giCASES

www.gicases.eu

The giCASES project facilitates the collaborative creation, management and sharing of Geographic Information knowledge

About giCASES

GiCASES – Creating a University-Enterprise Alliance for a Spatially Enabled Society – is a Knowledge Alliance co-funded within the EC ERASMUS+ Programme.

The wider objectives of giCASES are:

- To enable and strengthen innovation in GI education and industry.
- To facilitate the collaborative creation, management and sharing of knowledge.

These objectives are addressed by developing new, innovative and multidisciplinary approaches to teaching and learning within the Geographic Information (GI) sector, and facilitating the exchange, flow and co-creation of knowledge.

In particular, giCASES aims to:

- Improve the quality and relevance of GI courses provided by the University members of the consortium.
- Facilitate the growth of new knowledge-sharing processes and tools between enterprises and universities.
- Improve the management of knowledge by the partners.

The overall approach to address these objectives is to develop new learning material and processes based on case based learning. In the approach taken in the project, enterprises and academia collaborates both when creating learning material based on real cases and also during and after the courses (through a collaborative platform).

With the support of the Erasmus+ programme of the European Union

Knowledge Alliance N° 562657-EPP-A-2015-1-IT-EPPKA2-KA

Co-funded by the Erasmus+ Programme of the European Union

Case Study: Use of indoor GIS in healthcare

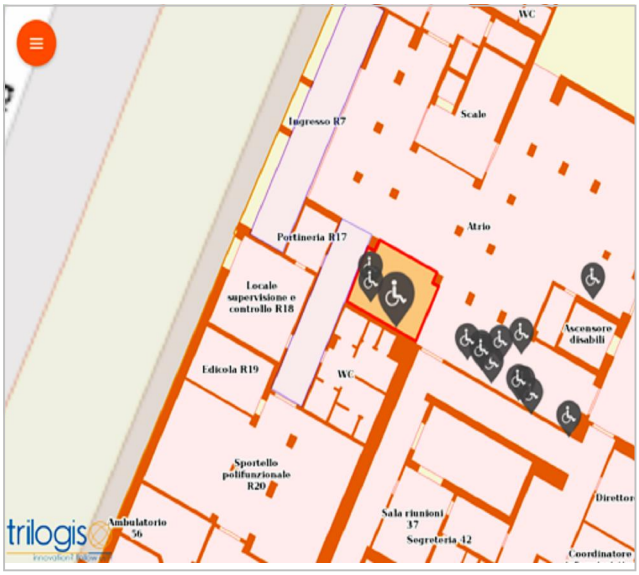
Application domain

People spend most of their time indoors and often in places different from their houses such as offices, hospitals or airports. For this reason, many localization technologies have recently become available for indoor Location Based Services (LBS) and this has opened new research areas and innovation challenges such as the integration of indoor and outdoor location for tracking and managing assets (human or material) based on open Geographic Information Systems (GIS), privacy issues related to indoor tracking of people, data and software standardization, etc. These technologies are key drivers for new business activities in several value added scenarios such as e-government services, eHealth, personal mobility, logistics, mobility, facility management, retail, to name but a few.

Case Study Objectives

The objective of this Case Study is to introduce a group of 4-5 students to the topic of GIS-based indoor LBS and engage them in the development of a real application in a context of interaction between a university (POLIMI) and a SME company (TRILOGIS). The development of the Case Study will be based on a variety of learning methods, which will encompass traditional theoretical lectures as well as practical hands-on tutorials and teamwork sessions.

Students will be involved in a real case scenario where, exploiting their background in computer science, the GIS knowledge acquired during the academic course where the Case Study is developed, and the specific expertise learned from the industry, they will develop a project that exploits a Wi-Fi based indoor location system. The students will develop a GIS-based desktop, web or mobile application that tracks and visualizes the movement of devices or people within the faculty.



Provision of training/education

The Case Study will be developed within the course “Geographic Information Systems (GIS)” (10 CFU), offered at Politecnico di Milano. This course is entirely taught in English as part of the MSc in Geoinformatics Engineering. Students attending the course have a background either in Computer Science Engineering or in Environmental Engineering.

Learning contents

- *Location Based Services (LBS)*
- *Indoor LBS principles*
- *OGC IndoorGML standard*

Learning outcomes

This Case Study will provide a first approach of a joint teaching effort between university and industry. Students will have the unique opportunity of overpassing the traditional boundaries of a university course, where the notions and concepts taught during the lectures are evaluated at most through ad-hoc exercises or simulations. Conversely, students will tackle a real case study (proposed by a real company and where a real result is expected) and will benefit from a practical teamwork experience with industry indoor GIS technologies. At the end of the Case Study implementation, students will be able to develop a complete mobile, web or desktop application based on indoor LBS. They will practice on one specific technology; however, they will be able to apply the same concepts learned during the Case Study also to different technologies. This can happen because the solutions for indoor LBS available on the market are many and quite different, but the core concepts are interchangeable.

Case Study: Environmental analysis using cloud service system

Application domain

The evaluation of Sites of Community Importance (SCI) vulnerability to plant protection products (agrochemicals and pesticides), through an analysis of threats and potential threats to the target species and habitats resulting from the use of such products in the agricultural sector, in compliance with protection objectives of habitats and species in the European Natura 2000 network.

Case Study Objectives

The case wants to address the use of new web technologies and GIS analysis to perform an integrated multi-criteria assessment for the evaluation of potential hazard to SCI areas caused by the exposure to agrochemicals and pesticide.

For those analyses the next generation of technique has to more extensively use web tools and geo-processing. In fact, most data are now available via the web thought web services (OGC WxS or ArcGIS Server) and Linked Open Data protocols.

Also, new calculation power can be offered by specific computational services that help the user to perform complex and articulated analysis.

Provision of training/education

This case study will be implemented as Master thesis in a well-known International Master in Geographic Information Systems and Science at NOVA-IMS.

Learning contents

- *Geographic Information Systems and Science*
- *Spatial Databases*
- *GIS Applications*
- *Cartographic Sciences*
- *Geostatistics*
- *Databases and Geospatial Web Services*

Learning outcomes

After the Master the students will acquire:

- A new professional set of skills and expertise to integrate the GIS competences of Analyst using more web-GIS tool;
- A capacity to solve problems related to the Environmental domain and to set-up data and perform analysis in a new type of platform, starting to increase hazard analysis

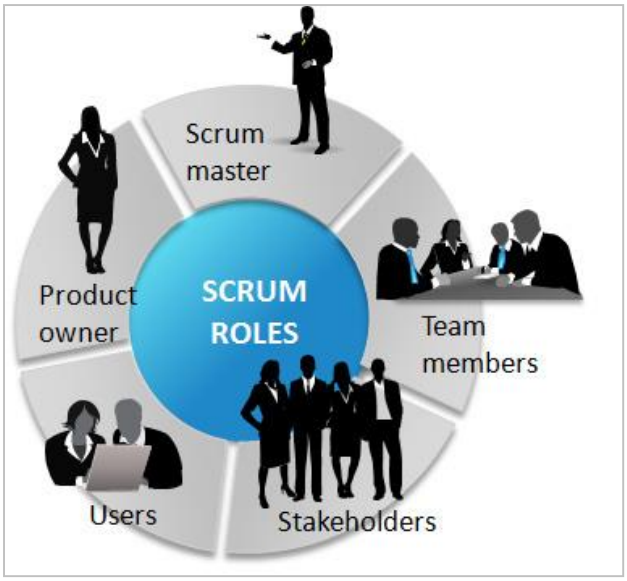
Case Study: Location Enablement of e-Government

Application domain

Over the past years important efforts have been made to improve the access to and sharing of location information, e.g. through the INSPIRE Directive at European level, and the development of Spatial Data Infrastructures (SDI) at national and regional level. However, the uptake and integration of this information and the services in e-Governmental business processes remains relatively weak. Many e-Government processes are apt to be location enabled. This can be done by building applications using SDI components and API's. The Case Study will build upon ongoing projects in geosparc, a SME active in the geospatail sector. More specifically, the students will work on developing applications supporting the process for obtaining environmental permits.

Case Study Objectives

The case study aims the set-up of a case-based and collaborative learning environment in the private company in the context of an existing internship course offered by KU Leuven. Students will apply their already acquired knowledge and skills on GIS, SDI and ICT to work in a mixed team with staff from the company to design, develop and/or test location enabled applications. The students will also be involved where possible in the user requirements analysis. By working together with experienced staff they will learn new skills or apply what they have learned in a real-world context. Moreover, by co-creating code for applications the students and also the staff of the company will get new insights. The internship will apply the scrum method for developing and testing code through the organisations of a series of 'sprints' which are initiated after short interdisciplinary team-meetings.



Provision of training/education

The Case Study will be developed within the course "Geographic Information Systems (GIS) Internship" (15 ECTS), offered at KU Leuven. Students must have taken several other courses prior to the start of the internship: e.g. "Spatial Data Infrastructures". Additional training might be required, e.g. on agile programming methods (scrum) and the geomajas open source platform. The internship itself consists of 20 working days in the company and the preparation of a detailed internship report.

Learning contents

- *Programming and testing apps using the scrum methodolgy*
- *Integration of INSPIRE components and use of API's*
- *Geomajas and other Open Source environments*
- *Team work: students work with company staff*

Learning outcomes

- To consolidate the theoretical knowledge and basic technical skills regarding GI and GIS development and usage;
- To gain a thorough experience in designing and developing applications for making spatial data available, for decision making and e-Government, using state-of-the art methods and tools: (i) Information analysis, (ii) Functional analysis, (iii) Prototyping, (iv) Documenting;
- To learn analysing and describing e-Government processes in which location information and services will be embedded through geospatial web applications using existing SDI components and API's;
- To learn thinking from the user perspective in the design phase of such applications and in particular to learn analysing user requirements and translate them into software code;
- To exercise social skills, to develop attitudes such as flexibility, coping with stress, the ability to organize, to be critical as well as to be geared towards results.

Case Study: Integrated management of the underground

Application domain

Utility networks are owned and maintained by utility companies in different sectors such as water, electricity, sewage, storm-water, fiber optics, cable-TV and telecommunication.

GI technologies plays an important role in the management of utility networks, but despite its economic and environmental impact, management of utility networks are rarely taught in GI-related university program.

Case Study Objectives

The case study has two scopes: the asset management of utility networks and the sharing of utility network data.

Infrastructure asset management is the combination of management, financial, economic, engineering and other practices applied to physical assets with the objective of providing the required level of service in the most cost-effective manner. The objectives are to achieve maximum return on investments and/or to provide the best possible services to the end users

Data sharing refers to the technologies, procedures, standards and regulations to be applied when sharing data with external parties. The INSPIRE directive specifies for instance the data structures and services to be used when sharing data while the directive on broadband cost reduction specifies more specific conditions for access to utility network data.

The main goal of this case study is that the students will become acquainted with problems related to utility networks and asset management.

Provision of training/education

This case study will be implemented as an elective course included in a well-known International Master in Applied Geoinformatics offered by University of Salzburg.

Learning contents

- *INSPIRE Data Specification*
- *INSPIRE Network Services*
- *Metadata and Data* validation *for INSPIRE*
- *GeoSmartCity Data Models*
- *Basic principles of utility asset management*
- *District Heating Networks*
- *Advanced topics in utility asset management*
- *Electricity Networks*

Learning outcomes

After the course, our students will:

- become acquainted with the main problems related to utility networks and asset management.
- have knowledge about the concepts and terms used in data sharing, data harmonisation and service provision.
- have knowledge about the concepts and terms used in project management and in the management of electricity networks and water supply systems.
- be able to publish utility network data through standardised network services.
- be able to specify different requirements on asset management system for utility network, for instance risk models and cost and revenue models.
- understand the complexity, objectives and benefits of modern software for management of utility network.

Reference partners

UNIVERSITÄT SALZBURG · Digpro GEOGRAPHIC IT · OISIG · Novogit AB

Case Study: Harmonizing data flows in Energy saving EU policies

Application domain

This Case Study (CS) will have the overall purpose of co-creating knowledge in the field of GIS-based data flow harmonization in Energy efficiency EU policies. There are indeed several EU Directives (e.g. Energy Performance of Buildings Directive, Energy Efficiency Directive, Renewable Energy Directive) as well as voluntary initiatives such as Covenant of Mayors, which, at different geographical scales and from different perspectives, aim to reduce greenhouse gases emissions and to increase energy saving. In all these policy instruments location data can play an enabling role to support the whole policy lifecycle, from planning to implementation, monitoring and reporting.

Case Study Objectives

The objective of this Case Study is to engage a group of 4-5 students in the development of an application focused on one or more specific aspects of a data flow in support of one of the energy policies. The implementation will rely on the concepts, principles and technicalities of the EU INSPIRE Directive and will be based on a preliminary analysis of the current EU policies on energy efficiency.

The main activities will consist in: analysis of the relevant EU policies related to energy efficiency (i); identification of a relevant business process contained in one of the policies and implying the processing of location-based data (ii); identification of data, methodologies and tools required to run the business process (iii); analysis of input data availability, focusing on open data, and their accessibility (iv); application of the methodologies to obtain output data (v); presentation of results (vi). Whenever possible, emphasis will be given to data harmonization and interoperability according to the INSPIRE Directive, as well as to the use of open source geospatial software and exploitation of open GI standards (e.g. OGC). The workflow will be implemented and tested in a real case at local level.

Provision of training/education

The Case Study will be developed within the course “Geographic Information Systems (GIS)” (10 CFU), offered at Politecnico di Milano. This course is entirely taught in English as part of the MSc in Geoinformatics Engineering. Students attending the course have a background either in Computer Science Engineering or in Environmental Engineering.

Learning contents

- *Energy Saving/Efficiency Policies*
- *Data harmonization and interoperability according to INSPIRE*
- *Open source geospatial software and open standards*

Learning outcomes

At the end of the CS implementation, students will acquire a deep understanding of the issues related to spatial data harmonization workflows contained in the different phases of the energy efficiency policies lifecycle and how to effectively apply IT and GIS technologies in this field. Applying the knowledge acquired to a real case, students will need not just to use the concepts/tools learned during the course, but they will exploit their personal knowledge and skills to find solutions to the problems encountered. This experience strengthens the students curricula and fosters their employability, as it prepares them to work in the industry sector related to energy efficiency as professionals with geospatial *skills*. Moreover, the interaction between the academic and business approaches will benefit and enrich both the industry and the university staff.

The collaboration between the partners will lead to concrete outputs other than the learning material such as academic and scientific publications or white papers. The CS shared work may also lead to the identification of new research/business topics/ideas which can potentially enable further collaboration.

Reference partners

POLITECNICO MILANO 1863

EPSILON Italia

Case Study: GIS Applications in Forestry

Application domain

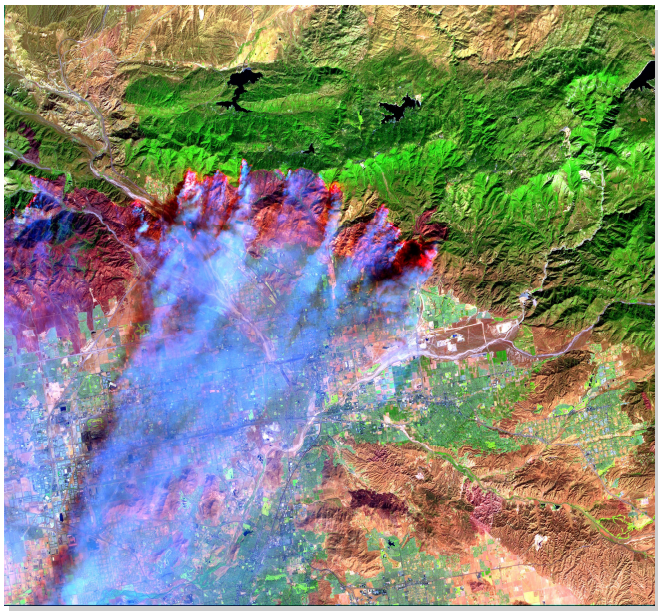
Forests are important renewable natural resources and have a crucial role in preserving an environment suitable for human life. Forest management has become more complex because of the fact that there are many multiple objectives to fulfil as well as multiple and demanding criteria and constraint to address. This makes the spatial technologies are well suited for applications to cope with forest management issues. The GIS technology is a very valuable tool not only in decision-making but also in forest planning and forest management.

Case Study Objectives

The ultimate goal of this course is to bridge the gap between academic institutions and private sector regarding the GIS applications in Forestry, in order to provide students both with the theoretical background and real-case experience and management. The scope of this case study, is, by creating a well-structured graduate / postgraduate course, to introduce the GIS tools that can be used in forest management, and also to provide novel data processing, spatial and multi-objective methods. The general aim is to provide the students with a firm theoretical foundation and understanding of forest management, including the social and environmental parameters and the ability to apply theory in practice, through the lab sessions. The CS6 implementation will follow two steps :

Module 1 (UWH): To students of the University, 2 weeks, 8 hours/week, June 2017

Module 2: (EPSILON): To students & interested stakeholders, 3 days, 5 hours/day, September 2017



Provision of training/education

Learning material will be implemented within Forestry MSc Programme (2 ECTS) offered by University of West Hungary as an individual test course. This course will be entirely taught in English. A high level of English language ability in reading, writing and study skills is needed.

Learning contents

- *Forestry GIS database*
- *Forest Mapping & data collection*
- *LIDAR based timber volume estimation*
- *Climate change*
- *Multiobjective forest management*
- *Forest Fire Risk mapping*
- *Forest Fire Monitoring*
- *Forest Fire Simulation*

Learning outcomes

After completion of the course the students will be familiar with GIS applications in Forestry and more specifically they will be able to:

- Prepare thematic maps for decision makers
- Develop a critical awareness of forest management from a multidisciplinary perspective
- Use complex tools and methods serving at the real world fire cases
- Be able to conduct geospatial analysis and simulation of forest fire events

The outcomes of this procedure are not only student related, but are also expected to benefit the rest of the actors involved from the academic and private field.

Reference partners

Epsilon

UNIVERSITAS HUNGARIAE OCCIDENTALIS SOPRONIENSIS

Project activities

- Creation of a repository of best practices on industry-academia cooperation to create and share knowledge in the GI domain
- Definition of the focus, scope and requirements of the case studies
- Specification of innovative collaboration methods, with best practices on different methods and validation of these methods in different settings
- Definition of process, tools and methodologies for co-creation of knowledge
- Definition of technical specifications for the set up of a collaboration tool (collaborative platform) and implementation of the technical infrastructure
- A set of case studies adopted for case based learning and related learning material

The collaborative platform will be also used to make the project results (learning material and processes) available to other stakeholders under open licences, as well as to attract more content providers / stakeholders to contribute to the growth of the content base.

The Consortium

Get in touch with us: *Project Coordinator contact, gisig@gisig.it*

Co-funded by the Erasmus+ Programme of the European Union