

Brain-Computer Interface (BCI) in Latin America: a scientometrics perspective

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Introduction:

Brain-Computer Interface (BCI) technology has gained significant attention, especially in fields such as medicine, rehabilitation, and human-computer interaction. Scientific productivity related to BCI in Latin America has been increasing, but comprehensive research on this trend is limited. This study aims to provide a scientometric analysis of BCI publications in Latin America, focusing on the distribution of research across countries, categories, and subcategories.

Materials, Methods, and Results:

Data were collected from PubMed, ScienceDirect, IEEE, Scopus, and Redalyc, considering articles in English, Spanish, and Portuguese. Articles were selected if they included at least one Latin American author and were relevant to BCI development or application. A total of 445 articles were analyzed after removing duplicates. The articles were classified into five main categories: Acquisition systems, Signal processing, Applications, Paradigms, and Others, each further subdivided. Descriptive statistical analysis was performed to explore the distribution of publications.

Brazil led BCI publications with 155 articles, followed by Colombia (79) and Mexico (62). In the Acquisition systems category, EEG was the most frequent subcategory (94.68%). In Signal processing, Classification models were predominant (63.14%), while Neuroscience led in Applications (43.24%). In Paradigms, MI was the most prevalent (63.11%), and in the Data Capture category, the "Yes" subcategory represented 60.65%.

Conclusion:

Brazil, Colombia, and Mexico are the leading contributors to BCI research in Latin America. EEG, Classification models, Neuroscience, and MI paradigms dominate the research focus. However, subcategories like fMRI, fNIRS, and Ethics are less explored, suggesting potential areas for further investigation. Despite the growing scientific productivity, thematic distribution remains imbalanced, indicating the need for broader research topics to advance BCI technology in the region. Additionally, while no specific reports on BCI in Latin America have been found, studies on scientific productivity in neuroscience in the region (Forero et al., 2019) and a market report projecting growth in the BCI sector in Latin America to US\$ 361.9 million by 2030 (Brain Computer Interface Market Outlook, 2023-2030) reinforce the importance and potential of this technology in the region.

References:

- Forero, D. A., Trujillo, M. L., González-Giraldo, Y., & Barreto, G. E. (2019). Scientific productivity in neurosciences in Latin America: a scientometrics perspective. *International Journal of Neuroscience*, 130(4), 398–406. <https://doi.org/10.1080/00207454.2019.1692837>
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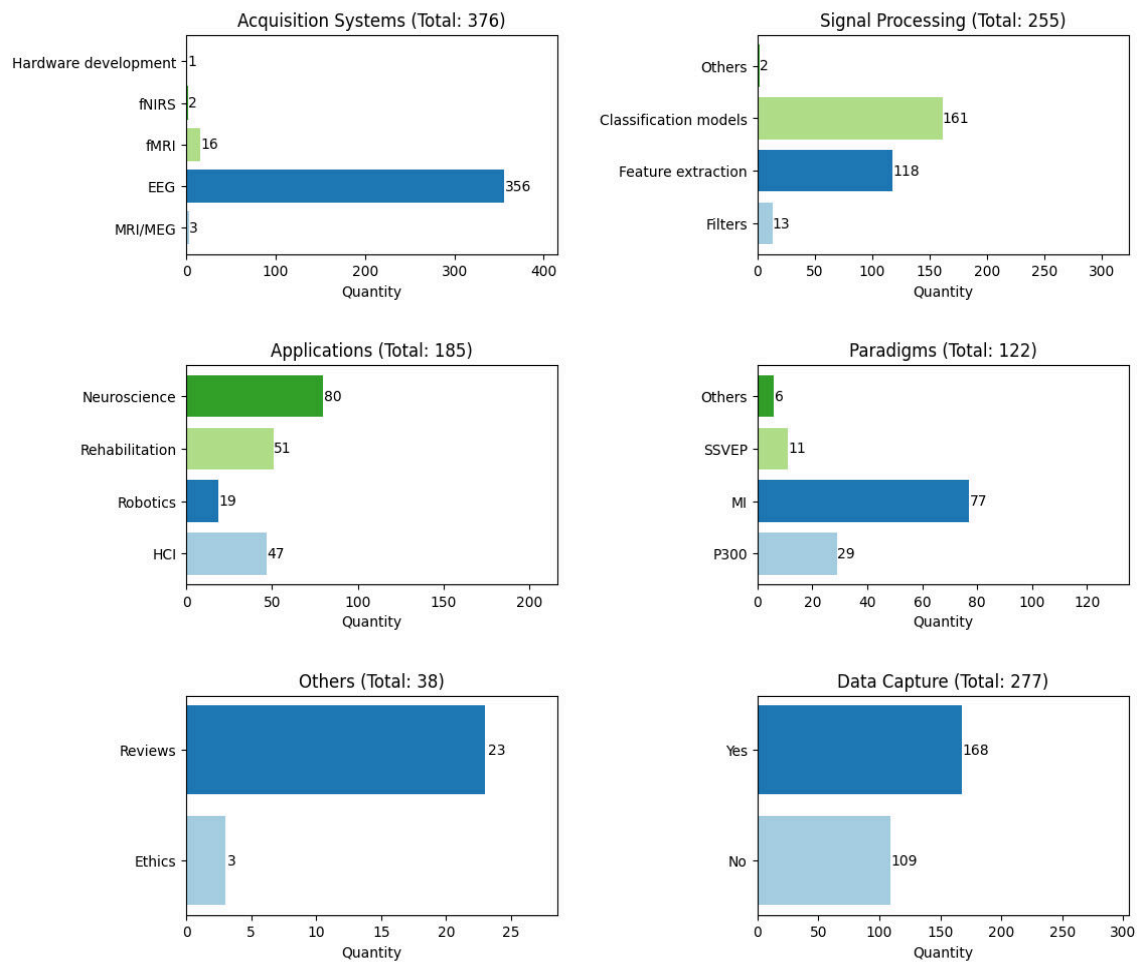


Figure 1: Distribution of the six main categories and their respective subcategories in Brain-Computer Interface (BCI) research in Latin America. The categories include Acquisition Systems (EEG, fMRI, MRI/MEG, ECoG, fNIRS, hardware development), Signal Processing (feature extraction, classification models, filters), Applications (rehabilitation, robotics, neuroscience, HCI), Paradigms (P300, MI, SSVEP), Others (reviews, ethics), and Data Capture (Yes/No).