



PROFESSIONAL SERVICES

Case Study: Mining text to deliver answers on demand

The complexity of biomedical research

The information demands of biomedical R&D teams are considerable and complex. Not only do they need to cover a broad range of fields – biology, chemistry, medicine and even engineering – they also need to retrieve very specific information about topics such as disease mechanisms, compound bioactivities, drug efficacies and competitor product performances.

For example, a pharmaceutical company might be interested in repurposing an immune modulator. That would require information about the mechanisms underlying inflammatory and autoimmune diseases, the performances and safety profiles of existing drugs targeting those diseases, and chemical property information for optimization studies.

ELSEVIER'S ROLE IN BIOMEDICAL RESEARCH

Most of the world's large pharmaceutical companies subscribe to multiple Elsevier products and recognize that having these products means having a single information service provider with reliable and comprehensive databases covering all the fields involved in biomedical R&D.

Elsevier R&D Solutions for Pharma & Life Sciences makes it possible for even novice researchers to retrieve much of the information needed for drug and medical device development, including post-launch safety and performance monitoring. The user-friendly interfaces simplify search construction and the expert content indexing maximizes discoverability.

However, situations can still arise where even expert researchers may need support in retrieving data.

A REQUEST FOR EXPERT ASSISTANCE

A major global pharmaceutical company approached Elsevier with a request for support with some very difficult questions that would require considerable expertise to construct. They had performed extensive searches and determined some baselines, but they saw the value of having the Elsevier R&D Solutions Professional Services team take the information retrieval process to the next level.

The company wanted to mine a defined set of journals for specific information for three separate projects. The content consisted of life and health science articles from Elsevier's ScienceDirect collection. The three projects focused on:

- Inflammatory diseases and immune modulators
- Manufacturers of microelectrodes and their sources and production methods
- Single-point mutations related to resistance to anti-viral drugs

CREATING CUSTOMIZED TEXT MINING QUERIES

Retrieving such specific information demanded considerable expertise in search construction. The Professional Services team set up the requested set of content as a database and then created search algorithms to mine the full text of each document. This is essential because much of the critical information that the project teams needed would be found in the main body of the text. Traditional text mining is typically based on article abstract searches. Elsevier Text Mining allows the retrieval of information from full text. Together with tailored vocabularies and additional post-processing tools, Elsevier's solution provides more complete answers.





Figure 1. Using Elsevier Text Mining, the Elsevier R&D Solutions Professional Services team created searches that would retrieve the information related to three specific topics from a defined set of life and health science articles.

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Elsevier R&D Professional Services brings considerable expertise to the table when it comes to text mining. The aim is to provide customers with relevant answers quickly. Not only were the queries structured to find the articles with content matching the search criteria, but the presentation of the answers was also tailored to the needs of the individual project team.

In the case of the inflammatory disease queries, relevant results about drug–disease relationships were retrieved with links to full-text articles as that team was interested in the broader state of knowledge on the topic.

For the microelectrode project, the team restricted the mining to the materials and methods sections of the documents, building a fit-for-purpose vocabulary to aid in retrieval of the relevant manufacturer information along with links to any articles about production methods.

For the queries pertaining to single-point mutations related to anti-viral drug resistance, citations and abstracts would not be useful. Information about such mutations is unlikely to be contained in the abstract. However, the researchers would not have time to read through the full-text of articles to find the specific mentions of the mutations. Therefore, the output mode was information about relevant single-point mutations extracted from the full-text together with the relevant citation.

Performing the searches using traditional means might have returned some or all of the same results, but the hit set would require extensive post-processing—at the very least, the researchers would have to read through all of the articles retrieved to find the items of interest. The Professional Services team ensured that the three project teams had the answers they needed quickly and in the desired format.

THE OUTCOME

The customer was extremely happy with the results of this initial set of work and went on to sign a contract to collaborate on several other projects. The impact of this cooperation may take time to become visible in the clinical setting but this continued closer partnership with Elsevier R&D Professional Services is testament to the customer’s level of satisfaction.

What’s more, the customer decided to adopt Elsevier Text Mining for specialist search applications based on their experiences in this early project. Professional Services goes further than creating customized searches and databases. Elsevier’s experts also ensure that our customers can continue to work with the most advanced search and discovery tools.

Customized text mining and search construction is just one of the ways in which the Professional Services team supports pharmaceutical and medical device R&D.

