europass

Lama Moualla

EDUCATION AND TRAINING

Ph.D. Candidate

"Giuseppe Colombo" University Center for Space Studies and Activities - CISAS [09/2020 – Current]

Address: Padova Via Venezia 15, 35131 PD (Italy)

Website: https://cisas.unipd.it/

Field(s) of study: Sciences, Technologies and Measurements for Space

Thesis: Prevention of Potential Catastrophes Depending on Interferometric Radar and Artificial Intelligence

- The significant contributions of the project are particularly highlighted through the application of real case studies to derive displacement signal patterns for individual pixels from the filtered-wrapped interferograms. Each case study is distinct, characterized by its unique features, necessitating the development of customized techniques for InSAR data preprocessing. An example of such innovation is our approach to using pseudo-labeling to augment the training set of the cosine KNN classifier. Another fundamental strength lies in the rigorous data collection processing and conducting thorough thematic analysis. Together, these elements significantly underscore the novelty and importance of the research, especially within the field of geohazard risk management.
- The project successfully introduced an innovative ArcGIS Pro-based toolbox for interactive prediction of ground displacement, showcasing the integration of InSAR, Geographic Information Systems, and Artificial Intelligence.
- A diverse set of skills was honed, including advanced expertise in InSAR for precise ground monitoring and a deep understanding of machine learning for environmental data analysis. Developing a GIS-integrated toolbox underscored proficiency in software development and the practical application of AI technologies in geohazard detection. Furthermore, the use of Long Short-Term Memory models for predicting displacement time series demonstrated an advanced capability in predictive modeling, especially for handling complex, irregular data patterns. These achievements reflect not only a significant advancement in geohazard monitoring techniques but also the cultivation of a comprehensive skill set in data analysis, predictive modeling, and technological integration within the environmental sciences domain.

Civil Engineering master's degree

Aleppo University [12/2010 – 08/2015]

City: Aleppo

Country: Syria

Field(s) of study: Geographical Information Systems GIS, Remote Sensing, Advanced Mathematics and Mathematical Modelling

Thesis: Using of Geographic Information Systems to Establish Sensitivity Mapping ATLAS for Coastal Cities

- This research focused on the exploration and application of Geographic Information Systems in the analysis of environmental sensitivities, specifically within the context of the Syrian Coast. The study aimed to address two major areas of environmental concern: groundwater pollution sensitivity and landslide sensitivity. To achieve this, the "DARSTIC" technique along with statistical methods were utilized, which enabled assessing and categorizing the studied areas into five distinct degrees of sensitivity. This approach allowed for a nuanced understanding of the region's vulnerabilities to specific environmental hazards.
- Valuable expertise was gained in the application of GIS software for environmental sensitivity analysis. This included proficiency in conducting complex queries and analyses within the GIS framework The ability to

classify areas into different degrees of sensitivity based on their vulnerability to environmental hazards showcases a significant skill set in environmental analysis and planning. Moreover, producing a final sensitivity map serves as a tangible outcome of the research, and demonstrates a capability to synthesize and present data in a meaningful way. These skills are critical for advancing the field of environmental protection and management, particularly in the context of increasing global awareness and concern for Earth's ecosystems.

Civil Engineering bachelor's degree

Aleppo University [08/2005 – 08/2010]

City: Aleppo

Country: Syria

Website: https://alepuniv.edu.sy/

Physics for Engineering, Informatics for Engineering, Geometric Geology, Geodesy, Computer programming and Applications, Geographic Information Systems, Cartography, Project management and organization, Computer-aided solving of Geodesy problems

WORK EXPERIENCE

Research Associate

Bristol University (Visual Information Laboratory) [15/05/2022 – 15/11/2022]

City: Bristol

Country: United Kingdom

Identifying the areas where linear infrastructures are at risk of displacements due to landslides. The method determined the level of catastrophic risk in potentially unstable locations.
The above main activity has been done by:

1. Employing deep learning approaches by adapting a convolutional neural network (CNN) to detect spatial deformation in a national scale velocity field depending on Interferometric Synthetic Aperture Radar (InSAR) datasets.
2. Analyzing and modeling the time series and the pattern of temporal occurrence of InSAR datasets using long short-term memory (LSTM) architecture.

Lecturer at Topography Engineering Department

Faculty of Civil Engineering,Tishreen University [01/2012 – 06/2020]

City: Latakia

Country: Syria

• Taught many Geomatic courses for civil engineering, architecture and geology students
• Supervised on student groups to do a cadastral survey using different surveying instruments

Engineer at Directorate of Engineering Affairs

Tishreen University [08/2011 – 12/2011]

City: Latakia

Country: Syria

• Formed committees to receive Tishreen University's modern constructions
• Carried out maintenance for all Tishreen University's equipment

Volunteer at the Syrian Trust for Development

The Arab Cultural Center [09/2011 – 12/2011]

City: Latakia

Country: Syria

• Guided teenage groups to achieve small contributing projects for developing their city

• Organized a computer literacy basics workshop for the elderly which included calling candidates, preparing lect ure sessions, and ending up with the distribution of symbolic certificates

Lecturer at Topography Engineering Department

Faculty of Civil Engineering, Aleppo University [01/2011 – 06/2011]

City: Aleppo
Country: Syria

• Taught Geomatic courses for civil engineering students
• Supervised on student groups to implement basic surveying applications using surveying instruments

LANGUAGE SKILLS

Mother tongue(s): **Arabic**

Other language(s):

English

LISTENING C1 **READING** C1 **WRITING** C1

SPOKEN PRODUCTION C1 **SPOKEN INTERACTION** C1

Italian

LISTENING B1 **READING** B1 **WRITING** A2

SPOKEN PRODUCTION A2 **SPOKEN INTERACTION** A2

German

LISTENING A1 **READING** A1 **WRITING** A1

SPOKEN PRODUCTION A1 **SPOKEN INTERACTION** A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

DIGITAL SKILLS

Microsoft Office: Word, Excel, Access, Power Point, Outlook. / Erdas Imagine / GIS software: ArcGIS, QGIS / Geomedia / Visual Basic Programming / High ability to use AutoCAD / High ability to use Autoland / Machine Learning and Deep Learning frameworks: Tensorflow, Keras, PyTorch / Interferometric synthetic-aperture radar InSAR / programming: Python, MATLAB and SQL

PUBLICATIONS

Learning displacement signals directly from InSAR wrapped interferograms using Sentinel-1 and artificial intelligence

[2023]

This article, submitted, elucidates the first objective of the PhD project, as presented in the FRINGE workshop via the provided video link, commencing at minute 22.

Link: https://www.youtube.com/watch?v=XmG9zgrS978

Assessment Sensitivity of Landslides in The Syrian Coast Using Geographic Information Systems

[2015]

L. Moualla, I. Abbas, & S. Sarkis, 2015, "Assessment sensitivity of landslides in the Syrian coast using geographic information systems", Tishreen University Journal for Research and Scientific Studies.

Assessment Sensitivity of Groundwater Pollution in The Syrian Coast Using Geographic Information Systems

[2015]

L. Moualla, I. Abbas, & S. Sarkis, 2015, "Assessment Sensitivity of Groundwater Pollution in The Syrian Coast Using Geographic Information Systems", Research Journal of Aleppo University.

HONOURS AND AWARDS

NoR Sponsorship

European Space Agency ESA [13/07/2021]

The NoR Sponsorship aims to support research, development, and pre-commercial users to innovate their working practices, moving from a data download paradigm towards a 'bring the user to the data' paradigm, considered essential for maintaining the competitiveness of European data exploitation. The approved amount of the sponsorship is 10000 **€.**

Date: 12/03/2024