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3D Urban Models: Processing and Management of Point Clouds for 3D Urban Modeling

The badge entitled "3D Urban Models: Processing and Management of Point Clouds for 3D Urban Modeling" is awarded as part of the Casa Delle Tecnologie Emergenti Matera project, coordinated by the Department of Engineering, ICT, and Technologies for Energy and Transport of the National Research Council (CNR), in collaboration with UNIBAS.

The training program aims to delve into theoretical and practical aspects related to three-dimensional urban modeling using methods for the management and processing of point clouds from laser surveys, photogrammetry, and other 3D data sources. The course will focus on advanced methods for filtering, data cleaning, classification, and recognition of features in complex urban environments.

This course will extensively cover the data structures necessary for storing and manipulating large volumes of 3D data. Additionally, it will explore standards for annotating urban 3D models and data exchange, ensuring that students are prepared to collaborate in a professional context. Visualization is a crucial element in communicating complex 3D data, and therefore, the course will include basic concepts of visualizing annotated 3D urban models.

The 30-hour training program aims to provide the tools and skills necessary to understand the procedures for creating three-dimensional models of the urban environment. The didactic sessions will provide the theoretical foundations that will be applied in laboratory activities, forming the necessary background for independently following developments in the field's technologies and interfacing with professional and industrial entities operating in the module's themes.

Laboratory activities will allow participants to experiment in the field, applying the acquired skills to a case study. Those who earn this badge will have acquired advanced skills for further training as a professional capable of leveraging modern and advanced three-dimensional digital reconstruction technologies to monitor and visualize the state of urban contexts. They will also be able to simulate the effect of potential changes to the area of interest before their actual real-world application.

Skills

The owner of this badge has demonstrated the following skills:

- Ability to assess existing technologies and standards for annotating urban 3D models and data exchange
- Three-dimensional modeling and digital reconstruction of real environments
- Semantic annotation of 3D models
- Visualization of annotated 3D digital models

The owner of this badge has shown to have acquired the following soft skills:

- Capacity of evaluating the urban and social context where data acquisition will take place
- Capacity of design and optimize the digitalization pipeline to conclude the process on time
- Capacity of maximizing teamwork to achieve the final goal

The owner of this badge has demonstrated the following knowledge:

- Methods for the 3D digital representation of urban context
- Method for informative visualization of cities
- Data exchange methods
- Standards for annotating 3D models
- Strategies/technologies for evaluating various urban planning solutions

Criteria

The Badge is awarded upon the attendance of the course "3D Urban Models: Processing and Management of Point Clouds for 3D Urban Modeling". The percentage of attendance cannot be less than 80% of the planned activities (30 hours).

The assignment of the Badge is subject to passing the final theoretical and practical test.



Modelli urbani 3D: Elaborazione e Gestione di Nuvole di Punti per la modellazione urbana 3D

Issued by University of Basilicata

The University of Basilicata is the leading University of the Basilicata region, in the Southern part of Italy. Since 2012, according to the new University statute and rules of procedure, ex D.R. n. 88/2012, the University of Basilicata is organized through six primary structures (precisely four departments and two schools) in which the functions and the personnel of the pre-existing twelve departments and eight faculties have been re-addressed. Degree programs range from the Humanities, to architecture, archeology, education, economics and management, as well as to the STEM disciplines (hard sciences, agriculture, engineering, computer sciences). Such degree programs are effectively connected to the research, training and third mission activities developed by the primary structures. University of Basilicata counts about 7000 students, and is based in the cities of Potenza and Matera.



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