

NLP

Introduction to NLP

NLP Tasks (cont'd)

Information Extraction

- RESEARCH ALERT–Wells Fargo cuts PPD Inc to market perform
- China Southern Air Upgraded To Overweight From Neutral–HSBC
- CITIGROUP RAISES INGERSOLL RAND <IR.N> TO HOLD FROM SELL
- TCF Financial Corp Raised To Overweight From Neutral By JPMorgan
- BAIRD CUTS KIOR INC <KIOR.O> TO UNDERPERFORM RATING
- BRIEF–RESEARCH ALERT–Global Equities Research cuts LinkedIn to equal weight

Information Extraction

DATE/ TIME	TICKER	COMPANY	SOURCE	OLD	NEW	CHANGE
		PPD Inc	Wells Fargo		market perform	↓
		China Southern Air	HSBC	Neutra 	Overweight	↑
	IR.N	INGERSOLL RAND	CITIGROUP	SELL	HOLD	↑
		TCF Financial Corp	JPMorgan	Neutra 	Overweight	↑
	KIOR.O	KIOR INC	BAIRD		UNDERPERFORM	↓
		LinkedIn	Global Equities Research		equal weight	↓

False Positives

- Examples of false positives
 - BARCLAYS CUTS FLAGSTONE REINSURANCE <FSR.N> PRICE TARGET TO \$9 FROM \$11
 - Rimage To Buy Qumu For \$52M;; Raises Dividend;; Lowers EPS View
 - S&P rates Ameren Illinois commercial paper 'A-3'
 - BRIEF-Moody's changes otlk for Stirling Water Seafeld Finance to positive
 - BRIEF-RESEARCH ALERT-HSBC cuts price targets on European telcos
 - Stifel cuts Philip Morris price target
 - Media General shares plummet on Moody's downgrade
- Explain why these are false positives.

Answers to the Quiz

- BARCLAYS CUTS FLAGSTONE REINSURANCE <FSR.N> PRICE TARGET TO \$9 FROM \$11
 - Didn't cut the ratings but the price target
- Rimage To Buy Qumu For \$52M;; Raises Dividend;; Lowers EPS View
 - Lowers eps view
- S&P rates Ameren Illinois commercial paper 'A-3'
 - Debt rating
- BRIEF-Moody's changes otlk for Stirling Water Seafeld Finance to positive
 - Changes outlook
- BRIEF-RESEARCH ALERT-HSBC cuts price targets on European telcos
 - Not a company but a group of companies
- Stifel cuts Philip Morris price target
 - Price target, not rating
- Media General shares plummet on Moody's downgrade
 - Event in the past

Semantics

- First order logic
- Inference
- Semantic analysis

$$\forall x,y: \textit{Mother}(x,y) \Rightarrow \textit{Parent}(x,y)$$

NACLO Problem

- “Bertrand and Russell”, 2014 problem by Ben King
 - <http://www.naclo.cs.cmu.edu/problems2014/N2014-H.pdf>

NACLO Solution

- Bertrand and Russell
 - <http://www.naclo.cs.cmu.edu/problems2014/N2014-HS.pdf>

Reading Comprehension

Mars Polar Lander - Where Are You?

(January 18, 2000) After more than a month of searching for a signal from NASA's Mars Polar Lander, mission controllers have lost hope of finding it. The Mars Polar Lander was on a mission to Mars to study its atmosphere and search for water, something that could help scientists determine whether life ever existed on Mars. Polar Lander was to have touched down December 3 for a 90-day mission. It was to land near Mars' south pole. The lander was last heard from minutes before beginning its descent. *The last effort to communicate with the three-legged lander ended with frustration at 8 a.m. Monday.* "We didn't see anything," said Richard Cook, the spacecraft's project manager at NASA's Jet Propulsion Laboratory. The failed mission to the Red Planet cost the American government more than \$200 million dollars. Now, space agency scientists and engineers will try to find out what could have gone wrong. They do not want to make the same mistakes in the next mission.

(sources: CBC "For Kids" web page, Associated Press, CBC News Online, CBC Radio news, NASA)

1. When did the mission controllers lose hope of communicating with the lander?
Answer: 8AM, Monday Jan. 17, 2000
2. Who is the Polar Lander's project manager?
3. Where on Mars was the spacecraft supposed to touch down?
4. What did the Mars Global Surveyor do?
5. What was the mission of the Mars Polar Lander?

Text Understanding

There are four bungalows in our cul-de-sac. They are made from these materials: straw, wood, brick and glass.

Mrs. Scott's bungalow is somewhere to the left of the wooden one and the third one along is brick. Mrs. Umbrella owns a straw bungalow and Mr. Tinsley does not live at either end, but lives somewhere to the right of the glass bungalow. Mr. Wilshaw lives in the fourth bungalow, whilst the first bungalow is not made from straw.

Who lives where, and what is their bungalow made from?

<http://www.brainbashers.com/showpuzzles.asp?puzzle=ZSOP>

Word Sense Disambiguation

- “The thieves took off with 100 gold **bars**”.
 - Did they steal 100 drinking establishments?
 - Or 100 measures of a song?

Word Sense Disambiguation

Bar=Noun

- S: (n) barroom, bar, saloon, ginmill, taproom (a room or establishment where alcoholic drinks are served over a counter) "he drowned his sorrows in whiskey at the bar"
- S: (n) bar (a counter where you can obtain food or drink) "he bought a hot dog and a coke at the bar"
- S: (n) bar (a rigid piece of metal or wood; usually used as a fastening or obstruction or weapon) "there were bars in the windows to prevent escape"
- S: (n) measure, bar (musical notation for a repeating pattern of musical beats) "the orchestra omitted the last twelve bars of the song"
- S: (n) bar (an obstruction (usually metal) placed at the top of a goal) "it was an excellent kick but the ball hit the bar"
- S: (n) prevention, bar (the act of preventing) "there was no bar against leaving"; "money was allocated to study the cause and prevention of influenza"
- S: (n) bar ((meteorology) a unit of pressure equal to a million dynes per square centimeter) "unfortunately some writers have used bar for one dyne per square centimeter"
- S: (n) bar (a submerged (or partly submerged) ridge in a river or along a shore) "the boat ran aground on a submerged bar in the river"
- S: (n) legal profession, bar, legal community (the body of individuals qualified to practice law in a particular jurisdiction) "he was admitted to the bar in New Jersey"
- S: (n) stripe, streak, bar (a narrow marking of a different color or texture from the background) "a green toad with small black stripes or bars"; "may the Stars and Stripes forever wave"
- S: (n) cake, bar (a block of solid substance (such as soap or wax)) "a bar of chocolate"
- S: (n) Browning automatic rifle, BAR (a portable .30 caliber automatic rifle operated by gas pressure and fed by cartridges from a magazine; used by United States troops in World War I and in World War II and in the Korean War)
- S: (n) bar (a horizontal rod that serves as a support for gymnasts as they perform exercises)
- S: (n) bar (a heating element in an electric fire) "an electric fire with three bars"
- S: (n) bar ((law) a railing that encloses the part of the courtroom where the judges and lawyers sit and the case is tried) "spectators were not allowed past the bar"

Bar=Verb

- S: (v) bar, debar, exclude (prevent from entering; keep out) "He was barred from membership in the club"
- S: (v) barricade, block, blockade, stop, block off, block up, bar (render unsuitable for passage) "Block the way"; "barricade the streets"; "stop the busy road"
- S: (v) banish, relegate, bar (expel, as if by official decree) "he was banished from his own country"
- S: (v) bar (secure with, or as if with, bars) "He barred the door"

WSD is Important for Translation

- Paul plays soccer
 - Paul joue **au** football
- Paul plays the guitar
 - Paul joue **de la** guitare
- “wall” in German
 - die Chinesische **Mauer** (The Great Wall of China)
 - (otherwise Wand)
- “wall” in Spanish
 - pared, muro, muralla

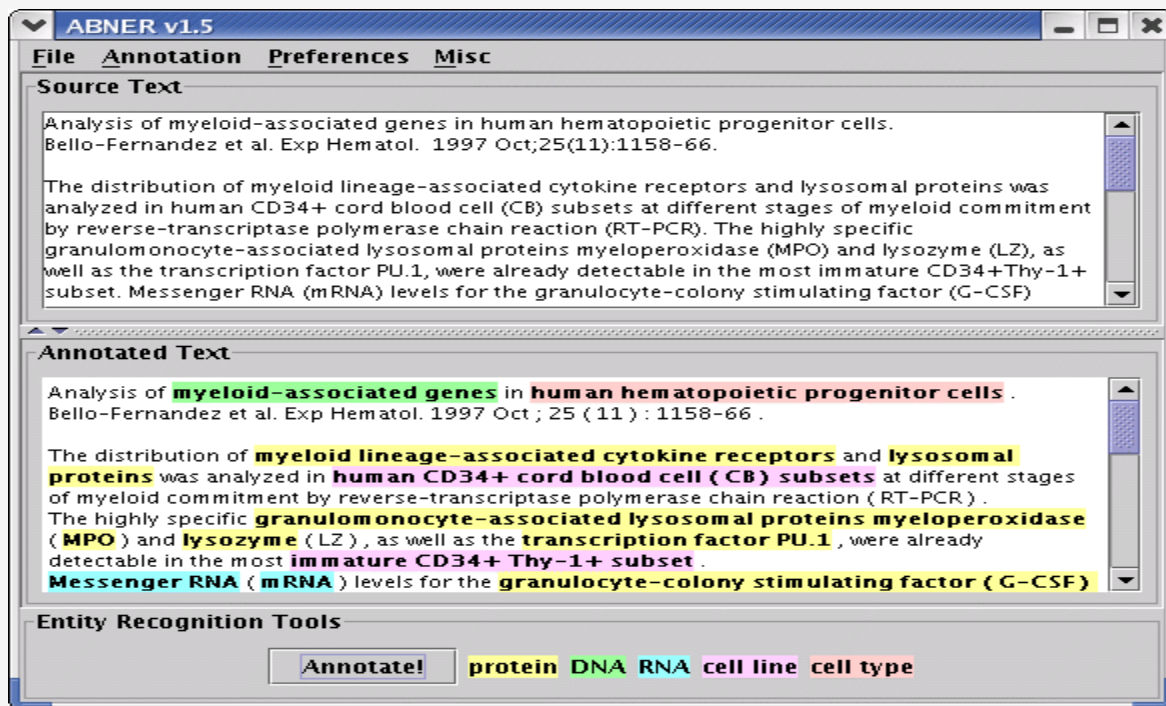
Named Entity Recognition

Wolff, currently a journalist in Argentina, played with Del Bosque in the final years of the seventies in Real Madrid.

Wolff	B-PER
,	O
currently	O
a	O
journalist	O
in	O
Argentina	B-LOC
,	O
played	O
with	O
Del	B-PER
Bosque	I-PER
in	O
the	O
final	O
years	O
of	O
the	O
seventies	O
in	O
Real	B-ORG
Madrid	I-ORG
.	O

- http://cogcomp.cs.illinois.edu/page/demo_view/NER
- <http://nlp.stanford.edu:8080/ner/>

Named Entity Recognition



<http://pages.cs.wisc.edu/~bsettles/abner>

Semantic Role Labeling

- $[_{A0}$ He] $[_{AM-MOD}$ would] $[_{AM-NEG}$ n't] $[_V$ **accept**] $[_{A1}$ anything of value] from $[_{A2}$ those he was writing about] .
- **V:** verb
A0: acceptor
A1: thing accepted
A2: accepted-from
A3: attribute
AM-MOD: modal
AM-NEG: negation
- http://cogcomp.cs.illinois.edu/page/demo_view/SRL

Coreference Resolution

- Barack Obama visited China. The US president met with his Chinese counterpart.
- Cynthia went to see her aunt at the hospital. She was scheduled for surgery on Monday.
- Because he was sick, Michael stayed home on Friday.

Ellipsis, Parallelism, and Underspecification

- Chen speaks Chinese. I don't.
- Santa gave Mary a book and Johnny a toy.

NLP