

**Patent mining :**  
*Les brevets comme source de veille technologique*

*Nicolas van Zeebroeck*  
Questions Actuelles d'Informatique  
ULB, 27/4/2010

**Patent mining**

- Condensé d'économie de la connaissance
  - Les rôles du brevet dans l'entreprise
- Veille concurrentielle et technologique
- Bases de données de brevets
- Outils et techniques
- Que peut-on en apprendre?

## Patent mining

Condensé d'économie de la connaissance

## Economie de la connaissance: un aperçu

- Connaissance = ?



## Economie de la connaissance: un aperçu

- Les multiples facettes de la connaissance
  - Information that is useful and exploitable in a given context
  - An object and a meaning (Spender and Marr, 2005)
  - The intangible part of a firm's assets
  - Explicit (codified) v. tacit (Polanyi, 1966)
  - Technical v. organizational
  - Observable (e.g. products) v. non observable (e.g. processes) (Teece, 2005)
  - Positive (of success) v. negative (of failure) (Teece, 2005)
  - Replicability, imitability, appropriability, observability (e.g. products v. processes)
  - Positivist, interpretive, organic (Marr and Spender, 2004)
  - Mentally stored knowledge in the minds of employees v. policies, routines, documents, identity, culture, and systems (Alavi and Leidner, 2001)

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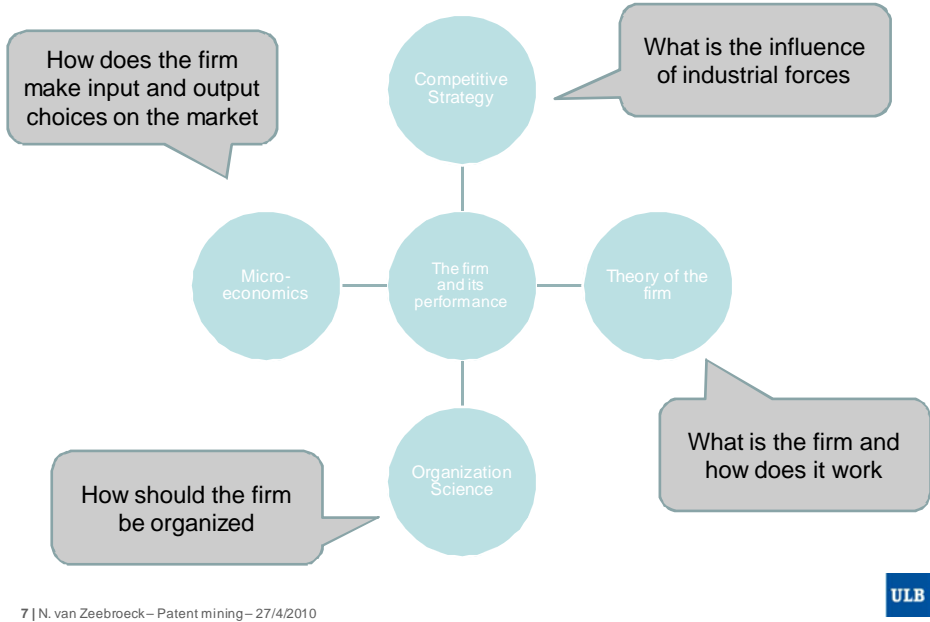
## Economie de la connaissance: un aperçu

- Celle qui nous intéresse ici: la connaissance technologique
  - Ensemble des
    - processus de fabrications
    - produits (intermédiaires ou finis)
    - applications ou usages (des produits)
  - mis en oeuvre ou fournis par l'entreprise
  - C'est à dire, grossièrement, les inventions

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## Economie de la connaissance: un aperçu



## Economie de la connaissance: un aperçu

- La théorie de la firme
  - Expliquer les sources d'avantages concurrentiels
  - Plusieurs vues de l'entreprise
    - The behavioral view (Cyert & March, 1963)
    - The evolutionary view (Nelson & Winter, 1982)
    - The resource-based view (Wernerfelt, 1984; Barney, 1991, 2001)
      - Firm performance depends on exploitation of exclusive assets
      - Long-term advantage can be maintained by protecting the organization against resource imitation, loss, transfer, or substitution
    - **The knowledge-based view** (Grant, 1996; Spender, 1996)

## Economie de la connaissance: un aperçu

- Knowledge-based view
  - Knowledge is the most important asset
  - Sustainability requires resources idiosyncratic (hence scarce) and difficult to transfer or replicate (Grant, 1991)
  - Firms are institutions that integrate individual (specialized) knowledge (Grant, 1996)
  - Structure and systems of the firm = isolating mechanisms to protect knowledge-based rents (Liebeskind, 1996)
  - Long-term competitive advantage can be obtained by collecting and sharing expert or innovative knowledge (Argote and Ingram, 2000; Lee and Choi, 2003)
  - **Sustainable competitive advantage flows from the creation, ownership, protection and use of difficult to imitate knowledge assets, which need to be usable and transferable within the firm, but difficult for outsiders to access or recreate** (Teece, 2000)
  - The importance of knowledge assets to competitive advantage is determined by firm structures and industrial contexts (Teece, 2000)

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## Economie de la connaissance: un aperçu

- Le dilemme de la gestion de la connaissance
  - Maximiser sa diffusion, sa persistance et son exploitation internes
  - Minimiser sa fuite et son exploitation externes
  - L'objectif de la gestion de la connaissance est donc
    - De faciliter les flux entrants et internes
    - De maximiser la préservation (donc le partage et/ou la formalisation)
      - Comment la rendre résistante au départ des employés qui la détiennent?
    - De limiter au maximum les flux sortants et externes
  - La principale difficulté:
    - Maximiser la diffusion/formalisation interne
      - augmenter le risque de fuite externe

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## Economie de la connaissance: un aperçu

- Information is non-excludable
  - Impossible to exclude a user, even if the latter did not contribute to its 'funding'
  - A publisher cannot prevent you from sharing books, music
  - Journalists use the ideas of other journalists
  - Lack of motivation to create information: collective loss!!
- Information is non-rival
  - Using it does not preclude others to use it
  - Watching a football match on TV does not preclude others to watch it
  - Reverse of congestion: going to the football match...
  - The additional cost of an additional consumer is ZERO

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## Economie de la connaissance: un aperçu

- Non-exclusion et non-rivalité: un défi économique
  - Entraînent qu'une fois réalisée, une invention se diffuse
  - Peut-être exploitée par des tiers qui n'ont pas eu à encourir les coûts de développement
  - Désavantage majeur pour l'inventeur qui se trouve pénalisé
  - → Recherche risque de toujours profiter aux autres

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## Economie de la connaissance: un aperçu

- Social welfare?
  - L'intérêt du 'social planner' est double, et contradictoire
    - Que les inventions (bénéfiques aux consommateurs) soient réalisées
    - Que les produits soient vendus aux prix les plus bas possible

## Economie de la connaissance: un aperçu

- Solution? De manière séquentielle
  1. Monopole temporaire, garanti par l'Etat, pour l'inventeur
  2. Description détaillée de l'invention pour qu'elle puisse se diffuser
  3. A l'expiration du monopole: concurrence joue à plein régime (exemple: les médicaments génériques)

= BREVET

## Economie de la connaissance: un aperçu

- Qu'est-ce qu'un brevet?
  - Un document légal
  - Qui confère un droit exclusif temporaire (20 ans max.)
    - C'ad le droit d'exclure, pas celui d'utiliser
  - Sur une invention technique nouvelle
    - C'ad non-évidente pour une personne compétente dans le domaine
    - C'ad jamais publiée ou diffusée avant le dépôt de la demande de brevet
  - Susceptible d'une application industrielle
  - Décrite de manière suffisamment détaillée
    - Pour permettre à une personne compétente dans le domaine de la reproduire
  - C'est donc
    - Un moyen légal d'appropriation et de protection de la connaissance
    - En échange de la divulgation complète de son invention

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## Economie de la connaissance: un aperçu

### Avantages du brevet

- Exclusivity enables investment and higher returns on investment
- Strong, enforceable legal right
- Makes invention tradable (licensing)

### Disadvantages

- Reveals invention to competitors (after 18 months)
- Can be expensive
- Patent enforceable only after grant (this can take 4-5 years)

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Source: EPO Patent Teaching Kit (2010)



## Economie de la connaissance: un aperçu

### Alternatives to patenting

#### Information disclosure (defensive publishing)

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Cheap</li> <li>• Prevents others from patenting the same invention</li> </ul> | <ul style="list-style-type: none"> <li>• Does not offer exclusivity</li> <li>• Reveals the invention to competitors</li> </ul> |
|--|--|

#### Secrecy (creating a trade secret)

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>• Cheap (but there is the cost of maintaining secrecy)</li> <li>• Does not reveal the invention</li> </ul> | <ul style="list-style-type: none"> <li>• No protection against reverse-engineering/duplication of invention</li> <li>• Difficult to enforce</li> <li>• "Secrets" often leak quite fast</li> </ul> |
|---|---|

#### Do nothing

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• No effort required</li> </ul> | <ul style="list-style-type: none"> <li>• Does not offer exclusivity</li> <li>• Competitors will often learn details</li> </ul> |
|--|--|

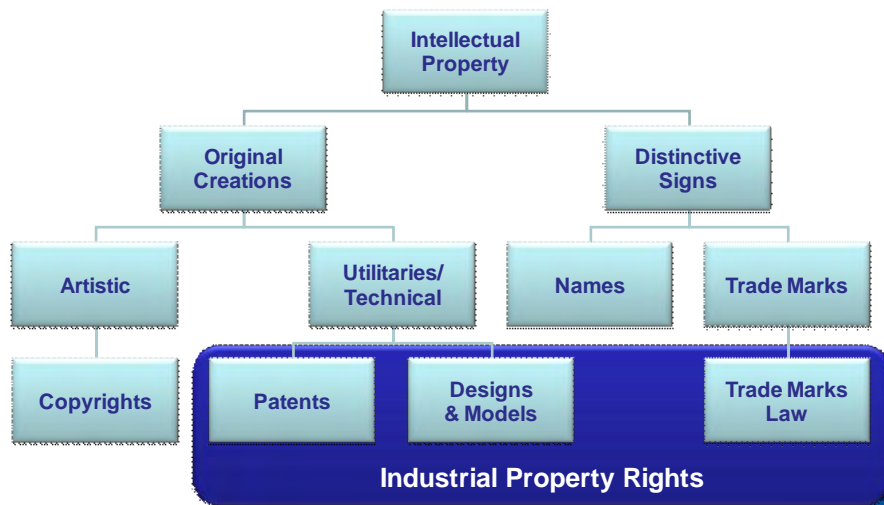
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Source: EPO Patent Teaching Kit (2010)

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## Economie de la connaissance: un aperçu

Secrecy

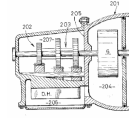


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## Economie de la connaissance: un aperçu

Legal right	What for?	How?
Patents	New inventions	Application and examination
Copyright	Original creative or artistic forms	Exists automatically
Trade marks	Distinctive identification of products or services	Use and/or registration
Registered designs	External appearance	Registration
Trade secrets	Valuable information not known to the public	Reasonable efforts to keep secret



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Source: EPO Patent Teaching Kit (2010)



## Economie de la connaissance: un aperçu

### Trade marks:

- Made by "Nokia"
- Product "N95"
- Software "Symbian", "Java"

### Patents:

- Data-processing methods
- Semiconductor circuits
- Chemical compounds
- ...

### Copyrights:

- Software code
- Instruction manual
- Ringtone
- ...



© Nokia

### Trade secrets:

?

### Designs (some of them registered):

- Form of overall phone
- Arrangement of buttons in oval shape
- Three-dimensional wave form of buttons
- ...

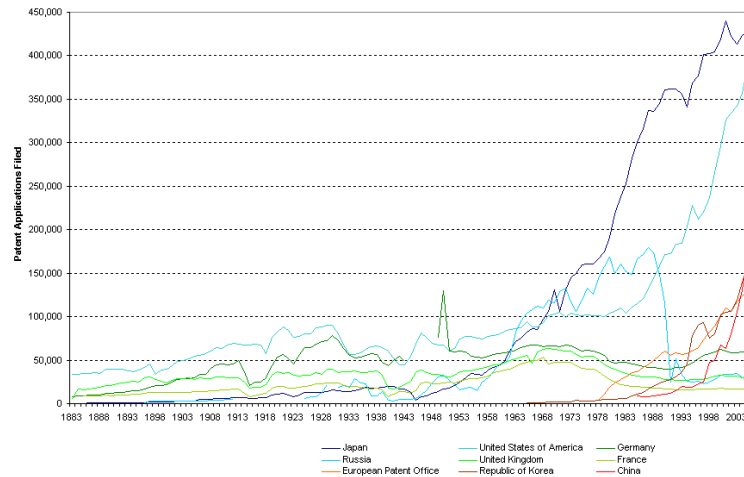
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Source: EPO Patent Teaching Kit (2010)



## Economie de la connaissance: un aperçu

- Economie de la connaissance → Popularité du brevet



Source: WIPO Statistics Database

### Filing rates at selected patent offices

Source: EPO Patent Teaching Kit (2010)



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## Economie de la connaissance: un aperçu

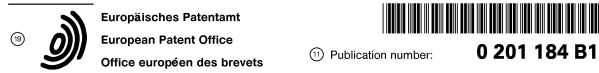
- Que contient un brevet?
  - Bibliographic information
    - Inventor, proprietor, date of filing, technology class, title, etc.
  - Abstract
    - Around 150 words as a search aid for other patent applications
  - Description
    - Summary of prior art (i.e. the technology known to exist)
    - The problem that the invention is supposed to solve
    - An explanation and at least one way of carrying out the invention
  - Claims
    - Define the extent of patent protection
  - Drawings
    - Illustrate the claims and description

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Source: EPO Patent Teaching Kit (2010)



## Economie de la connaissance: un aperçu



### EUROPEAN PATENT SPECIFICATION

Date of publication of patent specification: 16.12.92 Int. Cl.<sup>5</sup> C12P 19/34, C12N 15/10, //C12Q1/68, C07H21/00

Application number: 86302299.2

Date of filing: 27.03.86

Divisional application 92201226.5 filed on 27/03/86.

Process for amplifying nucleic acid sequences.

Priority: 28.03.85 US 716975  
25.10.85 US 791308

Date of publication of application: 17.12.86 Bulletin 86/46

Publication of the grant of the patent: 16.12.92 Bulletin 92/51

Proprietor: F. HOFFMANN-LA ROCHE AG  
Postfach 3255  
CH-4002 Basel(CH)

Inventor: Mullis, Kary Banks  
447 Beloit Avenue  
Kensington California 94708(US)

## Economie de la connaissance: un aperçu

- En bref...
  - Connaissance devient principale source d'avantage concurrentiel
  - Nécessité impérieuse de la protéger / approprier
  - Instrument légal privilégié pour ce faire: le brevet
    - Droit exclusif (monopole) sur une invention
    - En échange de sa divulgation (description) complète et publique
  - Devient de plus en plus populaire
    - Environ 200.000 brevets déposés chaque année à l'OEB (sans compter les centaines de milliers aux USA, JP ou... en Chine)
  - Constitue dès lors à la fois
    - Un mécanisme de protection
    - Une source d'information inépuisable

## Patent mining

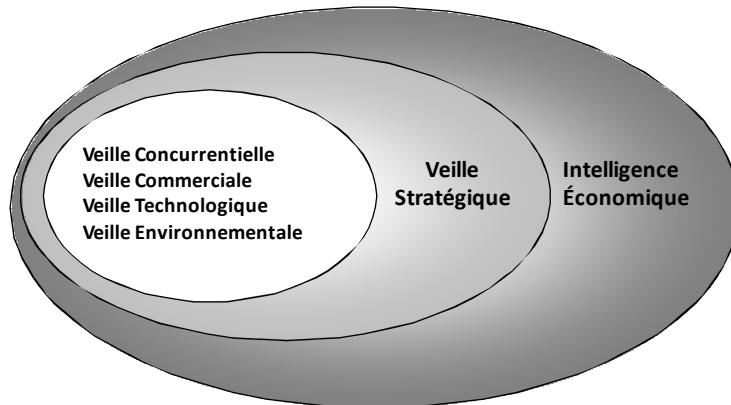
Veille concurrentielle et technologique  
(Business intelligence)

## Veille concurrentielle et technologique

- En quoi consiste la gestion de brevets?
  - Patent strategy
    - Offensive/defensive
    - Internationalisation
    - Kind of exploitation: licensing or own use
  - **Patent information**
    - Keep abreast of technology
    - Avoid infringing patents
    - Understand the competitive landscape
  - Communication
    - Compile convincing evidence that your patents are valuable
    - Inform investors and banks, clients and prospective employees
  - Maintenance
    - Pay renewal fees, observe deadlines
    - Strengthen important patents and get rid of ones with no value

} Veille technologique  
et concurrentielle

## Veille concurrentielle et technologique



Les entreprises qui réussissent le mieux dans le lancement de nouveaux produits montrent une grande corrélation entre «stratégie innovantes» et fréquence d'application de la veille stratégique. (Ahituv, Zif, Machlin ;1998)

## Veille concurrentielle et technologique

### • Veille concurrentielle

**Quoi:** les concurrents et leur(s)

- Stratégie
- Politique tarifaire
- **Nouveaux produits ou services**
- Résultats financiers
- Recrutements
- Clients, nouveaux contrats
- Communiqués ou articles de presse
- Accords, partenariats, rachats,...

**Comment:**

- Internet, site web
- Rapports d'activité
- Bilans d'entreprises
- Documentation commerciale
- Achats de produits
- Revues, Magazines
- **Brevets**

**Pourquoi:**

- Identifier les concurrents les plus menaçants
- Identifier l'apparition de nouveaux concurrents
- Ajuster son argumentation commerciale
- Mettre en place des stratégies commerciales plus efficaces

## Veille concurrentielle et technologique

- Veille technologique

**Quoi:** l'environnement technologique

- Les dépôts de brevets
- L'évolution des normes
- L'évolution des technologies
- Les procédés de fabrication
- La recherche fondamentale

**Comment:**

- Banques de données [brevets](#)
- Littérature scientifique
- Thèses
- Organes de normalisations
- Rapports scientifiques

**Pourquoi:**

- Détecter les technologies de substitution
- Détecter des niches technologiques
- Surveiller l'activité innovante des concurrents
- Valoriser la R&D (brevets)
- Orienter la R&D
- Orienter la recherche de partenaires technologiques

## Veille concurrentielle et technologique

- Pourquoi s'intéresser aux brevets?

- Pour ne pas réinventer la roue
  - 25% de la R&D gaspillée pour réinventer des inventions existantes
- Pour découvrir les technologies des concurrents ou émergentes
  - 80% de la technologie publiée dans les brevets ne l'est nulle part ailleurs
  - Et elle est libre de droits dans 90% des cas (brevets refusés ou périmés)
- Pour évaluer sa liberté d'entreprendre (freedom to operate)
  - N'êtes-vous pas en train d'enfreindre le brevet d'un autre?
- Pour découvrir vos concurrents (et contrevenants) potentiels
  - Qui dépose des brevets dans le même domaine que vous?

## Veille concurrentielle et technologique

**GB-A-2365393**

UK Patent Application GB 2365393 A

151 Inventor: J. A. FAUCONIER ET AL  
152 Applicant: J. A. FAUCONIER ET AL

153 Date of Filing: 07/11/1999

154 Abstract: A method of landing an aircraft...

**US-A-1833019**

Nov. 24, 1931

J. A. FAUCONIER ET AL  
AUGUST 1928  
Filed Nov. 1, 1929

Source: EPO Patent Teaching Kit (2010)

## Veille concurrentielle et technologique

- Quelle information peut être intéressante?
  - Texte (titre, résumé, description, revendications)
  - Dessins / Graphiques
  - Classes technologiques (IPC/EPCL)
  - Noms des déposants (applicants (EU) / assignees (US))
  - Noms des inventeurs
  - Citations

WIPO Reformed IPC - Internet Publication - Microsoft Internet Explorer

Address: <http://www.wipo.int/classifications/ipc/pcd7/lang=en>

WIPO

IPC

Definitions Illustrations RCL Catchwords Help Options

Version: Version 8 [2006.01] Current symbol: A61K

Jump Print

A | B | C | D | E | F | G | H

Level: core  adv.

Lang: En  Fr

View mode: path  full  hierarc

Standard seq: yes  no

Display: deleted

A	SECTION A — HUMAN NECESSITIES	
B	SECTION B — PERFORMING OPERATIONS; TRANSPORTING	
C	SECTION C — CHEMISTRY; METALLURGY	
D	SECTION D — TEXTILES; PAPER	
E	SECTION E — FIXED CONSTRUCTIONS	
F	SECTION F — MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING	
G	SECTION G — PHYSICS	
H	SECTION H — ELECTRICITY	

SolvayBrusselsSchool  
of Economics and Management

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Bases de données de brevets

UNIVERSITÉ LIBRE DE BRUXELLES, UNIVERSITÉ D'EUROPE **ULB**

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## Bases de données

- Différentes bases de données existent (exemples)
  - Celles des Offices de Brevets
    - USPTO: <http://patft.uspto.gov/netahtml/PTO/search-bool.html>
    - EPO (couverture mondiale)
      - Online: <http://ep.espacenet.com/>
      - Offline: Patstat (<http://www.epo.org/patents/patent-information/raw-data/test/product-14-24.html>)
  - D'autres bases en accès public
    - Google Patents: <http://www.google.com/patents>
  - Bases de données commerciales
    - Thomson Reuters' Delphion: <http://www.delphion.com/>

## Bases de données

Meistbesuchte Seiten Aktuelle Nachrichten

espacenet - Quick Search

European Patent Office

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2. Type of search

Select whether you wish to search with simple words in the titles or abstracts (where available) or with the name of an individual or organisation:

Select what to search:  Words in the title or abstract  Persons or organisations

3. Search terms

Enter search terms (not case sensitive):

Search term(s): plastic and bicycle

SEARCH CLEAR

## Bases de données

Advanced Search

1. Database

Select patent database:

Worldwide - Full collection of published patent applications from 80+ countries

2. Search terms

Enter keywords in English - Hit enter expands the field you are in

Keyword(s) in title: plastic and bicycle

Keyword(s) in title or abstract: hair

Publication number: WO2008014520

Application number: DE19971031496

Priority number: WO1995051925

Publication date: yyyy/mm/dd

Applicant(s): Institut Pasteur

Inventor(s): Smith

European Classification (ECLA): F03G7/10

International Patent Classification (IPC): H03M1/12

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## Bases de données

Google patents solvay

Patents 1 - 10 on solvay. (0.06 seconds)

List view

High efficiency production of chlorine dioxide by solvay process

US Pat. 4001520 - Filed Feb 22, 1977 - ERCO Industries Limited

28, [54] HIGH EFFICIENCY PRODUCTION OF [58] Field of Search 423/478, 479, 520, 551, CHLORINE DIOXIDE BY SOLVAY 423/5 PROCESS [56] References Cited [75] ...

Sort by relevance

Sort by date (new first)

Sort by date (old first)

Any status

Multi-layered polymer structure for medical products

US Pat. 5293019 - Filed Nov 16, 1993 - Baxter International Inc.

4 Skin 0.5 mil - 100% Amoco PP Copolymer 25.75, 16 Yes Yes 4 -35° C. Yes B410

Regind 1.0 mil - 100% Regind Core 3.0 mils - 45% Solvay ...

LIMEKILN

US Pat. 386665 - THE SOLVAY PROCESS COMPANY

ERNEST SOLVAY, OP BRUSSELS, BELGIUM, ASSIGNOR TO THE SOLVAY PROCESS COMPANY, OF SYRACUSE, NEW YORK, LIMEKILN - SPECIFICATION forming part of Letters Patent ...

EBNEST SOLVAY

US Pat. 240196 - Filed Jun 9, 1880

To all whom it may concern: Be it known that I, ERNEST SOLVAY, of Brussels, in the Kingdom of Belgium, manufacturer, have invented new and useful Im-5 ...

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## Bases de données

- 2 types de recherche: mot-clé ou classe technologique?

### Keyword searches

- Patent applicants don't use a common language
  - Legal implications
  - Scope of protection
  - Hide from competitors
- Hard to find the right keywords
- Good results usually require professional patent search experience

### Technology class searches

- Each patent classified by patent professionals
- IPC is hierarchical and very detailed: you can gradually narrow down searches
- Descriptions of classes written in such a way as to be easily found and understood
- Little experience required
- BUT: IPC classes won't match your needs 100%

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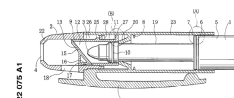
Source: EPO Patent Teaching Kit (2010)



## Patent jargon

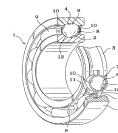
**writing instrument**

= pen



**a plurality of balls**

= ball bearing



**spherical object  
with floppy filaments  
to promote sure capture**

= toy ball



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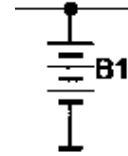
Source: EPO Patent Teaching Kit (2010)



## Patent jargon in electronics

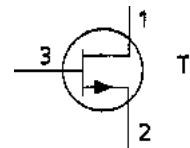
**electrical power source for electronic circuits**

= battery



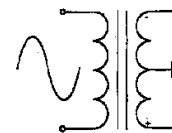
**semiconductor switching device with a control electrode**

= transistor



**galvanically isolated electrical coupling means**

= transformer



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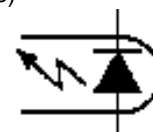
Source: EPO Patent Teaching Kit (2010)



## Patent jargon in electronics

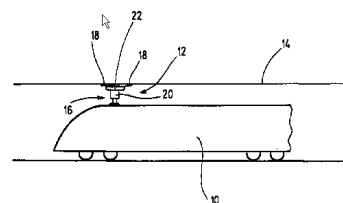
**photo-transmitting device**

= LED (light-emitting diode)



**arrangement for tapping power from an electrical cable**

= current collector



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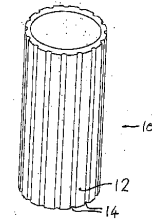
Source: EPO Patent Teaching Kit (2010)



## Patent jargon in general technology

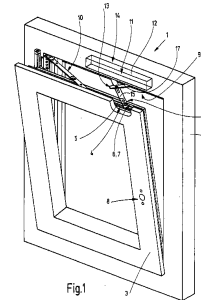
**elongate member**

= pipe, riser, cable or optical fibre



**wing**

= door or window



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Source: EPO Patent Teaching Kit (2010)



## Patent jargon in chemistry

- water- and oil-repellent surface
- water-soluble or water-dispersible polymer
- superabsorbent
- expanded styrenic (co)polymer
- polyisoprene
- ionomer
- graft copolymer of vinyl aromatic monomers on a butadiene rubber
- aromatic polyester

**Teflon®**

**polyacrylic acid (salt) or polyvinyl alcohol**

**gel of polyacrylic acid (salt)**

**polystyrene foam; Styrofoam®**

**natural rubber**

**copolymer of ethylene and salts of acrylic acid**

**ABS (the plastic of which LEGO bricks are made)**

**PET (polyethylene terephthalate)**

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## Classification search

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### Search the European classification

View Section	Find classification(s) for keywords	Find description for a symbol
Index A B C D E F G H Y	e.g. mast sail <input type="text"/> <input type="button" value="Go"/>	e.g. A23C <input type="text"/> <input type="button" value="Go"/>

Next page: A

HUMAN NECESSITIES	<input type="checkbox"/>	A
PERFORMING OPERATIONS; TRANSPORTING	<input type="checkbox"/>	B
CHEMISTRY; METALLURGY	<input type="checkbox"/>	C
TEXTILES; PAPER	<input type="checkbox"/>	D
FIXED CONSTRUCTIONS	<input type="checkbox"/>	E
MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING ENGINES OR PUMPS	<input type="checkbox"/>	F
PHYSICS	<input type="checkbox"/>	G
ELECTRICITY	<input type="checkbox"/>	H
GENERAL TAGGING OF NEW TECHNOLOGICAL DEVELOPMENTS [N0403]	<input type="checkbox"/>	Y

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## Wanted: air-conditioning technology for buses

### Search the European classification

View Section	Find classification(s) for keywords	Find description for a symbol
Index A B C D E F G H Y	(bus* or coach*) air c <input type="text"/> <input type="button" value="Go"/>	e.g. A23C <input type="text"/> <input type="button" value="Go"/>

Next page: A

HUMAN NECESSITIES	<input type="checkbox"/>	A
PERFORMING OPERATIONS; TRANSPORTING	<input type="checkbox"/>	B
CHEMISTRY; METALLURGY	<input type="checkbox"/>	C
TEXTILES; PAPER	<input type="checkbox"/>	D
FIXED CONSTRUCTIONS	<input type="checkbox"/>	E
MECHANICAL ENGINEERING; LIGHTING; HEATING; WEAPONS; BLASTING ENGINES OR PUMPS	<input type="checkbox"/>	F
PHYSICS	<input type="checkbox"/>	G
ELECTRICITY	<input type="checkbox"/>	H
GENERAL TAGGING OF NEW TECHNOLOGICAL DEVELOPMENTS [N0403]	<input type="checkbox"/>	Y

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## Detailed view of a technology class

Previous page: [B60H](#) Next page: [B60H3/00](#)

**PERFORMING OPERATIONS; TRANSPORTING** B

**VEHICLES IN GENERAL** B60

**ARRANGEMENTS OR ADAPTATIONS OF HEATING, COOLING, VENTILATING, OR OTHER AIR-TREATING DEVICES SPECIALLY FOR PASSENGER OR GOODS SPACES OF VEHICLES** B60H

**Heating, cooling or ventilating devices** (heating, cooling or ventilating devices providing other air treatment, the other treatment being relevant, [B60H3/00](#), ventilating solely by opening windows, doors, roof parts, or the like [B60J](#), vehicle window or windscreen cleaners using air, e.g. defrosters, [B60S1/54](#)) B60H1

B60H1/00

show notes

- [N: Combined heating, ventilating, or cooling devices (control systems or mechanisms [B60H1/00Y](#))] B60H1/00A
- [N: for load cargos on load transporting vehicles] B60H1/00A1
- [N: disposed in front of the passenger compartment] B60H1/00A2
- [N: Constructional lay-out of the devices in the vehicle] [N9604] B60H1/00A2A
- [N: for sending an air stream of uniform temperature into the passenger compartment] [N9604] B60H1/00A2B
- [N: the air passing only one heat exchanger] [N9604] B60H1/00A2B1
- [N: the air being firstly cooled and subsequently heated or vice-versa] [N9604] B60H1/00A2B2
- [N: the air being heated and cooled simultaneously, e.g. using parallel heat exchangers] [N9604] B60H1/00A2B3
- [N: for sending air streams of different temperatures into the passenger compartment] [N9604] B60H1/00A2C
- [N: the air passing only one heat exchanger] [N9604] B60H1/00A2C1
- [N: the devices being independent of the vehicle] B60H1/00B
- [N: non-transportable devices, disposed outside the vehicle, e.g. on a parking] B60H1/00B1
- [N: Transportable devices] B60H1/00B2

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## Adding further criteria to your search

Select patent database:

### 2. Search terms

Enter keywords in English

Keyword(s) in title:	<input type="text"/>	plastic and bicycle
Keyword(s) in title or abstract:	<input type="text"/>	hair
Publication number:	<input type="text"/>	WO03075629
Application number:	<input type="text"/>	DE19971031696
Priority number:	<input type="text"/>	WO1995US15925
Publication date:	<input type="text"/>	yyyyymmdd
Applicant(s):	<input type="text"/>	Institut Pasteur
Inventor(s):	<input type="text"/>	Smith
European Classification (ECLA):	<input type="text" value="B60H1/00B2"/>	F03G7/10
International Patent Classification (IPC):	<input type="text"/>	H03M1/12

← Only applications published in a certain year?

← Only applications by certain inventors?

**European Classification (ECLA):**

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**B60H1/00B2** as the European Classification  
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- |   |  |   |
|---|--|---|
| 1 | <b>Vorrichtung zum Warmhalten von Speisen in Kraftfahrzeugen</b>   | in my patents list <input type="checkbox"/>   |
|   | <b>Inventor:</b> JAKUBITZ LUTZ WOLFGANG [DE]<br><b>EC:</b> B60H1/00B2; B60H1/22A3<br><b>Publication info:</b> DE202008002890 (U1) — 2008-05-15                           | <b>Applicant:</b> JAKUBITZ LUTZ WOLFGANG [DE]<br><b>IPC:</b> B60H1/22; A47B31/02; B60P3/025; (+5) |
| 2 | <b>Refrigeration Apparatus and Vehicle Incorporating the Same</b>  | in my patents list <input type="checkbox"/>   |
|   | <b>Inventor:</b> JACKSON PETER MAITLAND [GB]<br><b>EC:</b> B60H1/00B2; B60H1/32S; (+3)<br><b>Publication info:</b> GB2442739 (A) — 2008-04-16                            | <b>Applicant:</b> L E JACKSON [GB]<br><b>IPC:</b> B60H1/32; F25D3/06; B60H1/32; (+1)              |
| 3 | <b>AIR-CONDITIONING SYSTEM FOR STANDSTILL AIR-CONDITIONING OF A MOTOR VEHICLE</b>  | in my patents list <input type="checkbox"/>   |
|   | <b>Inventor:</b> PFALZGRAF MANFRED [DE];<br>BEDENBECKER MARKUS [DE] (+2)<br><b>EC:</b> B60H1/00H4; B60H1/00B2<br><b>Publication info:</b> WO2008037242 (A1) — 2008-04-03 | <b>Applicant:</b> WEBASTO AG [DE]; PFALZGRAF MANFRED [DE] (+3)<br><b>IPC:</b> B60H1/00; B60H1/00  |
| 4 | <b>COMPOSITIONS AND METHODS FOR ELIMINATING AND PREVENTING VEHICLE ODORS</b>   | in my patents list <input type="checkbox"/>   |



## Self-contained refrigeration unit

Bibliographic data	Description	Claims	Mosaics	Original document	INPADOC legal status
<b>Publication number:</b> EP1308330 (A1) <b>Publication date:</b> 2003-05-07 <b>Inventor(s):</b> MATONOG PHILIPPE [FR]; PETIT XAVIER [US] <b>Applicant(s):</b> CARRIER CORP [US] <b>Classification:</b> - international: <b>B60H1/00; B60H1/32; B60P3/20; F25D19/00; B60H1/00; B60H1/32; B60P3/20; F25D19/00; (IPC1-7): B60H1/32</b> - European: B60H1/00B2; B60H1/00H1; B60H1/32C11; B60P3/20 <b>Application number:</b> EP20020257383 20021004 <b>Priority number(s):</b> US20010021573 20011030 <a href="#">View INPADOC patent family</a> <a href="#">View list of citing documents</a> <a href="#">View document in the European Register</a>	<b>Also published as:</b> EP1308330 (B1) US2004187507 (A1) US2003079487 (A1) ES2256417 (T3) DE60208762 (T2) more >>	<b>Cited documents:</b> WO0065288 (A1) US6279334 (B1) US2766439 (A) US5436842 (A) DE19641642 (A1) Report a data error here			
<b>Abstract of EP 1308330 (A1)</b> A removable self-contained refrigeration unit 12 is mounted within a vehicle 10, and is removable from a vehicle as a unit. The casing 14 mounts both the evaporator 42 and the condenser 34, and in one embodiment also mounts the compressor 46. With the embodiment that mounts the compressor 46, no refrigerant lines need be found anywhere except on the casing 14. The casing 14 is removable from the vehicle as a one piece unit merely by connecting or disconnecting electrical connections 31A,31B. In a second embodiment (Fig. 5) the compressor 53 is mounted remotely from the casing 14 but the evaporator 42 and condenser 34 are still changeable as a one piece unit 12. In this embodiment a refrigerant connection 50 need also be connected or disconnected to change the unit.					



## View list of citing documents

Citing documents for EP0200362 (PCR, invented by Nobel Laureate Kary Mullis)

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LIST OF CITING DOCUMENTS  
Approximately 121 document citing EP0200362

- 1 Isothermal strand displacement nucleic acid amplification** in my patents list  
Inventor: DATTAGUPTA NANIBHUSHAN (US); Applicant: GEN PROBE INC (US)  
STULL PAUL DOUGLAS (US); (+2)  
EC: IPC: C12P19/34; C07H21/02; C07H21/04 (+4)  
Publication info: US939007E - 2006-03-07
- 2 Isothermal strand displacement nucleic acid amplification** in my patents list  
Inventor: DATTAGUPTA NANIBHUSHAN (US); Applicant: GEN PROBE INC (US)  
STULL PAUL DOUGLAS (US); (+2)  
EC: IPC: C12P19/34; C07H21/02; C07H21/04 (+6)  
Publication info: US939960E - 2006-01-31
- 3 AUTOMATABLE QUICK TEST FOR DIRECT DETECTION OF APC RESISTANCE MUTATION WITH SPECIFIC PRIMERS AND ASSAY** in my patents list  
Inventor: SPRINGER WOLFGANG (DE) Applicant: BAYER AG (DE); SPRINGER WOLFGANG (DE)  
EC: C12Q1/68D2G; C12Q1/68M6 IPC: C12Q1/68; C12Q1/68; (IPC1-7): C12Q1/68  
Publication info: W00024928 - 2000-05-04
- 4 NOVEL PRIMER AND USE THEREOF** in my patents list  
Inventor: IMAMURA MIO (JP); ITAGAKI YASUHARU Applicant: SNOW BRAND MILK PROD CO LTD (JP); (JP); (+1) IMAMURA MIO (JP); (+2)  
EC: C07K14/47A21; C07K14/47A28; (+1) IPC: C12N15/09; C07K14/47; C12Q1/68 (+5)  
Publication info: W09913065 - 1999-03-18
- 5 Proteins with urease activity** in my patents list  
Inventor: LABIGNE AGNES (FR) Applicant: INST PASTEUR AND I NAT DE LE S (FR)  
EC: C07K16/40; C12N9/80; (+1) IPC: A61P31/04; C07K16/40; C12N9/80 (+12)  
Publication info: US6146634 - 2000-11-14
- 6 Quantitative PCR using blocking oligonucleotides** in my patents list

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Source: EPO Patent Teaching Kit (2010)



## View or print original document

Self-contained refrigeration unit

Bibliographic data | Description | Claims | Mosaics | **Original document** | INPADOC legal status

1 / 11 | 46,2% | Suchen

Europäisches Patent  
European Patent Office  
Office européen des brevets

(11) EP 1 308 330 A1

EUROPEAN PATENT APPLICATION

(43) Date of publication: 07.05.2003 Bulletin 2003/19 (51) Int. Cl.: B60H 1/32

(21) Application number: 02257883.6 (22) Date of filing: 24.10.2002

(84) Designated Contracting States: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IT LI LU MC NL PT SE SK TR Designated Extension States: AL LT LV MK RO SI (72) Inventors: • Wulfrong, Philippe 80775 St. Didier au Mont D'Or (FR) • Petit, Xavier Baldonville, New York 13027 (US) (74) Representative: Locking, David H., Fraiss B. Dehn & Co., 179 Queen Victoria Street London EC4V 4EL (GB)

(71) Applicant: CARRERA CORPORATION Syracuse New York 13221 (US)

(54) Self-contained refrigeration unit

(57) A removable self contained refrigeration unit 12 is mounted within a vehicle 10, and is removable from a vehicle as used. The casing 14 mounts both the evaporator 42 and the condenser 34, and in one embodiment also mounts the compressor 46. With the embodiment that mounts the compressor 46, no refrigerant lines need be found elsewhere except on the casing 14. The casing 14 is removable from the vehicle as a one piece unit merely by connecting or disconnecting electrical connectors 24, 28. In a second embodiment (FIG. 6) the compressor 34 is mounted remotely from the casing 14 but the evaporator 42 and condenser 34 are still changeable as a one piece unit 12. In this embodiment a refrigerant connection 36 need also be connected or disconnected to charge the unit.

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## Patent mining

Outils et techniques

## Outils et techniques

- Le défi informatique
  - 60 millions de documents de brevets dans le monde
  - Dont la taille augmente d'année en année
  - 500,000 nouveaux brevets aux USA, Japon, OEB par an
  - → Comment identifier les brevets pertinents dans une optique de veille concurrentielle ou technologique?
    - PATENT MINING

## Outils et techniques

- Patent mining:
  - Application de techniques de data mining aux banques de données de brevets
  - Repose essentiellement sur
    - Le text mining
    - L'analyse de liens (link analysis)
  - Une problématique particulière
    - Harmonisation des noms des déposants (et inventeurs)

## Outils et techniques

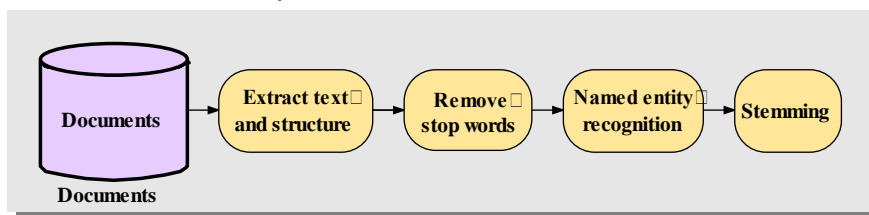
- Text mining:
  - The process of deriving high quality information from text (*Wikipedia*)
  - Usually involves
    - structuring the input text (pre-processing & representation)
    - deriving patterns within the structured data (analysis)
    - evaluation and interpretation of the output (evaluation)
  - Typical tasks:
    - Categorization, clustering, concept/entity extraction, production of taxonomies, sentiment analysis, document summarization, and entity relation modeling

## Outils et techniques: Text mining

- 1. Pre-processing
  - Let  $D$  be a collection of documents
  - Standard pre-processing steps
    - Extract text and structure (eg. from Microsoft Word, HTML pages or LaTeX to XML)
    - Clean characters and encoding
    - Remove stop words (eg. remove "the", "at", "all", etc)
    - Named entity recognition (eg. find proper names)
    - Stemming (eg. extract "process" from "processing")
    - Part-of-Speech Tagging

## Outils et techniques: Text mining

- 1. Pre-processing
  - This is a tedious job!



- But tools are readily available, eg.:
  - Galilei (ULB)
  - Weka (Wakaïke)
  - Text to Matrix Generator (Matlab toolbox)

## Outils et techniques: Text mining

- 2. Représentation

- In its basic form, each document is represented by a vector  
→ **Vector Space Model**
- The coordinates of the vector are words
  - Each element of the vector represents the frequency of the word in the document or the query
  - In the space of words
- Document-Term Matrix
  - $f(i,j)$  = frequency of term  $i$  in document  $j$  (or  $TFIDF_{ij} = f_{ij} \times \log\left(\frac{N}{d_j}\right)$ )

$$\mathbf{D} \triangleq \left[ \begin{array}{cccc} & \text{documents} & & \\ & & & \\ f_{11} & f_{12} & \dots & f_{1n_d} \\ f_{21} & f_{22} & \dots & f_{2n_d} \\ \vdots & \vdots & \ddots & \vdots \\ f_{n_w1} & f_{n_w2} & \dots & f_{n_w n_d} \end{array} \right] \left. \vphantom{\begin{array}{c} \\ \\ \\ \\ \end{array}} \right\} \text{words}$$

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Source: Saerens (2008)



## Outils et techniques: Text mining

- 3. Information Retrieval

- We have a collection of patent documents
- You want to retrieve the documents related to a given concept
- You submit a query expressed through words or terms
- An information retrieval system returns the documents most related to this concept

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Source: Saerens (2008)



## Outils et techniques: Text mining

- 3. Information Retrieval

- A query is also represented by a vector
  - Here is a query  $q$
  - Each element is 0 or 1 (presence or absence of a word)

$$\mathbf{q} \triangleq \begin{bmatrix} 0 \\ \vdots \\ 0 \\ 1 \\ 0 \\ \vdots \\ 0 \end{bmatrix} \quad i \longrightarrow \text{word } w_i \text{ is present in the query}$$

- The purpose is of course to retrieve documents  $d_i$  based on a query  $q$ 
  - We have to define a notion of similarity between a query and a document

## Outils et techniques: Text mining

- 3. Information Retrieval

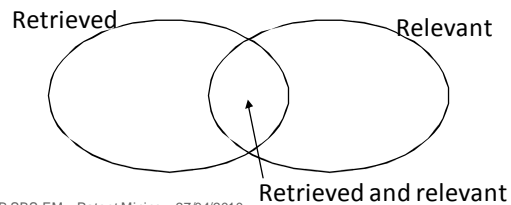
- The similarity between a query  $q$  and a document  $d_i$  can be defined as
  - The cosine of the angle between these two vectors:

$$\text{sim}(\mathbf{q}, \mathbf{d}_i) \triangleq \cos(\mathbf{q}, \mathbf{d}_i) = \frac{\mathbf{q}^T \mathbf{d}_i}{\|\mathbf{q}\| \|\mathbf{d}_i\|}$$


- Euclidean distance does not work well because queries contain much lesser words than documents
- It is called the cosine similarity

## Outils et techniques: Text mining

- 4. Evaluation des résultats
  - The precision measure estimates the percentage of relevant retrieved documents in the set of all retrieved documents
    - Precision indicates to which extent the retrieved documents are indeed relevant
  - The recall measure estimates the percentage of relevant retrieved documents in the set of all relevant documents
    - Recall indicates to which extent the relevant documents are indeed retrieved
  - The F-measure, taking both precision and recall is
    - $F = 2 (precision \times recall) / (precision + recall)$



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Source: Saerens (2008) 

## Outils et techniques: Link Analysis

- Link analysis:
  - A set of techniques
    - Applied to: Hyperlink document repositories
    - Typically web pages
  - Objective:
    - To exploit the link structure of the documents
    - In order to extract interesting information
    - Viewing the document repository as a graph where
      - Nodes are documents
      - Edges are directed links between documents
    - It does not exploit the content of the pages !!

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Source: Saerens (2008)



## Outils et techniques: Link Analysis

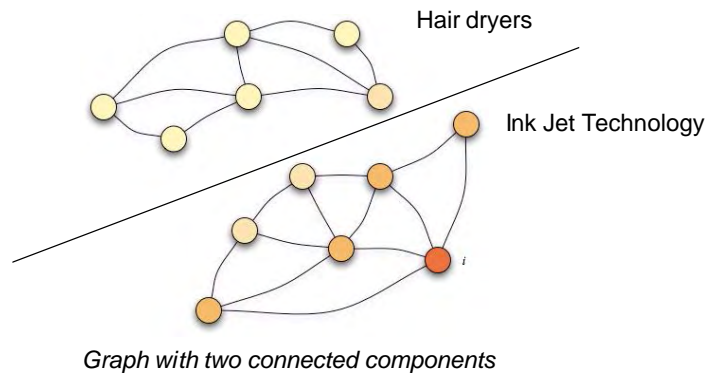
- Patent Link analysis
  - Brevets sont reliés par un réseau de citations
    - Brevet B cite brevet A
      - Invention B fait référence à l'invention A (L'améliore? L'utilise? L'enrichit?)
  - Intérêt des citations
    - Partant d'un brevet, permet de retracer
      - L'intérêt ou l'importance de la technologie (i.e. son impact sur le domaine ou le marché)
      - L'évolution de la technologie (i.e. nouveaux développements)
      - Les acteurs qui inventent et brevettent autour de la même technologie (i.e. la concurrence et son intérêt pour cette technologie)
      - La densité et la concentration de la protection par brevets autour d'une technologie (i.e. les patent 'thickets')

## Outils et techniques: Link Analysis

- Link analysis: Que peut-on en faire?
  - Cutting a graph in small pieces and exploring it
    - Looking for connected components
  - Identifying central or prestigious nodes by link analysis
    - HITS (Authority v. Hub): interdependent measures
    - PageRank (Google): A recursive weighting
  - **Computing similarities between nodes**
    - Based on different kernels, which exploit the (probabilistic) distance between nodes
  - **Clustering nodes of a graph**
    - Based on similarity measures
    - Typically using k-means or other clustering techniques
  - Finding dense regions
  - Graph partitioning

## Outils et techniques: Link Analysis

- Link analysis: quelques notions utiles
  - Connected component: a maximal connected subgraph



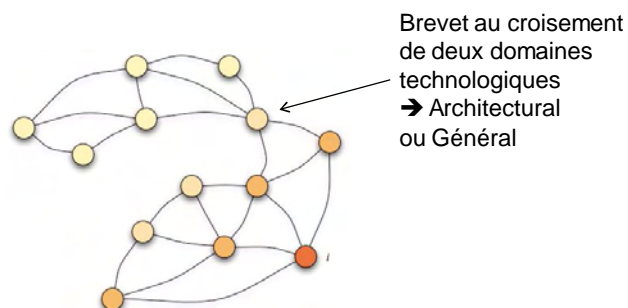
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Source: Saerens (2008)



## Outils et techniques: Link Analysis

- Link analysis: quelques notions utiles
  - Articulation point or vertex-cut: a node (vertex) of a graph such that removal of the node causes an increase in the number of connected components



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Source: Saerens (2008)



## Outils et techniques: Link Analysis

- Link analysis: quelques notions utiles
  - Bridge or edge-cut: an arc (edge) of a graph such that removal of the arc causes an increase in the number of connected components



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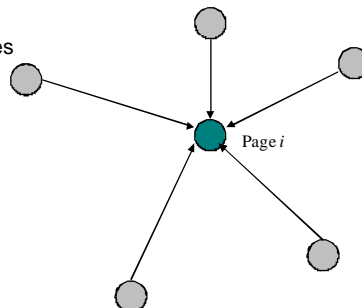
Source: Saerens (2008)



## Outils et techniques: Link Analysis

- Link analysis: quelques notions utiles
  - PageRank: notion de prestige
    - A page with a high score is a page that is pointed by
      - Many pages
      - Having each a high score
    - Thus a page is an important page if
      - It is pointed by many, important, pages

Permet d'identifier les brevets importants



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## Outils et techniques: Link Analysis

- Link analysis: quelques outils
  - JUNG: Java Universal Network/Graph Framework
    - Open source and written in Java
    - Mainly a toolbox of methods
    - <http://jung.sourceforge.net>
  - UCINET
    - Social Network Analysis Software
    - Written by active researchers in the social network community
    - Quite complete commercial software
    - <http://www.analytictech.com>
  - INSNA
    - Different tools for social networks analysis
    - [http://www.insna.org/software/software\\_old.html](http://www.insna.org/software/software_old.html)

## Outils et techniques: Name harmonization

- Harmonisation des noms des déposants
  - Exemple:
    - IBM: Plus de 200 orthographe différentes dans les DB brevets
  - Comment regrouper tous les brevets de chaque société?
    - Et tenir compte des dépôts par les filiales v. maison-mère?
    - Et tenir compte des fusions et acquisitions au cours du temps?
      - Ex: les brevets de Digital reviennent à Compaq puis à HP

## Outils et techniques: Name harmonization

- Projets parallèles dans le monde académique
  - USA:
    - NBER dataset ([www.nber.org](http://www.nber.org))
  - Europe
    - KUL-EUROSTAT
    - Bocconi-OECD ([www.epip.eu](http://www.epip.eu))
  - Objectif ultime: lier les déposants de brevets à une DB commerciale
    - USA: Compustat / Dun & Bradstreet
    - Europe: Amadeus (BVD)

## Outils et techniques: Name harmonization

- Méthodologie générale
  - Character cleaning
  - Punctuation cleaning
  - Legal form indication treatment
  - Common company words removal
  - Spelling variation harmonization
    - Approximate string matching
  - Condensing

## Outils et techniques: Name harmonization

- Approximate string matching
  - Edit distance: Nb of operations to switch from one word to the other
  - Jaccard similarity measure: token-based and accounts for differences due to the position of the same tokens between otherwise identical strings

$$J = \frac{T_1 \cap T_2}{T_1 \cup T_2} \rightarrow 2 \frac{T_1 \cap T_2}{T_1 + T_2}$$

- Can be weighted by the inverse frequency of a token among company names
  - « International », « Holding »: very small weight
  - « Agripa », « Solvay »: maximum weight

## Outils et techniques: Name harmonization

- Résultats sur Patstat
  - 7,5 millions de noms de déposants différents à l'origine
    - Après standardisation: 5 millions de noms (33% de réduction)
    - Noms standardisés reliés aux codes standardisés EPO/USPTO

Applicants by Last Patent Document Published						
Period	Original Names		Harmonized Names		Harmonized Names with std codes	
	N	%	N	%	N	%
before 1970	1,149,408	15.27	861,256	17.06	6,384	0.74
1971-1980	909,710	12.09	601,298	11.91	64,247	7.42
1981-1990	1,354,241	17.99	835,629	16.55	164,714	19.04
1991-2000	1,692,716	22.49	1,098,137	21.75	262,780	30.37
after 2000	2,419,645	32.15	1,651,628	32.72	367,165	42.43
<b>Overall</b>	<b>7,525,720</b>	<b>100.00</b>	<b>5,047,948</b>	<b>100.00</b>	<b>865,290</b>	<b>100.00</b>

## Outils et techniques: Name harmonization

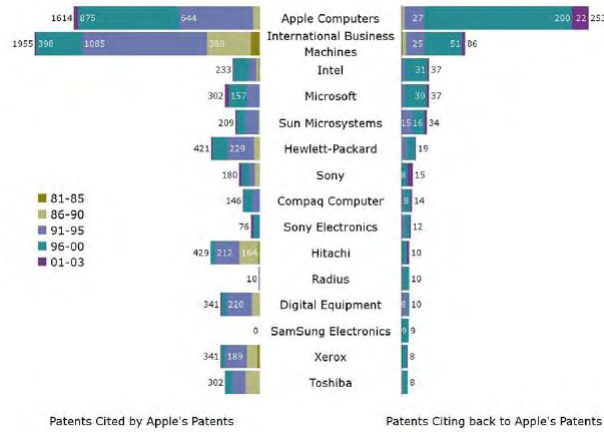
- Résultats sur Patstat
  - Matching avec Amadeus ou Compustat
    - Vise uniquement les déposants industriels (86%)
      - 244,632 noms originaux regroupés en 173,906 noms standardisés
    - 89,061 noms originaux (36%) → 68,126 noms standardisés
      - Associés à un code Amadeus (BVDID)
      - Couvrant 1,8 millions de publications de brevets
        - » 60% des brevets OEB
        - » 94% des brevets déposés par des sociétés européennes
    - 121,697 noms originaux (50%) → 75,611 noms standardisés
      - Associés à un code Amadeus (BVDID), Compustat (GVKEY) ou D&B
      - Couvrant 2,6 millions de publications de brevets
  - Disponible sur <http://www.researchoninnovation.org/epodata/>

## Patent mining

Que peut-on retirer de ces techniques?

## Résultats

- Analyse concurrentielle temporelle
  - Ex: Apple



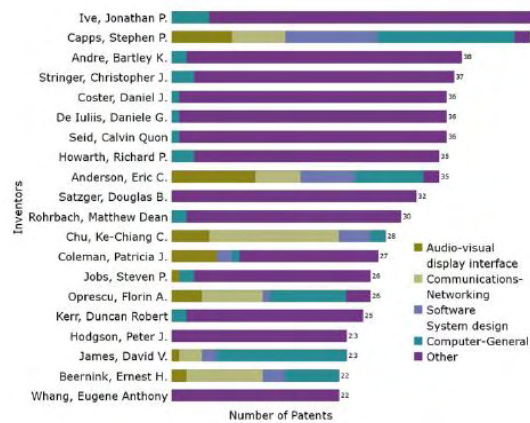
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Source: Computer Patent Annuities (2004)



## Résultats

- Analyse concurrentielle temporelle
  - Ex: Apple



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Source: Computer Patent Annuities (2004)



## Patent mining

### Conclusions

### Conclusions

- Protéger l'innovation est un impératif
- Ignorer celle des autres serait coupable
  - Cf. Research in Motion (Blackberry) v. NTP
- Les brevets constituent une source unique pour renseigner
  - Sur la concurrence
  - Sur les technologies existantes ou émergentes
  - Sur les brevets qui pourraient réduire la liberté d'entreprendre
- Mais le volume de ces données requiert
  - Une certaine connaissance du jargon des brevets
  - De bons outils pour extraire l'information pertinente
- Patent intelligence: un mélange
  - De veille stratégique
  - Et de data mining