Data-Driven Management of Fire Incidents (E051640)

Course size *(nominal values; actual values may depend on programme)*

Credits 3.0   **Study time 90 h**

Course offerings and teaching methods in academic year 2023-2024

| A (semester 1) | English | Gent | lecture |
| | | | practical |

Lecturers in academic year 2023-2024

| Verstockt, Steven | | TWO6 | lecturer-in-charge |

Offered in the following programmes in 2023-2024	crdts	offering
International Master of Science in Fire Safety Engineering	3	A
International Master of Science in Fire Safety Engineering	3	A
Master of Science in Fire Safety Engineering	3	A

Teaching languages

English

Keywords

Computer vision, NLP, BIM, GIS, web technologies, (meta)data enrichment, machine learning

Position of the course

The aim of this introductory course is to provide students with insights into the different building blocks of a data-driven fire incident monitoring/management framework. Basic knowledge of multimedia-based detection tools (video and other sensors), web technologies and (meta)data mining/linking (with GIS, BIM) forms the backbone of this course. The course is practice oriented and gives students the opportunity to gain hands-on experience with some of the building blocks of the framework. In the labs, the students will also perform an in-depth state-of-the-art study on the building block of their interest and present/discuss their results in the group.

Contents

1 General overview of a data-driven fire incident management system (introduction)
2 Sensor data analysis (video, thermocouples, social media, drones, IoT, etc.)
3 Machine learning & data mining algorithms
4 GIS basics / spatio-temporal data analysis/linking / mapping tools
5 BIM analysis/querying/localization
6 Location based services & context analysis based on (open) web data
7 (Meta)data enrichment
8 Visualization of fire incident data

Initial competences

The labs/exercises require basic programming experience.

Final competences

1 Explain the different building blocks involved in a fire incident management platform.
2 Analyze and critically evaluate alternatives for the discussed sensors/algorithms/tools.
3 Critically analyze and compare different tools/methods for fire incident data visualization.
4 Link sensor data with BIM/GIS and enrich it with other data sources.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Lecture, Practical

Extra information on the teaching methods

By means of (web)lectures, the substantive topics are explained. During these lectures, examples are demonstrated to illustrate the principles and algorithms. Furthermore, the lectures are supported by (web)tutorials/exercises where students can further explore/investigate some of the topics/techniques.

Learning materials and price

- Annotated powerpoint through the electronic learning environment
- Task Descriptions through the electronic learning environment

References

Course content-related study coaching

- Interactive support through the electronic learning platform
- Supervision of exercises via feedback moments during class or online meetings.

Assessment moments

end-of-term and continuous assessment

Examination methods in case of periodic assessment during the first examination period

Written assessment

Examination methods in case of periodic assessment during the second examination period

Written assessment

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is not possible

Extra information on the examination methods

- First examination period
  - End-of-term evaluation (written closed book examination)
  - Continuous assessment (permanent evaluation of assignments/reports)
- Second examination period
  - End-of-term evaluation (written closed book examination)
  - Continuous assessment (permanent evaluation of assignments/reports): examination during the second examination period is not possible (the mark from the first examination period is used)

Calculation of the examination mark

Both examination periods:
- Written closed book examination (periodic evaluation): 50%
- Portfolio/project (continuous assessment): 50%
In order to pass the course, the student must score at least 8/20 for both periodic evaluation and continuous assessment. If this condition is not met, a score of 10 or more is reduced to 9.