

Spotting cutting-edge topics in scientific research using keyword analysis

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Spotting emerging trends in scientific research has always been challenging, as thousands of research papers are published every year on a vast number of subjects. But now, researchers from Japan have

developed a novel technique for detecting cutting-edge trends in research that will be of keen interest to the scientific community, policymakers, and investors.

In a study published this month in *Scientometrics*, researchers from the University of Tsukuba revealed the findings of their massive study of research papers in the [life sciences](#) published over a half-century. By analyzing the keywords that were used to identify thirty million [research papers](#) in the PubMed database, they were able to track how "hot topics" in research emerged over time.

What is really exciting is that by examining how trends such as gene and protein manipulation in the 1970s or nanotechnology in the early 2000s emerged in the research literature, the researchers were able to uncover some general principles that can be used to detect topics that are emerging now, which is a far more challenging proposition than doing so in hindsight.

"As the existing methods of detecting emerging topics are retrospective in nature, it is difficult to use them to identify the topics currently emerging or the topics that will potentially emerge in the future," notes study lead author Ryosuke Ohniwa. "As the life science field is one in which new topics are constantly emerging, maturing, converging, and fading out, we chose to build a large dataset of articles in this field to try to identify the mechanisms behind the emergence of new topics."

Using bibliometric analysis, the researchers discovered that one way to predict which trends are likely to continue is to look at keywords associated with emerging topics that tend to appear together with keywords associated with other emerging or recently emerged topics.

"We found that emerging topics tend to generate emerging topics," comments co-author Aiko Hibino, adding that "emerging keywords that

achieved great success in the long run first appeared with other preceding emerging keywords."

The potential applications of these findings are significant. For example, [funding agencies](#) could prioritize projects in areas that have been identified as emerging and thus encourage innovative research. Venture capitalists and other investors could use these methods to identify promising new areas for early-stage investment, thus accelerating the process of scientific discovery and potentially yielding large returns.

More information: Ryosuke L. Ohniwa et al. Generating process of emerging topics in the life sciences, *Scientometrics* (2019). [DOI: 10.1007/s11192-019-03248-z](#)

Provided by University of Tsukuba

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