Changes in the characteristics of scientists in the field of AI in multiple countries from the mid-2010s to the early 2020s: Analysis based on the authors of scientific papers using non-negative matrix factorization

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Abstract

We extract information on articles and co-authors in AI-related research from the Web of Science (WOS) and compare the trends of research in the field after the advent of the Large Language Models (LLM). We analyze more than 300,000 authors in terms of number of publications in AI-related papers from 2014 to 2023. We focus on the number of papers in each of the 250 fields of WOS for each author. Our studies use non-negative matrix factorization (NMF), mainly because of the ease of interpretation of the results, from which we can extract the strength and trends of each country's research in this field. We must note that in the NMF analysis, there is a problem of having to specify the number of bases, which represents the granularity of the model. In this study, the number of bases was determined by heristics using the Frobenius norm of the matrix.