost prices, said Denise Messer, an analyst at Brascan Corretora. The increase made up for rising costs of corn and soybeans to feed chickens.

“The market is pretty heated in terms of sales and prices, both in the domestic and foreign markets,” Messer said in a report on July 24. Sadia also has sought to increase exports of higher value products, such as chicken parts rather than the entire bird, she said.

Net income topped the 107.4 million reais average estimate of seven analysts surveyed by Bloomberg.

Rising demand in Brazil and abroad will allow Sadia to raise prices further to make up for increasing feed costs, Chief Financial Officer Wilson Teixeira Jr. said.

“Demand remains strong,” Teixeira said in a conference call after the results were released.

Sadia S.A.

Type	Subsidiary
Industry	Food Processing
Founded	1944
Headquarters	Concórdia, SC, Brazil
Key people	José Júlio Cardoso de Lucena (current President)
Products	Food and Beverage
Revenue	▲ US\$ 7.6 Billion (2008)
Net income	▼ US\$ 178.4 Million (2008)
Employees	60,580 (2008)
Parent	BRF
Website	http://www.sadia.com

Figure 1: SF for Sadia S.A.

SLOT FILLING PIPELINE

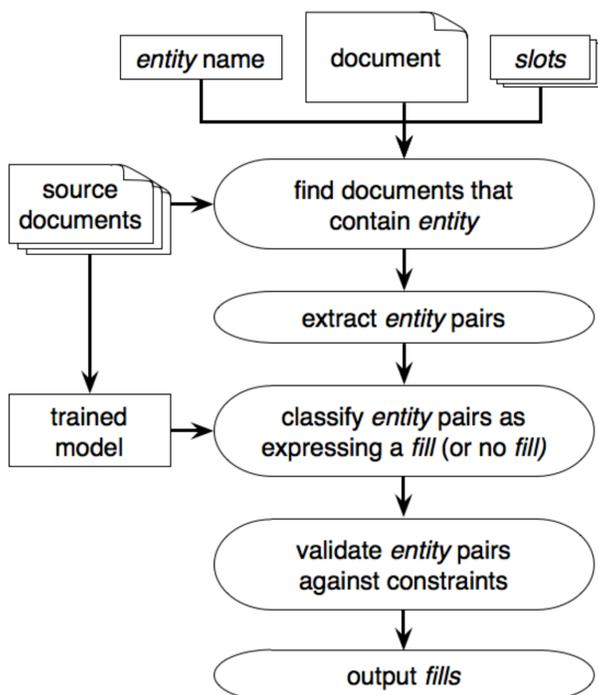


Figure 2: SF Pipeline

EXAMPLES per:employee_or_member_of

1) Glen Pink, University of Sydney

Glen Pink is an employee of the **University of Sydney**.

A straightforward case.

2) John Negroponte, McGraw-Hill

Negroponte was a career diplomat from 1960 to 1997 before leaving public service to become a senior executive with **McGraw-Hill**, a financial services and publishing conglomerate.

Longer distance, and need to know that 'senior executive' entails 'employee of'.

3) John Negroponte, U.S State Department

The Director of the State Council's Taiwan Affairs Office, Chen Yunlin, discussed the Taiwan situation in a meeting with **U.S. Deputy Secretary of State John Negroponte** on Thursday.

Having a specific title indicates being part of a specific organisation.

4) Sadia, Adriano Ferreira

Sadia said it fired chief financial officer **Adriano Ferreira**.

Need to know that being fired means that they were once an employee (event causality).

5) John Kerry, U.S. Senate

Kerry said on the **Senate floor** that it was not the time for him to launch a presidential campaign, but he would continue to try to end the Iraq war.

Taking a specific action indicates being part of an organisation.

6) Mohamed ElBaradei, New York University School of Law

After a stint in the Egyptian Ministry of Foreign Affairs, he received a doctorate in International Law at the **New York University School of Law** in 1974, and later **became an adjunct professor there**.

Multiple coreference decisions and events (where did he become an adjunct professor and what does that mean?).

SLOTS

Sample slots (from TAC Knowledge Base Population [Ji et al., 2011] tasks) include:

per:employee_of
 per:schools_attended
 per:charges
 org:subsidiaries
 org:shareholders
 org:political/religious_affiliation

CHALLENGES IN SLOT FILLING

- SF relies on many Natural Language Processing (NLP) techniques, errors in any one of these affect results.
- Training data is very limited, and there are many relations between *entities* (some systems identify more than a million relations, each potentially requiring training data).
- Complex inference from document information, cross-slot relations, event causality, and background knowledge is required to identify many *fills*.
- Recognition of *candidate fills* for *slots* can be difficult (e.g. per:cause_of_death) [Ji and Grishman, 2011].

EVALUATION

Method	Precision	Recall	F-score
All entities	0.1	88.8	0.2
+ path constraints	1.8	60.1	3.5
Phrase clustering	2.4	6.2	3.4
Bootstrapping	10.2	19.3	13.3
Weak supervision*	37.4	27.2	31.5

Table 1: TAC11 evaluation (* = state-of-the-art)

CONCLUSION

Results are still low for all approaches for SF, however there are promising aspects of all approaches. The next task is to add aspects of distant supervised approaches to a semi-supervised label propagation approach, to leverage the current feature space used for distant supervision.

REFERENCES

- Ji, Heng, and Ralph Grishman. "Knowledge Base Population: Successful Approaches and Challenges." ACL. 2011.
- Heng Ji, Ralph Grishman and Hoa Trang Dang. Overview of the TAC2011 Knowledge Base Population Track. In *Proceedings of TAC*, 2011.