

Are Analytics Needed in the Fight Against Health Care Fraud?

Andrew Pease, Analytics Solutions Manager

Today's Agenda

- 09:20 Analytic Solutions
- 09:40 Analytics in Action: Demo
- 09:55 Conclusions

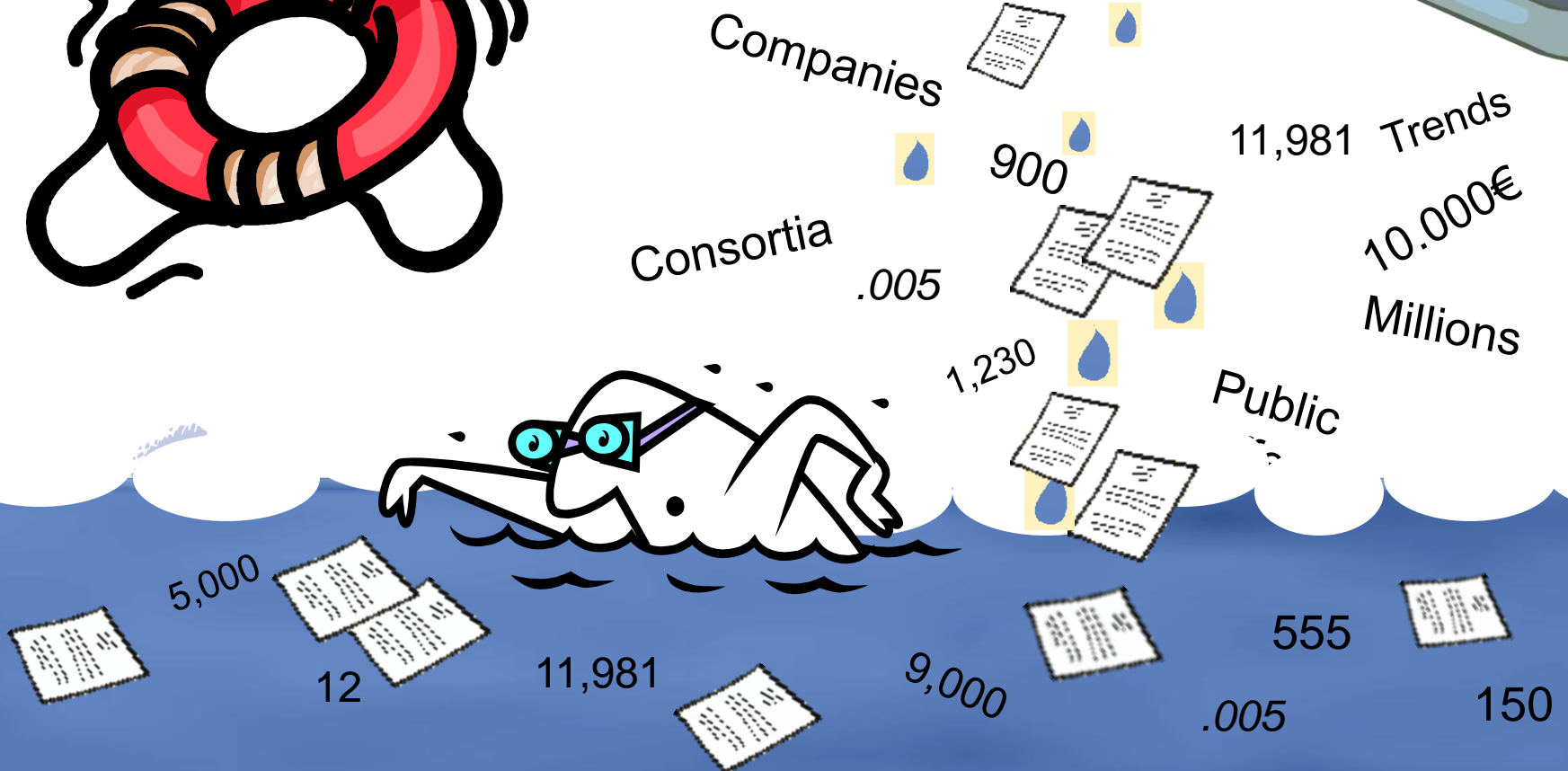
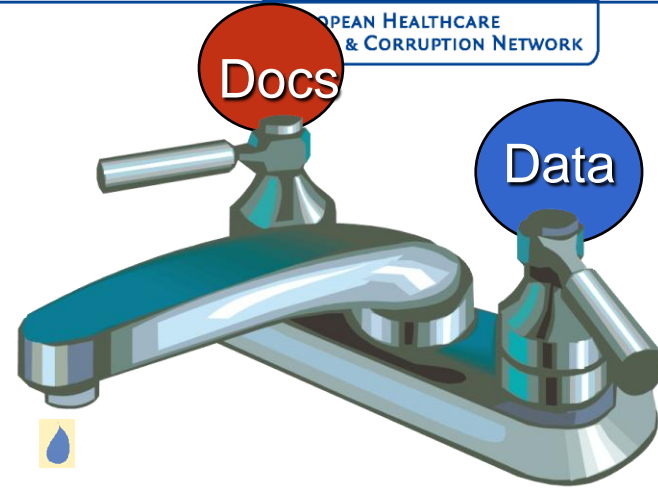


Information Overload???





Drowning in Signals...



Fraud Detection and Prevention Strategy

- Creation of an ***anti-fraud culture***
- Maximum ***deterrence*** of fraud
- Successful ***deterrence*** of fraud which cannot be deterred
- Prompt ***detection*** of fraud which cannot be prevented
- Professional ***investigation*** of detected fraud
- Effective ***sanctions***, including appropriate legal action against people committing fraud
- Effective methods of seeking ***redress*** in respect of money defrauded

Information Technology



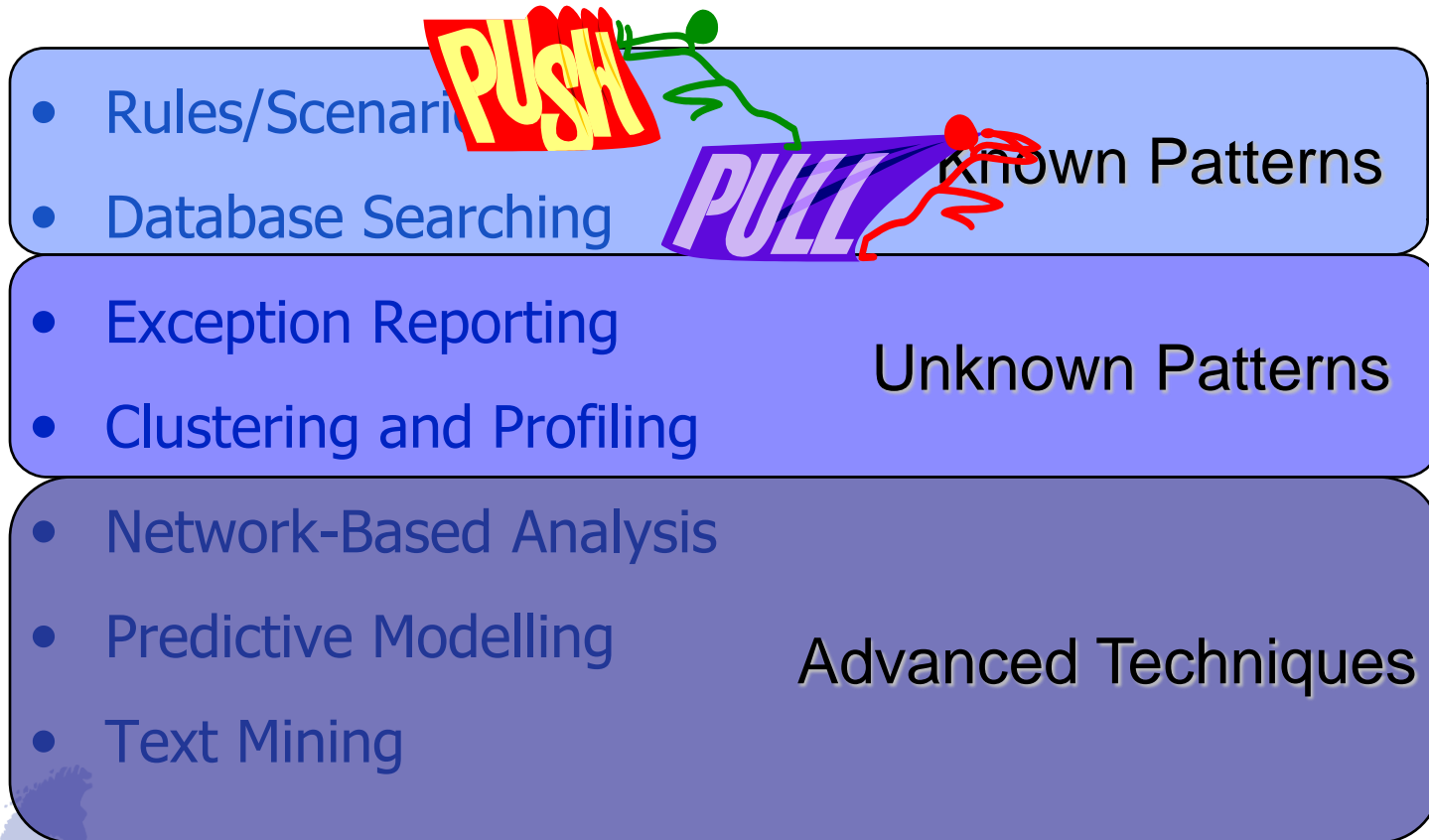
What are 'Fraud Analytics'?

*the iterative **process** of intelligently filtering large amounts of disparate, yet relevant data to uncover previously unknown patterns for **highly focused investigation***



	dob	custdate	gender	emp_cd	mrt_cd	rsd_cd	cidPerSid	forename	
1	29MAY19	22AUG90	F	0	1	1	41538	Norah	Kell
2	05JUN25	26JUN90	M	3	3	3	82711	Sidney	Dea
3	25NOV22	12APR92	F	0	2	3	109364	Jessie	Pipe
4	05DEC32	30JUN92	M	3	1	1	136827	Walter	Wri
5	29JUN69	30OCT96	M	0	0	0	154555	Yazid	Ben
6	17MAY28	03JUL93	F	3	2	3	167414	Edna	Far
7	12NOV19	11JUN91	F	0	2	4	199509	Mary	Rus
8	04JUN23	16MAR93	M	0	2	1	222401	Edward	Lyc
9	28OCT22	14DEC89	F	0	2	1	241758	Marjorie	Pric
10	31JUL64	19MAY87	M	1	2	2	266314	Martin	Dev
11	14MAY46	25JUL94	F	0	3	3	299570	Margaret	Phil
12	29JUL22	26NOV92	F	0	1	3	322437	Doris	Tom
13	09MAR77	06AUG87	F	1	1	3	346194	Karen	Per
14	22APR65	01JAN88	F	0	0	0	391369	Jayne	Sta
15	07FEB21	13FEB93	F	3	3	1	425168	Edith	Dav
16	09FEB21	21DEC87	F	3	3	1	456495	Vera	Bro
17	07APR70	08AUG86	F	2	1	3	500181	Amanda	Har
18	06SEP57	02MAR97	F	1	2	2	535316	Christine	Gre
19	12MAR21	05MAR92	F	0	2	1	559511	ELIZABETH	BA
20	28DEC22	21DEC88	M	3	1	1	585806	Grenville	Spe
21	16FEB27	06MAY92	M	3	1	1	600203	Bertram	Hall
22	01MAY62	03MAY88	M	1	9	2	626508	Mark	O'C
23	10JUL40	10NOV91	F	0	2	1	646415	Alma	Rob
24	08NOV34	01NOV82	F	3	2	1	686414	Betty	Will
25	02MAR45	01JAN79	M	3	2	1	706918	Michael	Ral
26	21MAY28	02JUN87	F	0	1	1	746223	Mary	Cle
27	06OCT32	01MAY90	F	0	2	1	775128	Patricia	Will
28	15JUL58	07MAY86	M	1	2	4	790571	John	Gin

Intelligent Data Filters



Rules-Based Approach

- IF-THEN logic
- Centralise 80% of Field Best Practices
- Investigation Framework



SAS Risk-Profiling Interface

Dan Thompson

Sign Out | Help



Alerts Query Reports

My Alerts Available Alerts Create Alert

Actions

Rows 1 - 10 of 29 with 10 rows per page

First Previous Next Last

		Alert ID	Category	Subject	Name	Date	Risk	Scenario	Description	Triggering Values (USD)	Availability
<input type="checkbox"/>		707	Textile Imports	Account: 1111111100233675	JENNIFER L STGERMAIN	13-sep-2005	735	FODFin_000002	Large Chinese Curtains Shipment	Over 100 kg of curtains from China. Please manually inspect contents.	*****
<input type="checkbox"/>		695	Textile Imports	Account: 1111111100233675	JENNIFER L STGERMAIN	13-sep-2005	735	FODFin1_000001	China Quota Avoidance 1	Over 3000 - in textiles originating and sent from Morroco. Please reconfirm origin.	*****
<input type="checkbox"/>		697	Textile Imports	Account: 1111111100233675	JENNIFER L STGERMAIN	13-sep-2005	735	FODFin1_000001	China Quota Avoidance 1	Over 3000 - in textiles originating and sent from Morroco. Please reconfirm origin.	*****
<input type="checkbox"/>		377	Textile Imports	Account: 1111111102380277	IDA S FIELDS	13-sep-2005	714	FODFin_000002	Large Chinese Curtains Shipment	Over 100 kg of curtains from China. Please manually inspect contents.	*****
<input type="checkbox"/>		371	Textile Imports	Account: 1111111102380277	IDA S FIELDS	13-sep-2005	714	FODFin_000002	Large Chinese Curtains Shipment	Over 100 kg of curtains from China. Please manually inspect contents.	*****
<input type="checkbox"/>		379	Textile Imports	Account: 1111111102380277	IDA S FIELDS	13-sep-2005	714	FODFin_000002	Large Chinese Curtains Shipment	Over 100 kg of curtains from China. Please manually inspect contents.	*****
<input type="checkbox"/>		385	Textile Imports	Account: 1111111102380277	IDA S FIELDS	13-sep-2005	714	FODFin_000002	Large Chinese Curtains Shipment	Over 100 kg of curtains from China. Please manually inspect contents.	*****

The Limitations of Rules...

- Tend to be predictable
- Can be learned / disclosed
- Become less effective over time as a result
- Create large number of false positives



Holistic Fraud Detection

Differentiating Between Monitoring Approaches

Issues

- Detect known and unknown patterns of fraudulent behavior
- Keep track with new patterns

Not exactly knowing what to look for

Rules

Set up rules to filter suspicious transactions

Examples:
 Refund > 20.000
 AND
 Income < 30.000

Suitable for **known** patterns

Profiling

Build statistical Profiles of Entities and interactions

Examples:
 Mean, standard deviation, quartiles, distributions

Suitable for **unknown** patterns

Advanced Analytics

Knowledge discovery In databases and machine learning

Examples:
 Neural networks
 Fuzzy logic
 Genetic algorithms

Suitable for **complex** patterns

Hybrid

Combination of all existing approaches

Examples:
 Genetic algorithm and Statistics plus Neural network






Tree

UNITED KINGDOM	0.0%
SVERIGE:	0.0%
SUOMI/FINLAND:	0.0%
PORTUGAL:	34.8%
OSTERREICH:	0.0%
NEDERLAND:	0.0%
LUXEMBOURG:	0.0%
ITALIA:	0.0%
IRELAND:	0.0%
FRANCE:	0.0%
ESPAÑA:	34.8%
ELLÁDA:	30.4%
DEUTSCHLAND:	0.0%
DANMARK:	0.0%
BELGI (QU) E:	0.0%
N in Node:	23

BELGI (QU) E: 7.1%
N in Node: 113

SE380_interest_paid_c_u_

< 11009

>= 11009

BELGI (QU) E: 8.3%
N in Node: 96

DANMARK: 47.1%
N in Node: 17

SE485_Total_liabilities_c_u_

< 33581.5

>= 33581.5

ESPAÑA: 22.9%
N in Node: 35

BELGI (QU) E: 13.1%
N in Node: 61

SE441_Total_fixed_assets_c_u_

SE405_Balance_subs_taxes_on_inv

< 208563

>= 208563

< 302

>= 302

ESPAÑA: 34.8%
N in Node: 23

ITALIA: 66.7%
N in Node: 12

DEUTSCHLAND: 18.2%
N in Node: 44

FRANCE: 47.1%
N in Node: 17

SE420_Family_Farm_Income_c_u_

< 43083

>= 43083

DEUTSCHLAND: 21.1%
N in Node: 38

BELGI (QU) E: 100.0%
N in Node: 6

Today's Agenda

- 09:20 Analytic Solutions
- 09:40 Analytics in Action: Demo
- 09:55 Conclusions



In Practice: Text Mining at OLAF

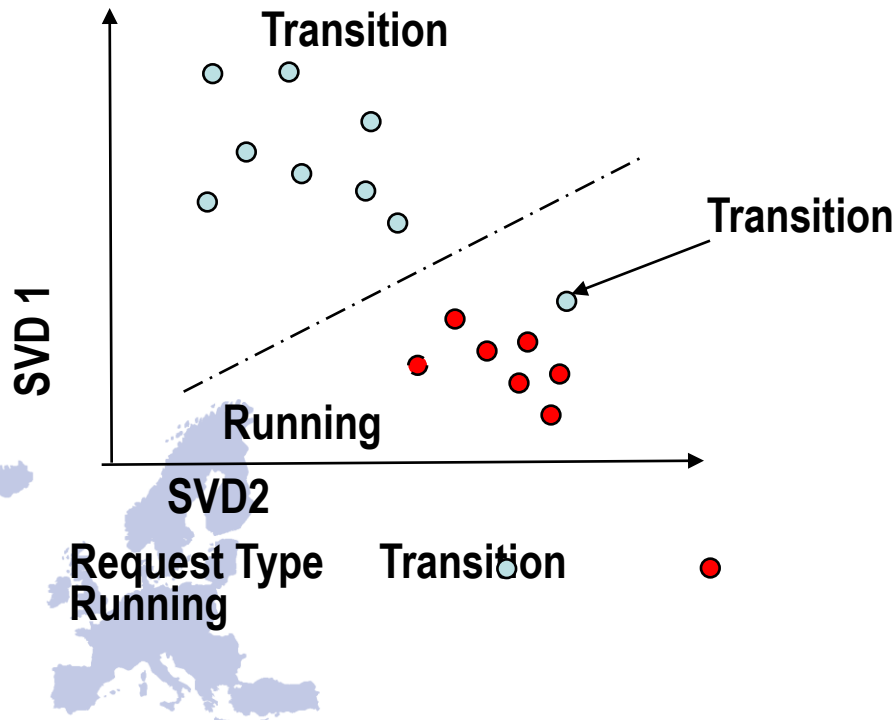
Term by Document Matrix

	T1	T2	T3	T4
D1	10	0	6	0
D2	0	4	0	0
D3	34	2	1	2
D4	0	0	3	0

SVD

Document by SVD element Matrix

	Sv1	Sv2	Sv3	Sv4
En1	.8	0	.2	0
En2	.5	.6	0	0
En3	.02	.05	.56	.01
En4	0	0	.3	0



Transition/Running Subsidy Inconsistencies

Obs	case_id	ms	amount_affected_in_
1	126420	DE	€71.515,00
2	(20903)	FR	€71.442,18
3	43238	BE	€71.268,82
4	21864	DE	€71.207,11
5	119525	BE	€71.207,00
6	(19320)	FR	€71.196,44
7	(96267)	IT	€71.030,02
8	98906	IT	€71.030,00
9	(19406)	GB	€70.849,26
10	(99506)	FR	€70.807,00

In Practice...Atos Worldline



The screenshot shows the L'Echo website interface. At the top left, there are navigation tabs: 'L'Echo', 'argent', 'sabato', 'investisseur', 'références', and 'Se connecter'. The main header features the 'L'Echo' logo and a list of news items: '15:27 Le private equity belge garde la...', '15:06 Fraude: 45.000 cartes de crédit...', and '15:00 Une fuite d'hydrogène force le r...'. To the right, a financial market summary table displays:

Bel-20	▼ -1,12%	€Stoxx50	▼ -1,27%
Dow Jones	= 0,00%	Nasdaq	= 0,00%
Gold	▲ 0,11%	EUR/USD	▲ 1,3880

 Below the header, there are navigation links for 'Le journal', 'Archives', 'Lecho.tv', 'T-zine', 'Finipedia', 'Blogs', 'Graphiques', 'Services e-mail', 'Alertes SMS', 'Mobile', and 'RSS'. A secondary navigation bar includes 'Home', 'Actualité', 'Mon portefeuille', 'Cours', 'Fonds', and 'Entreprendre'. A search bar with a 'Rechercher' button is present. Below the search bar, there are dropdown menus for 'Rechercher' (Articles) and 'Source' (Tout), and a 'Mot-clé' input field with an 'OK' button. On the right side, there are promotional banners for 'Abonnez-vous' and 'Privilège Class'.

Fraude: 45.000 cartes de crédit bloquées en Belgique

Une vaste fraude à la carte de crédit en Belgique a été signalée par les systèmes de détection d'Atos Wordline. Quelque 45.000 cartes de crédit sont susceptibles d'être concernées et ont donc été bloquées à titre préventif. Des banques ont porté plainte auprès du parquet, nous a précisé Febelfin, la fédération belge du secteur financier.




BNP PARIBAS FORTIS
La banque et l'assurance d'un monde qui change

1 milliard d'euros!

Pour les entreprises, les indépendants, et les professions libérales.

EN SAVOIR PLUS

Crédit aux entreprises

Difficulté à convaincre votre banquier ?



CardStop, ...

Today's Agenda

- 09:20 Analytic Solutions
- 09:40 Analytics in Action: Demo
- 09:55 Conclusions



Goal: First Call for Difficult Challenges

