INSA INSTITUT NATIONAL DES SCIENCES APPLIQUÉES LYON

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Télécommunications

Signal and Image Processing - Part2

IDENTIFICATION

CODE : IST-4-SIP2
ECTS : 3.0

HOURS

Lectures :	0.0 h
Seminars :	20.0 h
Laboratory :	0.0 h
Project :	0.0 h
Teacher-student contact :	20.0 h
Personal work :	20.0 h
Total :	40.0 h

ASSESSMENT METHOD

Grading is done according to the following :
- The image processing lab report.
- A presentation of work on the Kaggle challenge.

TEACHING AIDS

TEACHING LANGUAGE

English

CONTACT

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AIMS

This course comprises 2 modules :
- A theoretical and practical introduction to image processing.
- A deep learning workshop.

CONTENT

- Digital image representation (spatial and frequency domains), notions of neighborhood, sampling, quantization etc.
- Image processing : histogram operations, linear operations (denoising, edge detection etc.), non-linear operations and mathematical morphology.
- Image segmentation : histogram, contour and region based approaches.
- Image processing lab applied to previous points.
- Introduction to deep learning via convolutional neural networks tutorial lab.
- Application of deep learning to a Kaggle challenge.

BIBLIOGRAPHY

- Rafael C. Gonzalez and Richard E. Woods, Digital Image Processing, 3rd edition, Pearson, 2007
- Ian Goodfellow, Yoshua Bengio and Aaron Courville, Deep Learning, MIT Press, 2016, https://www.deeplearningbook.org/

PRE-REQUISITE

Good background in applied math and digital signal processing is necessary, e.g. the SIP1 module, in addition basic Python programming skills.