Computational analysis of biological structures and networks

Instructions for the thematic workshop

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Assessment methods

Two parts:

- *First part: **written exam** (during exam sessions)*
  - *Can be an oral depending on health situation*
- *Second part: **talk** within a thematic workshop (as in a conference)*

Assessment methods

- First part: **written exam** (oral if the case)
  - few questions on course topics
    - Example: "Describe the main properties of Bayesian Networks"
  - one question on the lab part (typically understanding a small piece of code)
    - Example: "Does this matlab code compute the mean of the vector x? Why?"

```
% x is a vector of N entries containing numbers

m = 0;
for i = 1:N
    m = m+x(i);
end
m = m/(N-1);
```

Assessment methods

*Second part: **Talk** within a thematic workshop*

- *The topic of the thematic workshop will be decided in advance (before middle of November)*
- *Each student has to choose a scientific paper to be presented in 10 minutes*
- *One thematic workshop will be held at the end of the course (registration needed by early December)*
- *Other sessions in June and September*

Thematic Workshop: procedure

- Three thematic workshops will be held this year
  1) End of January 2021
  2) Late June/early July 2021
  3) Late September 2021

Procedure:

STEP 1: **register** for a given Thematic Workshop.
To register you simply have to send an email before the registration deadline

January session: students who want to participate to the January session need to register by sending an email before 23/11

Thematic Workshop: procedure

Procedure:

STEP 2: **choose a paper** before the deadline

i) The paper should be related to the Thematic Workshop topic

ii) Every student should choose a different paper (a list of already taken papers will be maintained on line)

iii) The chosen paper should be approved by the instructor (send an email with paper details and wait for approval)

January session: students who want to participate to the January session need to choose the paper by 14/12

Thematic Workshop: procedure

Procedure:

STEP 3: **prepare the presentation and present the paper** the day of the Thematic Workshop

Please send me your slides (in **PDF format**) the **day before** your presentation (to speed up the process, all the slides will be shown using my laptop)

Deadlines

Workshop of January

Deadline for registration:	23-11-2020
Deadline for the paper:	14-12-2020
Workshop date:	(18-22) or (25-29) Jan 2021

Workshop of June/July

Deadline for registration:	01-05-2021
Deadline for the paper:	01-06-2021
Workshop date:	late June – early July 2021

Workshop of September

Deadline for registration:	15-07-2021
Deadline for the paper:	25-08-2021
Workshop date:	late September 2021

Topic

- The topic for this year is “**Dimensionality Reduction Techniques in Medical Bioinformatics**”
  - Description of advanced dimensionality reduction techniques (Novel methods, novel variants of known methods)
  - Application of advanced dimensionality reduction techniques to interesting biomedical problems

Suggestions for the choice

- The focus should be on advanced dimensionality reduction techniques applied to structured objects: try to avoid papers which use simpe methods on standard vectorial representations

- Good choices: Biomedical applications involving images/sequences/spectra faced with dimensionality reduction techniques

Suggestions for the choice

- Examples:
  - Heiko Hoffmann: “Kernel PCA for Novelty Detection”, Pattern Recognition, Vol. 40, pp. 863-874, 2007
  - Ricardo Vigário et al.: “Independent Component Approach to the Analysis of EEG and MEG Recordings, IEEE TRANSACTIONS ON BIOMEDICAL ENGINEERING, VOL. 47, NO. 5, MAY 2000589

The list of already booked papers can be found online, check it before submitting your choice!

Where to search

- **Preferred**: papers published in Briefings in Bioinformatics, Bioinformatics, IEEE/ACM Transactions on Computational Biology and Bioinformatics, BMC Bioinformatics, BMC Genomics, Artificial Intelligence in Medicine or other high impact journals (Nature, Science, ...)
- **Alternatives**: Other papers published in journals of Elsevier, IEEE, ACM, Springer and Oxford Academic can be considered, or Conference papers published in IEEE-IAPR-ACM conferences
- Good starting point: google!

The talk

- 10 minutes (strict!)
- Suggested structure of the talk:
  - Introduction to the problem
  - Main idea (better to avoid formulas!) together with the relevance with respect to previous works
  - Some results (if any) and discussion
- Don’t read the speech!