

69719 - Medical image analysis

Syllabus Information

Academic Year: 2022/23

Subject: 69719 - Medical image analysis

Faculty / School: 110 - Escuela de Ingeniería y Arquitectura

Degree: 633 - Master's Degree in Biomedical Engineering

ECTS: 3.0

Year: 1

Semester: Second semester

Subject Type: Optional

Module:

1. General information

2. Learning goals

3. Assessment (1st and 2nd call)

4. Methodology, learning tasks, syllabus and resources

4.1. Methodological overview

The methodology followed in this course is oriented towards achievement of the learning objectives. It is based on a practical orientation where all methodologies employed during the course will be illustrated with real examples. In some cases, the same examples will be used to present and compare the performance of several methodologies. Therefore, the learning process will be driven by projects and examples, which will cover the following topics:

1. Segmentation of medical images. Brain tumor segmentation from multimodal MRI images.
2. Registration of medical images. Computational anatomy and brain morphometry; motion correction artifacts on time-series of medical images and brain perfusion.
3. Statistical shape analysis. Statistical inference for clinical trials and disease understanding.

4.2. Learning tasks

The course includes the following learning tasks:

A01 Lectures (28 hours). The set of lectures will be devoted to introduce the concepts as well as to show illustrative lectures both teacher and students will make use of the computer during the class.

A03 Projects. Each individual student will make three projects, one for each of the main topics of the course: segmentation, registration and statistical shape analysis. These projects will be evaluated with a short document and with eventually an oral presentation.

A06 Tutorials. The teacher will be available to the students for helping them in their learning process, either in small groups or individually. A minimum of six hours will be offered per week.

A08 Assessment. A set of tests will be taken during the course, with either a theoretical or practical orientation. For more detail in the Assessment Section. These activities will help to monitor and to assess the quality of the individual student.

4. Statistical shape analysis.

1. Shape description. Pose definition
2. Statistical inference. Multiple comparison correction and spatial correlation.

4.4. Course planning and calendar

This course is planned for the spring semester. Further information concerning the timetable, classroom, office hours, assessment dates and other details regarding this course, will be provided on the first day of class or please refer to the EINA website and Moodle <https://moodle.unizar.es/>.

4.5. Bibliography and recommended resources

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=69719&Identificador=C73928>