

Establishing Spatiotemporal Linguistics: A New Approach to the Interdisciplinary Study of Language History and Human Movement



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Project Information	Project Number : 24K23937 Project Period (FY) : 2024-2030 Keywords : Language change, time and space, GIS, correlation between linguistic and non-linguistic data

Purpose and Significance of the Research

- **To establish a novel research domain focused on language change**, utilizing geographical information. The objective of this initiative is to enhance the existing research methodology by reversing the traditional approach, which is predicated on a time-axis delineating phylogenetic relationships, to a novel approach based on a spatial-axis that maps out the phylogenetic relationships from geographical information. To this end, a dual-pronged approach will be adopted: Firstly, the development of research tools that make use of GIS; and secondly, the promotion of research on specific research questions. The 7,000 languages of the world reflect different environments, cultures and histories, and knowledge of the history of their development is also socially significant in that it leads to acceptance of diversity.

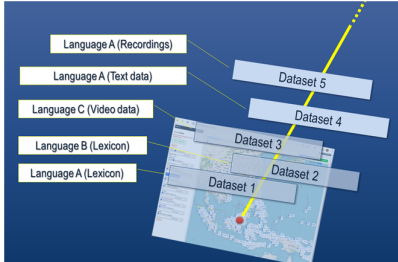


Fig.1 Integrating Disparate Language Datasets through Geographical Information

- **Methodology development: Micro- to Macro-, across language families and beyond.** The evolution of languages is influenced by a multitude of factors, including internal linguistic elements, human activities, the natural environment, and cultural contexts. This initiative will examine language data from diverse geographical regions. By transcending the existing limitations in data and collaborating with specialists in related fields, two objectives are being pursued. First, we seek to acquire a more profound understanding of the underlying mechanisms of language change. Secondly, we aim to establish a novel paradigm for the study of language evolution.

- **To develop a system that enables cross-searching across a range of disparate language datasets**, which are currently operating in a state of independence from one another. This will include both spoken and signed language data, as well as both structured and non-structured data. The final product will assist linguists in analyzing data and will inform future analyses in which human researchers and AI collaborate, thereby establishing foundations for additional future methods.

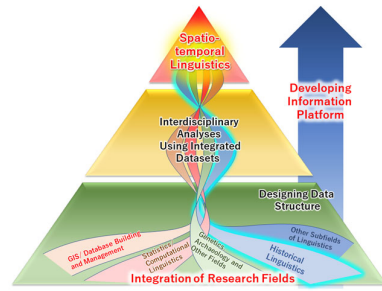


Fig.2 Interdisciplinary Study Leading to the Establishment of A New Research Field

Organization of the Project Team

- **12 researchers from 10 countries to build a new research tool**

The members include specialists in quantitative linguistics and GIS, data management specialists of large international repositories, and those who have created and manage advanced spoken and sign language databases. Those from developing countries will ensure the relevance and utility of the system for researchers working in diverse research environments.



- **14 core researchers from Japan, Fiji, and the United States**

The core team includes specialists in historical linguistics, historical-geographical linguistics, linguistic typology, quantitative and computational linguistics, geography, archaeology, genetics, statistics, and other relevant fields. It started in 2016 and has gradually evolved into its current form.

Plan for Fostering Early-career Researchers (ECRs)

- **As the "nodes" in this international research network**, ECRs will connect researchers and datasets and provide feedback to the grid. In doing so, they will build their own international network, but also evaluate the data and tools from perspectives other than their own needs. ECRs will have a good opportunity to understand the characteristics of each dataset, to learn, and to develop ideas about the potential of the tool. This will ultimately lead them to create new perspectives where traditional and new methods are integrated to maximize the use of the new database interface.
- **Engaging in field-based language research** will be an opportunity to learn the difference between "languages" as they appear in data and "languages" as they are actually used in everyday life by living people.
- **Planning and conducting seminars for university students and scholars from countries where information science is not yet established** will provide ERCs with the opportunity to review, renew, and develop their own knowledge and skills both in their own field and about this interdisciplinary research.



Fig.3 Converting Field Data to Digitized Maps