



Uni. Utrecht



# New research methods for investigating criminal networks involved in illicit trades of humans, wildlife, and drugs

Processing and visualizing patterns in big data sets

23 juni 2015

KIEM, Creatieve industrie, project nr. 314-98-030

# Programma

- Doel van de samenwerking
- NewsReader technologie
- De pilot: data feiten & aantallen
- Bevindingen en visualisaties

# KIEM project

- Haalbaarheidsstudie:
  - Kan NewsReader technologie worden ingezet voor het ontrafelen van criminale netwerken op grond van lange-termijn nieuwsberichten
- Opstap naar grotere projectaanvraag of samenwerking
  - Meer data, meer talen, meer vragen
  - Aanpassing aan het domein: eigen thesauri
  - Monitoring van data streams

# Vragen

- Welke (soorten) personen en organisaties zijn betrokken bij verschillende soorten van trafficking?
- Wie heeft relaties met wie?
- In welke regio's vindt dit plaats?
- Wat zijn de trends in tijd (dynamiek)?
  - activiteiten, regio's, veranderende sociale netwerken
  - wanneer worden nieuwe zaken, stoffen, personen zichtbaar in regio's en over tijd?
- Wat is de voorspellende waarde van patronen?

# NewsReader in het kort

- Verwerkt nieuws in 4 Europese talen (Engels, Nederlands, Spaans, Italiaans).
- Extraheert **wat** er gebeurd is, **wie** erbij betrokken was, **waar** het plaatsvond en **wanneer**.
- Verschillende bronnen worden samengevoegd om een zo compleet mogelijk beeld te geven: deduplicatie en aggregatie
- Broninformatie wordt opgeslagen zodat deze altijd getraceerd kan worden.
- Uit de verwerkte data worden verhaallijnen gehaald om beleidsmakers en informatiespecialisten inzicht te geven in gebeurtenissen en relaties daartussen.
- Gefinancierd door EU FP7 programma, beurs 316404
- Jan. 2013 - Dec. 2015



<http://www.telegraph.co.uk/finance/newsbysector/industry/engineering/10125280/Porsche-family-buys-back-10pc-stake-from-Qatar.html>

17 Jun 2013

## Porsche family buys back 10pc stake from Qatar

Descendants of the German car pioneer Ferdinand Porsche have bought back a 10pc stake in the company that bears the family name from Qatar Holding, the investment arm of the Gulf State's sovereign wealth fund.

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MENTIONS

Descendants of the German car pioneer Ferdinand Porsche have bought back a 10pc stake in the company that bears the family name from Qatar Holding, the investment arm of the Gulf State's sovereign wealth fund.

INSTANCES

WHO:

[http://dbpedia.org/page/Category:Porsche\\_family](http://dbpedia.org/page/Category:Porsche_family)  
<http://dbpedia.org/page/Category:Qatarholding>  
<http://dbpedia.org/page/Category:PorscheSE>

<http://www.telegraph.co.uk/finance/newsbysector/industry/engineering/10125280/Porsche-family-buys-back-10pc-stake-from-Qatar.html>

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WHAT:  
buy\_back

MENTIONS

INSTANCES

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<http://english.alarabiya.net/en/business/banking-and-finance/2013/06/17/Qatar-Holding-sells-10-stake-in-Porsche-to-family-shareholders.html>

Monday, 17 June 2013

Qatar Holding sells 10% stake in Porsche to founding families

Qatar Holding, the investment arm of the Gulf state's sovereign wealth fund, has sold its 10 percent stake in Porsche SE to the luxury carmaker's family shareholders, four years after it first invested in the firm.

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MENTIONS

INSTANCES

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MENTIONS

INSTANCES

WHAT:  
sell

<http://english.alarabiya.net>

Qatar Holding sells 10% stake in Porsche to  
founding families

<http://www.telegraph.co.uk>

Porsche family buys back 10pc  
stake from Qatar

**fn:Commerce\_money\_transfer**

type

**dbp:Porsche**

fn:Buyer

**Event  
buy/sell**

fn:Seller

**dbp:QatarHolding**

fn:Goods

**Entity  
10% stake**

sem:hasTime

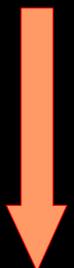
**2013-06-17**

fn:Money

?

# From mentions to instances

WORDS      Qatar[2] Holding[2] sells[8] 10% stake[5] in Porsche[10] to founding[3] families[8]



***2\*2\*8\*5\*10\*3\*8=38400 concept combinations***

2-2-8-5-10-3-8=38400 concept combinations

CONCEPTS    dbp:Qatar\_Investment\_Authority...SELL/BUY..STAKE.... dbp:Porsche



***Language  
Technology  
16 modules***

***16 modules***

RELATIONS    TIME=2013-06-17

(fn:Commerce, fn:Seller, QATAR.)  
(fn:Commerce, fn:Buyer, PORSCHE)  
(fn:Commerce, fn:Goods, 10%STAKE)



PROVENANCE

SOURCE

english.alarabiya.net → ***STATEMENT*** → ***CERTAIN***

ON A WORKING DAY

Friday

10:15

February 6

Tuesday

09:34

February 10

1 MILLION ARTICLES  
FROM 30,000 SOURCES

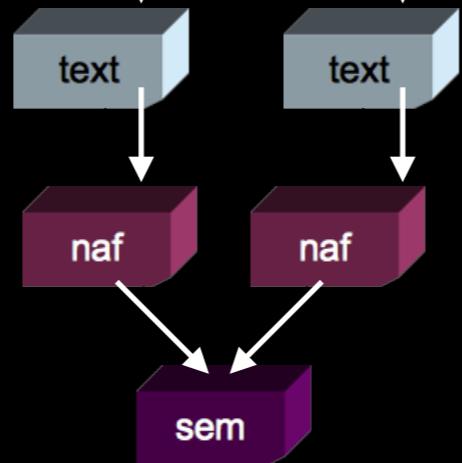
1 ARTICLE

100 EVENT MENTIONS PER ARTICLE

5 EVENT INSTANCE PER ARTICLE



PLACES



From text  
to RDF



Knowledge  
Store

EVENTS

ENTITIES

1995 96 97 98 99 2000 01 02 03 04 2005 06 07 08 09 2010 11

# English NLP Pipeline

17/06/2013

Porsche family buys back 10pc stake from Qatar

Descendants of the German car pioneer Ferdinand Porsche have bought back a 10pc stake in the company that bears the family name from Qatar Holding, the investment arm of the Gulf State's sovereign wealth fund.

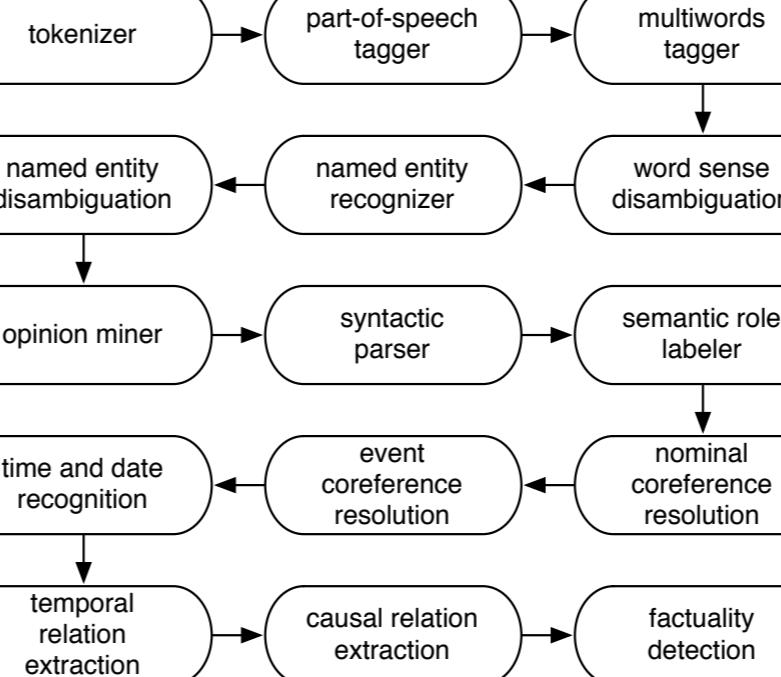
All of the common shares in Porsche Automobil Holding SE are now held by the Porsche-Piech family, descendants of the eng-

Qatar Holding sells 10% stake in Porsche to founding families

Qatar Holding, the investment arm of the Gulf state's sovereign wealth fund, has sold its 10 percent stake in Porsche SE to the luxury carmaker's family shareholders, four years after it first invested in the firm.

Qatar Holding, which owns stakes in some of the world's largest companies, said it sold the common shares in the automaker to the Porsche and Piech families. It did not disclose the value of the transaction.

## Step 1: Information Extraction at the Document Level



```

<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<NAF version="v3" xml:lang="en">
<nafHeader>
<fileDesc>
creationtime="20130617"/>
<public uri="5BC0-9GD1-F0JP-W2H2.xml"/>
<linguisticProcessors layer="srl">
<lp name="ixa-pipe-srl-en" timestamp="2014-02-58T19:28:32+0100" version="1.0"/>
  
```

```

@prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
@prefix time: <http://www.w3.org/TR/owl-time#> .
@prefix eso: <http://www.newsreader-project.eu/domain-ontology#> .
@prefix gaf: <http://groundedannotationframework.org/gaf#> .
@prefix nwrontology: <http://www.newsreader-project.eu/ontologies/> .
@prefix sem: <http://semanticweb.cs.vu.nl/2009/11/sem/> .
@prefix fn: <http://www.newsreader-project.eu/ontologies/framenet/> .

<http://www.newsreader-project.eu/instances> {
<http://www.telegraph.co.uk#ev2>
  a      sem:Event , fn:Commerce_buy , eso:Buying ;
  rdfs:label "buy" , "sell";
  gaf:denotedBy <http://www.telegraph.co.uk#char=15,19> , <http://english.alarabiya.net#char=15,19>
}
  
```

```

<http://dbpedia.org/resource/Porsche>
rdfs:label "Porsche" , "founding family" ;
gaf:denotedBy <http://www.telegraph.co.uk#char=0,7> , <http://english.alarabiya.net#char=0,7>
<http://www.newsreader-project.eu/data/cars/non-entities/10pc+stake>
rdfs:label "10pc stake" , "10 \% stake in Porsche" ;
gaf:denotedBy <http://www.telegraph.co.uk#char=25,35> , <http://english.alarabiya.net#char=25,35>
  
```

## Step 2: Cross-document event coreference

event coreference resolution

# Event-Centric Knowledge Graphs in RDF

# Vorst, Belgium in the news

SOURCE: <http://www.autoblog.nl/archive/2006/11/21/volkswagen-fabriek-belgie-moet-stoppen-met-de-golf>

TIME: 21-11-2006 om 15:07

TEXT: Volkswagen fabriek België moet **stoppen** met de Golf.

*stop with the Golf*

....

*Er gingen namelijk geruchten over zware saneringen, van 1.000 tot 4.000 ontslagen.*

*There were rumours about heavy cuts, of 1.000 up to 4.000 fired*

SOURCE: <http://www.standaard.be/kanaal/index.aspx?kanaalid=261&pageid=15>

TIME: Di 21/11/2006

TEXT: Tot 4.000 **banen weg** in Vorst

Fabriek **verliest** Golf

BRUSSEL - Boze arbeiders blokkeren de poorten van de Volkswagenfabriek in Vorst, nadat bekend raakte dat **zeker 3.500 van de 5.300 banen verdwijnen**.

*sure 3500 of the 5300 **jobs disappear***

SOURCE: <http://www.autointernationaal.nl/artikel.php?id=2868>

TIME: 21-11-2006 11:26

TEXT: Bij de Volkswagen fabriek in Vorst **verdwijnen zeker 3.500 banen**

*disappear sure 3.500 **jobs***

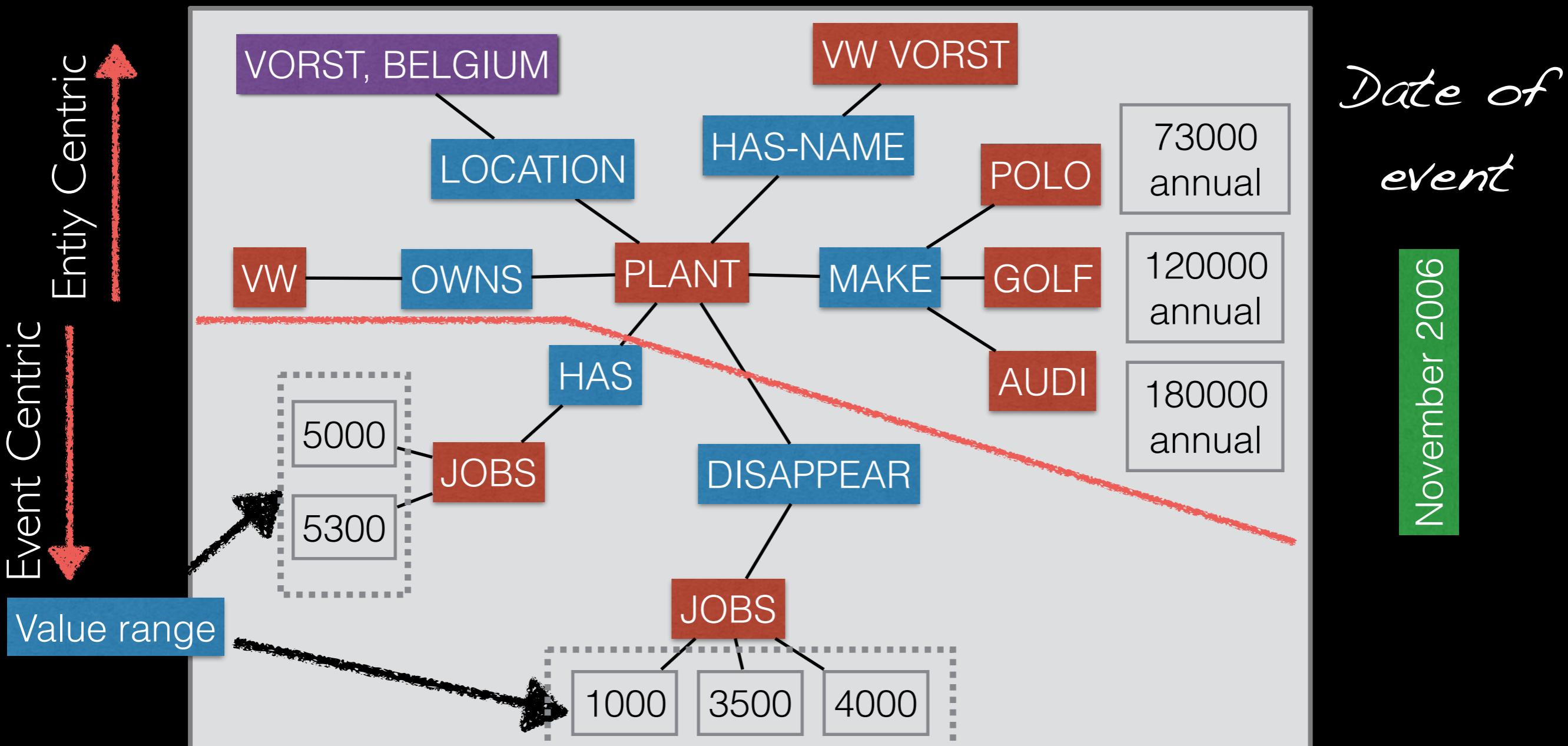
SOURCE: [http://nl.wikipedia.org/wiki/Audi\\_Brussel](http://nl.wikipedia.org/wiki/Audi_Brussel)

TIME: 13 mrt 2013 om 13:24

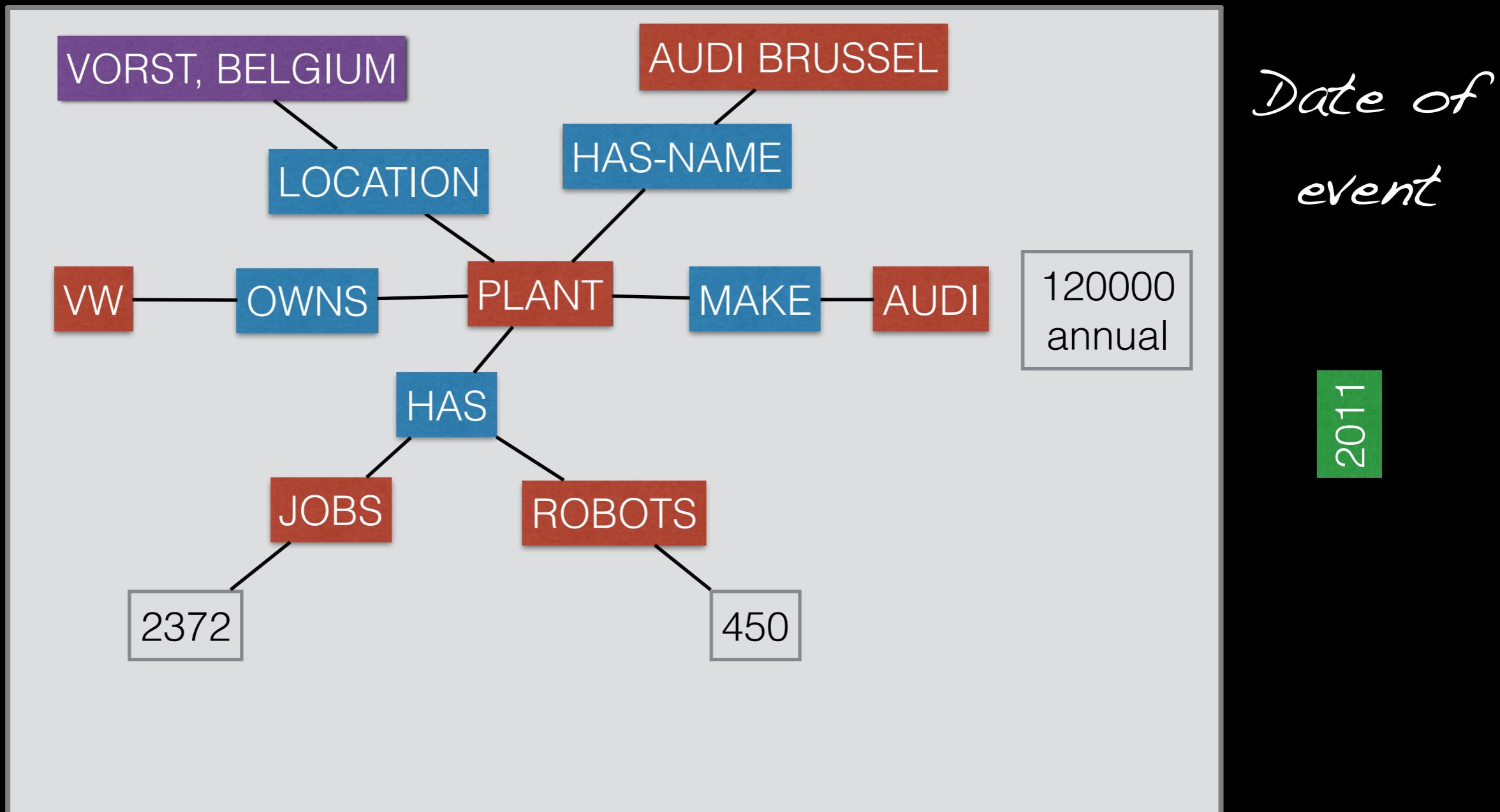
TEXT: Op 21 november 2006 kwam het nieuws dat Volkswagen Vorst de **productie van de Golf verliest** en er meer dan 3500 van de 5000 banen geschrapt zouden worden.

*production of the Golf lost and there more than 3500 of the 5000 jobs canceled should be*

# Knowledge Graph



# Knowledge Graph



*Date of statement:*

March 2013

[nl.wikipedia.org](http://nl.wikipedia.org)

# EVENTS ipv DOCUMENTEN

- Focus op wat er gebeurd is en niet wat verteld wordt
- Extreme reductie van informatie: deduplicatie
- Aggregatie over veel verschillende bronnen
- Verklaart wat er gebeurt ipv alleen weergeven
- Semantisch bevragen van data
- Ontelbaar veel mogelijkheden voor data analyse
- Inzicht in wie wat beweert en welke mening ze hebben

# LexisNexis input data

regio	periode	documenten
<b>China</b>	1999	33,169
	2000	84,533
	2010	83,636
<b>Morocco</b>	1999	9,398
	2009	20,920
	2014	14,571
<b>Mexico</b>	1999	99,767
	2009	255,873
	2014	218,285
<b>Russia</b>	1999	21,608
	2009	50,693
	2014	41,624
<b>TOTAL</b>		<b>934,077</b>

# Morocco

<b>documents</b>	44.889
<b>sources linked to</b>	12.768
<b>mentions</b>	3.815.832

	<b>Statements</b>
<b>Background knowledge</b>	95.018.320
<b>News</b>	111.073.781
<b>TOTAL</b>	206.092.101

	<b>TOTAL</b>	<b>DBpedia</b>	<b>Dark entities</b>
<b>Locations</b>	25.306	5.468	19.838
<b>Organisations</b>	48.469	4.505	43.964
<b>People</b>	37.608	7.999	29.609
<b>Miscellaneous</b>	7.024	4.252	2.772
<b>Total</b>	118.407	22.224	96.183

	<b>Instances</b>
<b>events</b>	798.355
<b>eso events</b>	225.587
<b>sem:hasActor</b>	772.336
<b>sem:hasPlace</b>	44.021
<b>sem:hasTime</b>	861.782

# Entities

LOCATION	Mentions	ORGANISATION	Mentions	PERSON	Mentions
dbp:Morocco	12.979	dbp:Federal_government_of_the_United_States	1.691	<a href="#">dbp:E. H. Carr</a>	454
dbp:South_Africa	5.364	dbp:United_Nations	1.29	<a href="#">dbp:Geraint_Jones</a>	436
dbp:Africa	4.802	dbp:United_States_Armed_Forces	791	<a href="#">dbp:Colin_Cowdrey</a>	433
dbp:Spain	4.564	dbp:United_Nations_Security_Council	585	<a href="#">dbp:Lleyton_Hewitt</a>	432
dbp:European_Union	4.255	dbp:Nissan_Motor_Company	533	nwr-entities:Khannouchi	417
dbp:United_Kingdom	3.493	dbp:United_States_Marine_Corps	359	<a href="#">dbp:Silvio_Berlusconi</a>	379
dbp:France	2.845	dbp:Al-Qaeda_in_the_Islamic_Maghreb	349	nwr-entities:Piccard	360
dbp:United_States	2.818	dbp:Politics_of_Iran	335	<a href="#">dbp:Bashar_al-Assad</a>	347
dbp:Mali	1.836	dbp:Microsoft	266	<a href="#">dbp:Thomas_More</a>	346
dbp:Algeria	1.504	dbp:Cooperation_Council_for_the_Arab_States_of_the_Gulf	266	<a href="#">dbp:Andre_Agassi</a>	300
dbp:China	1.465	dbp:Government_of_the_United_Kingdom	220	<a href="#">dbp:Mike_Tyson</a>	286
dbp:Syria	1.281	dbp:Al-Qaeda	193	<a href="#">dbp:Fidel_Castro</a>	282
dbp:Pakistan	1.253	dbp:United_States_Department_of_Defense	176	nwr-entities:El_Guerrouj	258
dbp:Arab_world	1.217	dbp:Taliban	167	<a href="#">dbp:Lyndon_B._Johnson</a>	247
dbp:Italy	1.139	dbp:International_Monetary_Fund	156	<a href="#">dbp:Muammar_Gaddafi</a>	224
dbp:Netherlands	1.091	dbp:United_States_Navy	143	<a href="#">dbp:Jim_Webb</a>	213
dbp:Israel	1.034	dbp:NATO	141	<a href="#">dbp:Earl_Warren</a>	210
dbp:Egypt	931	dbp:Belgacom	140	<a href="#">dbp:Haile_Gebrselassie</a>	200

# ENTITY BY TYPE

type	# linked instances	% type instances	# docs	% total docs
Place	5468	0.6%	11688	91.5%
PopulatedPlace	5468	0.6%	11688	91.5%
Settlement	5468	0.6%	11688	91.5%
Village	5468	0.6%	11688	91.5%
Agent	12189	0.6%	10744	84.1%
Country	464	9.4%	9333	73.0%
Work	2664	0.5%	9327	73.0%
Region	2326	1.2%	8412	65.8%
City	1751	1.4%	6563	51.4%
Town	1088	1.2%	3437	26.9%
Event	739	0.9%	2888	22.6%
Language	97	1.0%	2531	19.8%
Unknown	251	8.0%	2201	17.2%
Continent	15	71.4%	1968	15.4%
Territory	127	7.7%	1726	13.5%
NaturalPlace	326	0.4%	1653	12.9%
ArchitecturalStructure	686	0.4%	1502	11.7%
Disease	61	0.9%	1239	9.7%
EthnicGroup	173	3.4%	1226	9.6%
TopicalConcept	170	2.8%	1016	7.9%
Holiday	63	5.1%	977	7.6%
Island	161	1.8%	950	7.4%
Film	411	0.4%	935	7.3%
WorldHeritageSite	150	5.7%	932	7.2%
MeanOfTransportation	312	0.5%	827	6.4%
Species	323	0.1%	790	6.1%
State	49	98.0%	782	6.1%
ChemicalSubstance	89	0.6%	670	5.2%
Animal	122	1.1%	625	4.8%

# ENTITY BY TYPE

- file:///Users/piek/Desktop/KIEM/KIEM-stats-ks/linking-stats-1000.html

MeanOfTransportation	312	0.5%	827	6.4%
Automobile	152	1.5%	328	2.5%
Aircraft	59	0.5%	297	2.3%
Ship	58	0.2%	147	1.1%
Train	11	0.7%	21	0.1%
SpaceStation	3	9.6%	7	0.0%
Spacecraft	5	1.1%	5	0.0%
SpaceShuttle	3	16.6%	4	0.0%
Locomotive	3	0.0%	3	0.0%
Rocket	2	0.7%	2	0.0%
Species	323	0.1%	790	6.1%
Eukaryote	314	0.1%	768	6.0%
Animal	174	0.0%	425	3.3%
Mammal	89	0.6%	283	2.2%
RaceHorse	34	0.7%	71	0.5%
Dog	7	1.7%	9	0.0%
Bird	36	0.1%	66	0.5%
Fish	15	0.0%	23	0.1%
Insect	5	0.0%	20	0.1%
Reptile	14	0.1%	18	0.1%
Mollusca	2	0.0%	6	0.0%
Arachnid	3	0.0%	5	0.0%
Crustacean	3	0.1%	4	0.0%
Plant	130	0.2%	329	2.5%
FloweringPlant	103	0.5%	244	1.9%
Grape	7	1.3%	13	0.1%
CultivatedVariety	4	0.2%	4	0.0%
Conifer	1	0.1%	2	0.0%
Moss	1	0.2%	1	0.0%
Fungus	3	0.0%	7	0.0%
Bacteria	1	0.1%	1	0.0%
State	49	98.0%	782	6.1%
ChemicalSubstance	89	0.6%	670	5.2%
ChemicalElement	27	16.0%	418	3.2%
ChemicalCompound	60	0.4%	253	1.9%
Mineral	5	0.3%	27	0.2%

# EVENTS

50% coverage

25% coverage

Words	Instances	FrameNet	Instances	ESO	Instances
have	7.262	fn:Statement	20.918	eso:IntentionalEvent	55.852
say	5.922	fn:Arriving	12.250	eso:Motion	32.558
make	5.563	fn:Change_position_on_a_scale	10.994	eso:Getting	22.728
include	4.651	fn:Bringing	10.872	eso:Translocation	22.717
take	4.616	fn:Awareness	10.772	eso:Placing	18.224
come	4.388	fn:Choosing	9.975	eso:Transportation	17.623
get	3.865	fn:Self_motion	9.818	eso:Giving	16.431
see	3.691	fn:Text_creation	9.024	eso:QuantityChange	14.666
use	3.587	fn:Intentionally_create	8.910	eso:Removing	12.617
find	3.198	fn:Grasp	8.749	eso:Arriving	12.199
know	3.035	fn:Request	8.123	eso:Constructing	11.175
give	2.849	fn:Possession	7.985	eso:SocialInteraction	10.759
look	2.805	fn:Inclusion	7.976	eso:Creating	10.042
want	2.803	fn:Getting	7.681	eso:Merging	8.533
start	2.791	fn:Categorization	7.421	eso:HavingInPossession	7.985
need	2.775	fn:Perception_active	7.406	eso:Meeting	7.609
help	2.739	fn:Causation	7.341	eso:Manufacturing	7.529
end	2.681	fn:Perception_experience	7.250	eso:ChangeOfLeadership	7.207
call	2.638	fn:Opinion	7.224	eso:ChangingShape	6.290
work	2.602	fn:Change_of_leadership	7.207	eso:Taking	5.883
set	2.463	fn:Becoming_aware	6.871	eso:Injuring	4.968
meet	2.440	fn:Cause_change	6.648	eso:Buying	4.640
tell	2.396	fn:Activity_start	6.435	eso:Leaving	4.283
show	2.382	fn:Attempt	6.411	eso:OrganizationalEvent	4.281
think	2.361	fn:Removing	6.257	eso:BeingAtAPlace	4.101
lead	2.286	fn:Scrutiny	6.223	eso:LeavingAnOrganization	3.897
bring	2.269	fn:Path_shape	6.110	eso:JoiningAnOrganization	3.752

# ESO: EVENT & SITUATION ONTOLOGY

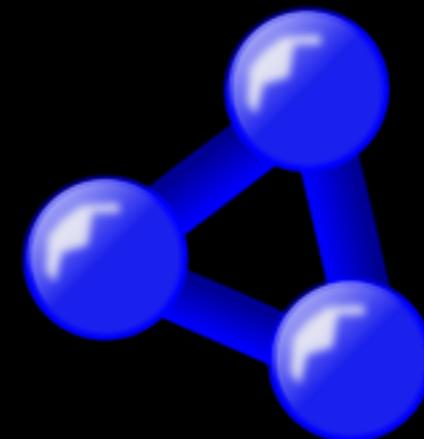
ChangeOfPossession  
FinancialTransaction: 589  
    Buying: 2,211  
    Paying: 1,346  
    Selling :2,274  
Getting: 20,366  
    Borrowing: 79  
    Renting: 74  
Taking: 6,356  
    Stealing: 600  
Giving: 15,897  
Lending: 385  
    RentingOut: 18  
IntentionalEvent: 37,398  
    Attacking: 1,694  
OrganizationalEvent: 4,548  
    ChangeOfLeadership: 7,790  
    JoiningAnOrganization:1,118  
    LeavingAnOrganization: 4,133  
Replacing: 1,237  
SocialInteraction: 11,332  
    ChangeOfRelationship: 1,385  
Meeting: 6,343

InternalChange:  
    ChangingShape: 5,143  
    Creating: 6,897  
    Constructing: 8,140  
    Manufacturing: 4,255  
    Damaging: 3,605  
    Injuring: 4,623  
    Destroying: 2,859  
    Killing: 2,837  
    Merging: 4,118  
    QuantityChange: 13,995  
    Separating: 2,004  
Motion: 26,524  
Translocation: 19,772  
    Arriving: 2,887  
    Distribution: 741  
    Leaving: 4,581  
    Escaping: 933  
Placing: 15,349  
    Installing: 257  
Removing: 13,356  
Transportation: 14,896

E._H._Carr		Geraint_Jones		Silvio_Berlusconi	
adopt,grow,follow	dbp:Africa	allege,say,add,appeal,plead,tell	A_lot_of_people	appear	dbp:George_Clooney
art	The_Japanese	arrive	dbp:Northern_Sotho_language	change,replace	Prime_Minister_Mario_Monti
buy	at_a_car_fair_in_Paris	become	dbp:Kamila_Skolimowska	convict,sentence,conviction	dbp:Italy
confine,control	to_any_single_country	chance	SYDNEY_Australia_-_Marion_Jones	dominate	dbp:Italy
cope,meet,group,gather,gain	for_these_terror_groups	chase,track	Brussels_Belgium	favor	for Keeping the affair under wraps
flee	dbp:Algeria	clear,pick,get,take,foot	dbp:Vyacheslav_Voronin	lawyer	dbp:Myspace
force,pressure	dbp:Brazil	compete	Walnut_Calif._Bursting	lawyer,attorney	dbp:Niccolò_Ghedini
gift	holiday_gift	compete	France_	measure,step	dbp:European_Union
give	any_legitimacy	complete,finish	dbp:Sacramento,_California	offer	her_money_and_other_favors
impose	dbp:Australia	convert	into_a_propulsive_leap	pay	for sex with an underage woman
lack	the_logic_of_violence	dream,ambition	dbp:Olympic_Games	pay,gain	Italy_.
love	all_religions_and_all_ethnic_groups	extend,performance,operation,career	dbp:Dom_people	politics,system,government	his_government
place,carry,transport,consider,take	hashish	fall,set,decision,lose	her_sights	power,office,force	to_the_regions
prevent	dbp:Iran	fight	dbp:Muhammad_Ali	relation,traffic	The_75-year-old
project,venture,business,see	dbp:Fiber_to_the_x	fight	on_her_hands	return	for Keeping the affair under wraps
resistance,drag	large_armies	finish	dbp:Leslie_Knope	trial	Italy_Turnabout
supply	of_fuel	fire	Main's_right_post	trial	Berlusconi's_trial_for_underage_prostitution

# SEMANTIC QUERIES

Events



Entities



eso:Destroying  
2,859

eso:Motion  
26,524

dbp:Drug  
25

dbp:Person  
7999

eso:Killing  
2,859

eso:Translocation  
19,772

hashish

murder

dbp:MilitaryPerson  
126

dbp:E.\_H.\_Carr



1995 96 97 98 99 2000



2002 03

2005 06 07 08 09 2010 11



→

# eso:Escaping

Event	Participant	Mention
escape	A0:nwr:the_plucky_heroine	nwr:55WV-G8K1-JDPF-N2T4.xml#char=363,370; nwr:55WV-G8K1-JDPF-N2T3.xml#char=363,370
escape	A0:nwr:The_robbery	nwr:58CX-9881-F072-450H.xml#char=804,810; nwr:58CX-6G41-DXDT-6228.xml#char=804,810
escape	A0:dbp:robbery	nwr:57HF-R4P1-JBSM-84PK.xml#char=3212,3219
escape	A0:nwr:DRUG	nwr:4S22-BBR0-TX4X-W093.xml#char=848,854; nwr:40V2-TX80-007C-60SX.xml#char=62,70; nwr:40V2-TX80-007C-60SX.xml#char=811,817; nwr:4S22-BBR0-TX4X-W093.xml#char=104,112
flee	A0:nwr:Drug_trafficker_John_Traynor_and_Veroncia_Geurin	nwr:40YH-HX10-0017-F01F.xml#char=304,308; nwr:40YH-HX10-0017-F01N.xml#char=289,293; nwr:4S22-BG60-TX4X-W0DH.xml#char=300,304; nwr:4S22-BG60-TX4X-W0DR.xml#char=285,289
flee	A0:nwr:the_drug_traffickers	nwr:57RT-PXV1-F03R-N215.xml#char=2780,2784
flee	A0:nwr:the_drug_traffickers	nwr:57RM-NJ11-JB1X-W1SG.xml#char=2682,2686
flee	A0:dbp:Thief	nwr:59R2-2K71-JBVM-Y472.xml#char=1554,1558
refugee	A1:nwr:for_drug_smugglers_and_Afghan_refugees	nwr:441W-7SR0-00SH-B287.xml#char=1458,1466

eso:Stealing instances mentions

Event	Participant	Mention
steal	A1:nwr:of_a_stolen_vehicle	nwr:3YN0-N530-009F-S162.xml#char=2512,2518; nwr:3YN0-MFK0-009F-R0M7.xml#char=2512,2518
steal	A2:nwr:from_banks_around_the_globe	nwr:58HT-9781-JD6S-R2PH.xml#char=2732,2740; nwr:58HR-XF21-JBSS-S0B6.xml#char=2737,2745; nwr:58HR-XDW1-JBPX-W01T.xml#char=2714,2722
steal	A1:nwr:all_the_money_and_the_cocaine	nwr:59N9-NTB1-JD6S-R3NP.xml#char=3323,3328; nwr:593V-JRX1-DY2D-K1YD.xml#char=3306,3311
theft	A1:nwr:motor_vehicle	nwr:457T-8NB0-01BN-X180.xml#char=5739,5744
steal	A1:nwr:to_report_the_vehicle_as_stolen	nwr:5BBR-VV71-JD6S-R54C.xml#char=2608,2614
steal	A1:nwr:one's_money	nwr:57M0-F5F1-JDKC-R2NN.xml#char=3788,3793; nwr:57M0-F5F1-JDKC-R2NN.xml#char=2531,2539
theft	A1:nwr:vehicle_theft	nwr:5573-TC91-JCW9-X2Y0.xml#char=2018,2023
lift	A1:nwr:drug_patent	nwr:4KXN-BS20-TXJ2-N2N7.xml#char=1668,1672
lift	A1:nwr:the_drugs	nwr:57DP-G321-JC60-C4CG.xml#char=1962,1968
steal	A1:nwr:stolen_cars,_arms_and_drugs	nwr:57HV-DXV1-DXY4-X18G.xml#char=4902,4908
steal	A1:nwr:all_the_money	nwr:54DM-9KP1-F0YS-04MK.xml#char=206,212
seize,snatch,capture	A1:nwr:their_own_cash	nwr:44HX-DNC0-00GG-M0H0.xml#char=3847,3855; nwr:44HX-DNC0-00GG-M0H0.xml#char=1601,1607; nwr:44HX-DNC0-00GG-M0H0.xml#char=1641,1647; nwr:44HX-DNC0-00GG-M0H0.xml#char=680,688; nwr:44HX-DNC0-00GG-M0H0.xml#char=1208,1213

# Analyses

- Welke entiteiten spelen een rol: soorten, aantallen van mentions, trends in de tijd en regio's?
- Welke gebeurtenissen vinden plaats: soorten en aantallen, trends in de tijd en regio's?
- Welke veranderingen zijn van toepassing op een persoon, regio, organisatie, in de tijd?
- Welke relaties tussen entiteiten en gebeurtenissen: op niveau van individuele personen of categorieën van personen, op het niveau van soorten gebeurtenissen?
- Welke sociale netwerken zijn er te zien, afgezet tegen de tijd, regio's en op grond van welke gebeurtenissen (zelfde document, gebeurtenis)

# Key assets

- Instance versus mention
- Event versus document
- Deduplication across mentions
- Aggregation from different mentions
- Semantic querying over types, time and places
- Adaptation to your own ontologies for events, entities, non-entities