Preface for GeoLD 2024: 6th Geospatial Linked Data Workshop

Timo **Homburg**[1,*,†], Beyza **Yaman**[2,†], Mohamed Ahmed **Sherif**[3] and Axel-Cyrille Ngonga **Ngomo**[3,†]

[1]*Mainz University Of Applied Sciences, Mainz, Germany*

[2]*ADAPT Centre, Trinity College Dublin, Ireland*

[3]*University of Paderborn, Germany*

Abstract

GeoLD 2024 was a full-day workshop on May 26th, 2024, in Hersonissos, Greece, co-located with the 21st edition of the Extended Semantic Web Conference (ESWC2024). This workshop invited papers covering the challenges and solutions for handling with GLD, especially for building high-quality, adaptable, geospatial infrastructures and next-generation spatial applications. The workshop demonstrated the latest approaches and implementations, and to discuss the solutions to challenges and issues arising from research and industrial organizations.

Keywords

Geospatial data, Linked data, GIS

1. Introduction

Geospatial data are essential for many traditional GIS tasks, such as navigation, logistics, and tourism, but even more so for emerging technologies like autonomous vehicle navigation, innovative city technologies, and location-based services. Geospatial Linked Data (GLD) is a crucial source of machine-readable pre-interpreted information for all these technologies. Recently, we have observed a transformation process of spatial data infrastructures from previously merely acting as data providers to becoming brokers of geospatial information of different kinds, origins, and quality, and a need to interconnect and incorporate information from different data repositories, often even in real-time. GLD enables web-based, interoperable geospatial data infrastructures that may enhance and support existing standardization efforts like Europe's INSPIRE directive. This need for GLD integration leads to efforts to create next-generation knowledge graphs which integrate multiple spatial datasets with large numbers of general

datasets containing some geospatial references (e.g., *DBpedia, Wikidata*) and even volunteered geographic information (e.g., *LinkedGeoData*) and sensor data. This integration, either on the public Web or within organizations, has immense socio-economic and academic benefits. The upsurge in linked data-related presentations in the Eurogeographics data quality workshop series, relevant journal publications, activities of standardization bodies (OGC GeoSPARQL), and Spatial Data Applications shows a deep interest in GLD in national mapping agencies and beyond. Moreover, geospatial information systems benefit from Linked Data principles in building the next generation of spatial data applications, e.g., federated smart buildings, self-piloted vehicles, delivery drones, or automated local authority services, which is of increasing interest to various stakeholders.

The GeoLD 2024 workshop invited papers covering the challenges and solutions for handling GLD, especially for building high-quality, adaptable geospatial data infrastructures and next-generation spatial applications. We aim to demonstrate the latest approaches and implementations and discuss the solutions to challenges and issues arising from research and industrial organizations.

2. Geospatial Linked Data Workshop

The GeoLD 2024 workshop was a full-day event held on May 26th, 2024, in Hersonissos, Greece, co-located with the 21st edition of the Extended Semantic Web Conference (ESWC2024).

The workshop started with article presentations and continued for three sessions. The presented articles were as follows:

- Nicholas John Car: *Representing spatial uncertainty and allowing for probabilistic topological functions with SUFF, an extension to GeoSPARQL*
- Timo Homburg: *GeoWebAnnotations: Extending the W3C Web Annotation Data Model for geospatial data*
- Basel Shbita, Namrata Sharma, Binh Vu, Fandel Lin, and Craig Knoblock: *Constructing a Knowledge Graph of Historical Mining Data*
- Martin Böckling, Heiko Paulheim, and Sarah Detzler: *A Planet Scale Spatial-Temporal Knowledge Graph Based On OpenStreetMap And H3 Grid*
- Simon Bin, Claus Stadler, Lorenz Bühmann, and Michael Martin: *Getting practical with GeoSPARQL and Apache Jena*
- Timo Homburg, Frans Knibbe, Ghislain Atemezing, Nathalie Abadie, and Luís Moreira de Sousa: *The Case for a standardised CRS ontology*

In addition, the workshop featured an invited talk by Luís Moreira de Sousa, "GloSIS: An operational Soil Ontology with the Semantic Web", which gave practical insight into how geospatial linked data is used at ISRIC, the International Soil Reference, and Information Centre to model soil information data using Semantic Web vocabularies.

The workshop continued with a keynote presentation by Manolis Koubarakis about "Recent advances in question answering for geospatial knowledge graphs". As an expert on linked data standards and interoperability in Greece, Manolis Koubarakis provided the participants with

first-hand experiences of the challenges that large language models such as Chat GPT face with respect to question answering and geospatial data. By presenting several question answering benchmarks he showed the efficiency of large language models with respect to geospatial data and could show the potential for combining large language models with specific knowledge graphs for geodata for better question answering results.

The workshop ended with the workshop chairs wrapping up the sessions and officially closing the workshop. The workshop received 7 paper submissions, 6 of which were accepted for presentation. The workshop attracted papers from industry and academia.

3. Organizing Committee

- Timo Homburg, Mainz University Of Applied Sciences, Germany
- Beyza Yaman, ADAPT Centre, Trinity College Dublin, Ireland
- Mohamed Ahmed Sherif, University Of Paderborn, Germany
- Axel-Cyrille Ngonga Ngomo, University Of Paderborn, Germany

4. Program Committee

- Manolis Koubarakis, National and Kapodistrian University of Athens, Greece
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- Nicholas Car, Kurrawong AI, Australia
- Erwin Folmer, Kadaster, University of Twente, The Netherlands
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- Michael Röder, DICE research group, University of Paderborn, Germany
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- Declan O'Sullivan, Trinity College Dublin, Ireland
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- Julio Hernandez, Trinity College Dublin, Ireland
- Marvin Hofer, ScaDS.AI, InfAI, Leipzig University, Germany
- Amit Kirschenbaum, InfAI, Leipzig University, Germany

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