THE VALUE OF TEXT MINING IN PHARMACEUTICAL LABORATORIES

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- What is Text Mining? – a global definition
- What Text Mining can bring to …?
  - Research
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Numerous information sources

What is Text Mining?

What Text Mining can bring to?
- Research
- Intellectual property
- Business development

Application to Research

Database

Structured data (10-40%)

Unstructured data (60-90%)
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Text Mining

- **Definition**: process of extracting useful information from a large volume of text and of using it for better business decision making.

- Computational linguistics: combination of linguistic analysis (syntax analysis & semantic analysis) with statistics
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Text Mining Steps

- **Information Retrieval**
  - Indexing
  - Searching
  - Routing

- **Information Analysis**
  - Summarizing
  - Extracting
  - Tagging

- **Information Organization**
  - Clustering
  - Categorizing
  - Filtering

- **Decision Support**
  - Alerting / Event detection
  - Trend Analysis
  - Quantification of text info
  - Data mining

Source: Text Mining – Toward Decision and Support, David A. Evans - Claritec
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Methodology: a virtuous circle

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Research in its technology watch function

- The technology watch function encompasses:

  - Documentary search
  - Patentability assessment
  - Global analysis
  - Research/retrieval assessment
  - Analysis classification
  - Research
  - Intellectual property
  - Business development

What is Text Mining?

What Text Mining can bring to?

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Conclusion
Value of Text Mining for technology watch

- Text Mining supports technology watch in its recurrent tasks:

  - Instant and synthetic vision of the technologies’ landscape in a domain according different analysis axes
  - Visualization of patents or studies relationships
  - Visualization of technologic trends and evolution
  - More time for high value tasks
  - New projects assessment
  - Speeding process optimization
  - Information structuring
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Intellectual Property
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Intellectual Property

- Determine the scope of the legal coverage that can be applied
- Ensure the conformity to international regulation
- Patentability Assessment / Validation according to:
  - innovation
  - inventiveness
  - industrial application
- Watch for the respect of the company’s legal interests
Value of Text Mining for Intellectual Property

- Detection of critical information regarding patent litigations and prosecution
- Determination of the protection’s nature
- Determination of the geographic spread…
- Documents comparison (fees justification…)
- Control of the documents’ content validity in the eyes of regulation (definition of target terms with taxonomies)
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Business Development

- Strategic development
  - Activity in the sector
  - Temporal trends
  - Geographical localization of research
  - Licenses

- Competitive watch
  - Market’s Activity
  - R&D competitors’ strategy
  - Partnerships
  - Geographical localization of research
  - Key inventors / teams

- Patent portfolio optimization
Value of Text Mining for Business Development

- determination of sectorial trends and arising technologies through indicators of
  - Market maturity,
  - Key inventors or teams,
  - Degree projects maturity
- Assessment of a technology in order to decide if it must be acquired, conserved or conceded.
- Analysis of the patent portfolio hold or acquired by competitors
  - Therapeutic or pharmacologic classes, market segments
  - Auto citation
  - phases and development speed
  - classifications.
Value of Text Mining for Business Development

- Assessment of the contribution and the profitability of technologic innovation and patents holding through citation analysis
- Assessment of the value and the liability of a patent portfolio
- Extension to the value of the company
  - Knowledge capital of a company = value of the patents portfolio + ability to develop new products (R&D = future incomes).
Value of Text Mining for Business Development

Bronwyn H. Hall, Adam B. Jaffe, Manuel Trajtenberg

• “we explore the contributions of R&D spending, patents, and citation-weighted patents to measures of Tobin's Q for the firms. We find that citation-weighted patent stocks are more highly correlated with market value than patent stocks themselves and that this fact is due mainly to the high valuation placed on firms that hold very highly cited patents”.

• ‘Firms’ possession of frequently cited patents is correlated with markets participants’ perception of the value of firms’ knowledge stocks”.

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Patents as information source

- Patents represent the richest and the most reliable source of information for research activities.
- They are now readily available.
Available information in patents

- dates
- Names and postal addresses of the inventors
- Organization to which the patent property right was assigned or transferred when the patent was issued
- Address of the organization
- Technological classification of the invention
- summary
- Patentee’s claims on what it can do that could not be done before
- Citations (« prior art »)
Citations analysis

- helps in the establishment of:
  - relationships between many subjects of interest like links between authors, studies, journals, reports, fields, countries, sectors, companies, dates ....
    - For instance: help in the determination of a single subject impact on a given field by analyzing its frequency of citation by others
  - a subject similarity between two documents (Co-citation coupling)
  - links two papers that cite the same articles (Bibliographic coupling)
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- Text Mining represents a strategic tool for innovative companies
  - Shorter drug development cycle, hasten the research process, the delivery of compound from laboratory to the market.
  - Competitive advantage, quantification of benefits in terms of reduced R&D costs and time.
  - Quality and efficiency increase
  - Use and share of knowledge
  - ROI
Sources

- Legal Times - Intellectual Property (16/10/2000)
- Interactive Exploration of Patent Data for Competitive Intelligence – IK@N, Knowledge Engineering, Novartis Pharma
- Patent research Made Painless - ClearResearch
- Text-Mining in Engineering – Kas Kasravi - EDS
- Patent Citation Analysis – Scientometrics Vol 51 – n°1 (2001)
- Text Mining applied to Patent Analysis – Michael Hehenberger (PhD) & Pascal Coupet (IBM Global Business Intelligence)
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- Any questions?