

Mapping Research on Brain-Computer Interfaces for Augmentative and Alternative Communication Across the Globe

Evandro L. T. P. Cunha

Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, Brazil

Faculdade de Letras da UFMG, gabinete 4012. Av. Antônio Carlos, 6627. CEP: 30270-901. Belo Horizonte, MG, Brazil. E-mail: cunhae@ufmg.br

Introduction: Due to the possibilities of improving the quality of life of individuals with different conditions and needs, an important virtue of a healthcare-related research field is to be globally far-reaching. This is even more relevant when the characteristics of the research populations might vary a lot, as in the case of studies involving persons with disabilities. Taking this into account, this investigation presents a scientometric mapping of global research on augmentative and alternative communication brain-computer interface (AAC-BCI) systems, with the goal of addressing the following question: how widespread is AAC-BCI research across the globe?

Methodology: The systematic review of research on AAC-BCI systems for individuals with disabilities written by Peters et al. [1] was used as data source for this study. The 73 articles that met the authors' inclusion criteria (cited in their Supplementary Table 1) were considered. For each of these articles, the affiliation country(ies) of each author was extracted (when an author reported being affiliated to two or more institutions in the same country, this country was counted only once). Author disambiguation was performed before data analysis, and general information about the global reach of research on AAC-BCI systems was obtained. Finally, the percentage of each country among the affiliations reported in author entries was calculated.

Results: The 73 articles contain 512 author entries (avg. of 7.0 authors per article, min. of 2, max. of 20), corresponding to 326 unique authors. These authors reported being affiliated to institutions based in 20 different countries: 13 in Europe, 3 in Asia (all in East Asia), 2 in North America and 2 in South America. Only 22 (4.3%) author entries report simultaneous

affiliation to institutions in two or more countries, but 34 (46.6%) of the articles include authors at least partially based in two or more countries – showing a substantial degree of internationalization of the collaborations. However, only 2 (10%) of these countries – Ecuador and Colombia – are (partially) in the Southern Hemisphere, and the majority of them (16, i.e. 80%) are classified by the World Bank as high-income economies in 2023. Fig. 1 shows the percentage of each country among the affiliations reported in author entries, and indicates the role of institutions from the USA, Germany and Italy (respectively in 26.0%, 20.4% and 14.0% of the affiliations) for the research in the field.

Discussion: The results make it clear that research on AAC-BCI systems for individuals with disabilities is still very dominated by authors based in high-income countries, especially in North America and in the European Union. The number of articles that originate from collaborations between authors working in different countries is meaningful; however, the need for collaborations that also involve institutions in the Global South is evident. This could be achieved by promoting conferences, scholarships, internships and hands-on training for researchers based in the countries underrepresented in the field, in order to increase the potential benefits that this research could bring for practitioners, students, the civil society and, above all, patients and their families in the whole world.

Reference

[1] Peters B, Eddy B, Galvin-McLaughlin D, Betz G, Oken B, Fried-Oken M. A systematic review of research on augmentative and alternative communication brain-computer interface systems for individuals with disabilities. *Frontiers in Human Neuroscience*, 16: 952380, 2022.

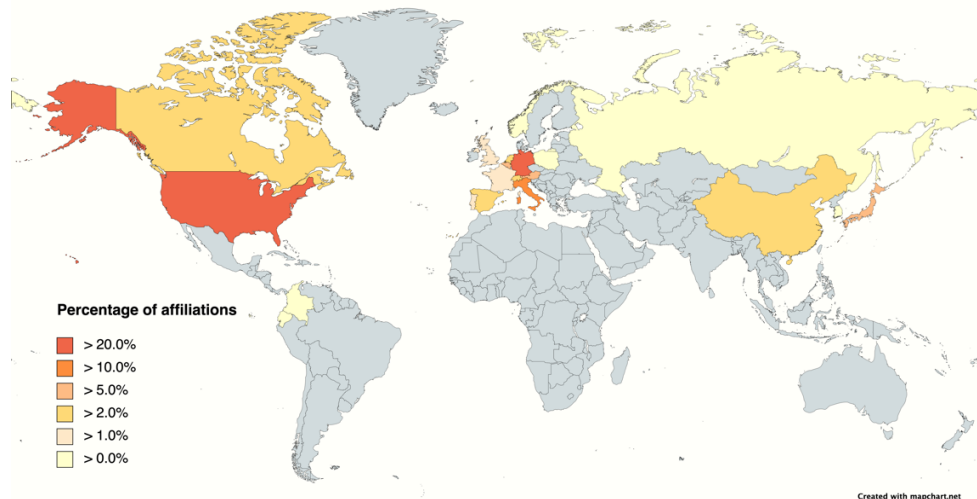


Figure 1. Percentage of each country among the affiliations reported in author entries.