

## PUBLICATIONS

1. Georgios Santipantakis, Christos Doulkeridis, Akrivi Vlachou, George Vouros, **Integrating Data by Discovering Topological and Proximity Relations Among Spatiotemporal Entities**, *Big Data Analytics for Time-Critical Mobility Forecasting: From Raw Data to Trajectory-Oriented Mobility Analytics in the Aviation and Maritime Domains*, "Springer International Publishing", (pp. 155-179), 2020
2. Georgios Santipantakis, Christos Doulkeridis, George Vouros, **Link Discovery for Maritime Monitoring**, *Guide to Maritime Informatics*, Springer, (pp. 201-227), 2021
3. Georgios Santipantakis, George Vouros, Christos Doulkeridis, **Coronis: Towards Integrated and Open COVID-19 Data**, *EDBT demo track*, (pp.656-669), 2021
4. Nikolaos Koutroumanis, Christos Doulkeridis, **Scalable Spatio-temporal Indexing and Querying over a Document-oriented NoSQL Store**, *EDBT*, (pp.611-622), 2021
6. Nikolaos Koutroumanis, Nikolaos Kousathanas, Christos Doulkeridis, Akrivi Vlachou, **A Demonstration of NoDA: Unified Access to NoSQL Stores**, *VLOB demo track*, (pp.2851-2854), 2021
7. Panagiotis Tampakis, Dimitris Spyrellis, Christos Doulkeridis, Nikos Pelekis, Christos Kalyvas, Akrivi Vlachou, **A Novel Indexing Method for Spatial-Keyword Range Queries**, *SEITD*, (pp.54-63), 2021 *best paper award*
8. Nikolaos Koutroumanis, Kousathanas Nikolaos, Christos Doulkeridis, Akrivi Vlachou, **Declarative Querying of Heterogeneous NoSQL Stores**, *SEAData workshop*, 2021
9. Georgios Santipantakis, George Vouros, Christos Doulkeridis, **Towards Integrated and Open COVID-19 Data**, *CoRR*, 2020

## PEOPLE

**Christos Doulkeridis** – Principal Investigator,  
Associate Professor

**George Vouros** – Professor

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<http://www.ds.unipi.gr/chorologos/>

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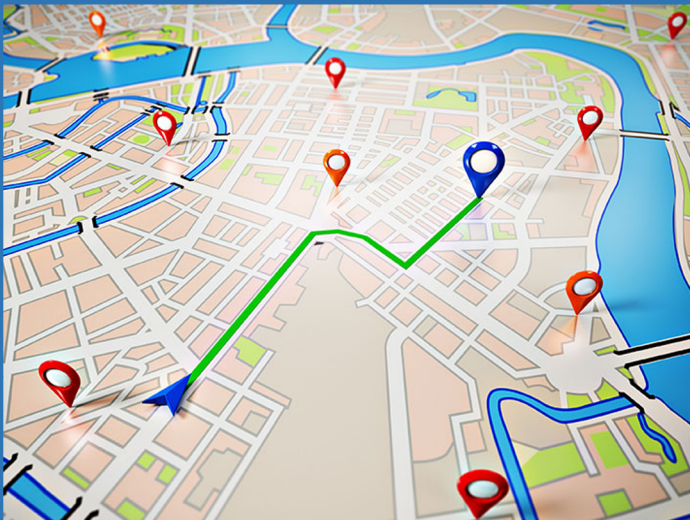
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# Objectives

- Formulation of expressive query types that enable selection of underlying spatio-temporal-textual data based on diverse information needs, going beyond exact or syntactical matching and towards semantic retrieval. Examples of such queries include similarity matching, pattern-based matching, as well as semantic similarity matching.
- Theoretical contributions in terms of properties and search bounds for the proposed query types, thus laying the foundations for efficient processing and search.
- Design of appropriate access methods that jointly index space, time, and text, in an appropriate way to support filtering of data that is irrelevant to the query at hand
- Efficient query processing algorithms following well-established methodologies, including filter-and-refine and branch-and-bound, aiming at fast delivery of accurate query results.
- Parallel processing of the proposed query types, towards scalable algorithms that make the analysis of vast-sized data sets feasible in practice.



# Impact

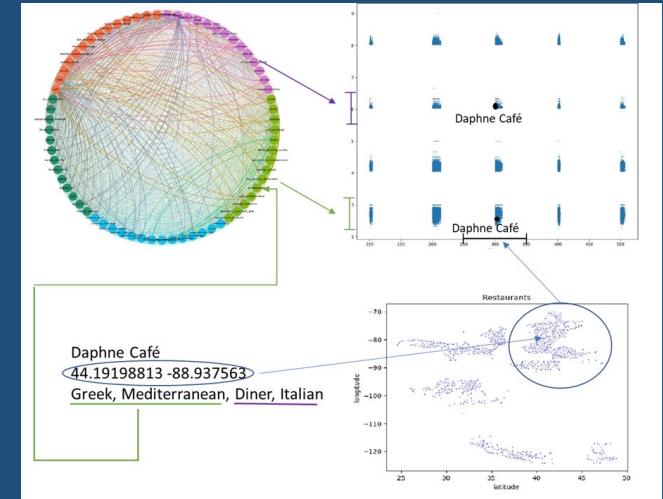
CHOROLOGOS promises to move the research frontier a step forward in the area of semantic spatio-textual data management. Effective and efficient retrieval of spatio-temporal-textual data is a challenging topic, which has attracted considerable attention recently, not only from the academia, but also from the industry. Search engines (such as Google, Yahoo and Bing) and social network providers (Twitter, Foursquare, etc.) either collect or own vast-sized spatio-textual data sets, and conduct research in new methods and technologies for advanced analytics, in order to provide personalized recommendations, targeted marketing, etc. By exploiting CHOROLOGOS the analysis of massive spatio-textual datasets, typically encountered in the aforementioned domains and especially in social networks, is going to be facilitated significantly.

# Results

CHOROLOGOS aims at advancing the state-of-the-art in spatio-temporal-textual query processing, by introducing a novel framework that tightly combines spatio-textual and spatio-temporal querying with semantic retrieval, focusing on expressive query formulation beyond syntactical matching, efficient indexing and query processing, and scalable analysis of massive spatio-textual data.



# Highlight



# Mapping Spatio-textual Data to 2D

- ❖ We propose a novel method that transforms spatio-textual object to points in a 2D space, which can be effectively indexed using traditional spatial access methods
- ❖ We provide appropriate search bounds for spatial-keyword range queries in the transformed space, in order to prune the search space and avoid processing unnecessary data objects
- ❖ We develop algorithms for query processing of spatial-keyword range queries in the transformed space
- ❖ We demonstrate the efficiency of our algorithms by implementing them in PostgreSQL