Open PhD position

Title	Learning Analytics and Educational Data Mining for Games
Scholarship duration	4 years
Research laboratory	Centre interuniversitaire de recherche en éducation de Lille (EA 4354) (https://cirel.univ-lille.fr/) Centre for Educational technology, Institute of Education, University of Tartu, Estonia https://www.ht.ut.ee/et/instituudist/tooruhm
Research team	CIREL-Trigone (https://cirel.univ-lille.fr/les-equipes/trigone/) Centre for Educational Technology: https://www.ht.ut.ee/et/instituudist/tooruhm
Address	Université de Lille (Campus Cité scientifique), France University of Tartu, Estonia
Starting date	September 2021
Deadline for application	2nd May 2021
Funding type	Scholarship from the Estonian government and University of Tartu
PhD directors	Nour EL MAWAS (https://pro.univ-lille.fr/nour-el-mawas/) Danial HOOSHYAR https://www.etis.ee/CV/Danial_Hooshyar001/est?tabId=CV_ENG&lang=ENG
Keywords	Technology-enhanced learning, Serious games, Learning Analytics, Educational Data Mining

PhD objectives

Educational computer games have the potential to improve students' learning experience (El Mawas *et al.*, 2020), as well as their motivation. Findings from several studies suggest that educational games can also improve students' learning achievements (e.g., El Mawas, Hooshyar, & Yang, 2020). One challenge for the successful deployment and adoption of educational games in formal education is how to measure the learning progress and outcomes achieved through educational games. Since traditional educational measures are mostly highly invasive and compromise the flow, they are not suitable for educational games. Conversely, learning analytics (LA) and Educational Data Mining (EDM) has the capability to provide continuous non-invasive assessment for educational games by extracting and interpreting pertinent information from the real-time game data. Therefore, the application of LA/EDM to educational games can potentially improve the assessment of performance, game quality, progress, user appreciation, and learning outcomes. Although LA/EDM have shown a great potential in enhancing educational games, yet they face two difficulties: transparency in assessing educational outcomes in real-time gameplay, and clarity in representing those results to players. The first difficulty involves exposing learners to the process of assessment (which can be the key to interactive maintenance processes as students can reflect better on their own learning). The second difficulty revolves around visualizing LA/EDM results from log data within educational games. As pointed out by

several researchers, e.g., Vieira, Parsons, & Byrd (2018), using more visual LA/EDM tools enables instructors to provide personalized feedback, thereby promoting students' metacognitive skills development. Additionally, visual analytics offers the advantage of dealing with heterogeneous data sources, including demographic and historical data, which can help to better understand the learning process, as prior learner experiences might affect future learning events. This project aims to apply LA/EDM methods to data from our existing computational thinking game, called AutoThinking, aimed at providing personalization to individual needs, refining the game features and feedback, etc.

Reference:

El Mawas, N., Tal, I., Moldovan, A. N., Bogusevschi, D., Andrews, J., Muntean, G. M., & Muntean, C. H. (2020). Investigating the impact of an adventure-based 3D solar system game on primary school learning process. Knowledge Management & E-Learning, 12(2), 165–190.

El Mawas, N., Hooshyar, D., Yang, Y. (2020). Investigating the Learning Impact of Autothinking Educational Game on Adults: A Case Study of France. In *Proceedings of the 11th International Conference on Computer Supported Education*. SCITEPRESS-Science and Technology Publications, Lda (Volume 2: CSEDU, 188 - 196).

Vieira, C., Parsons, P., & Byrd, V. (2018). Visual learning analytics of educational data: A systematic literature review and research agenda. *Computers & Education*, 122, 119-135.

Benefits

We offer a 4-years full-time PhD position at the Université de Lille and University of Tartu. The PhD student will be physically in Estonia (Tartu) but it is also expected that he/she spends some time in France (Lille). If the applicant is admitted, he/she will be eligible for the PhD scholarship of the University of Tartu (640 eur per month). There is a possibility for an additional scholarship provided by the Institute of Education (400 eur per month). The candidate will be part of international research team of educational technology and has possibility to collaborate with experienced scholars.

Needless to mention that the candidate will be part of the lively student life of Tartu city in Estonia.

Profile of applicant

A Master's degree (or equivalent) in Computer Science, Computer Engineering or similar is required.

The candidate must have good skills in Data Science (Data Analysis, Data Mining, and Machine Learning).
Excellent writing, speaking, and reading skills in English (French or Estonian is not mandatory). The PhD candidate should be highly motivated to work independently, but also to collaborate with the team and stakeholders.

Information and Application

The successful applicant(s) will work under the mentorship of Dr Nour EL MAWAS and Dr Danial HOOSHYAR and will also have an opportunity to spend time in the two research labs. There is generous funding available to attend/present at international and local conferences every year. Expressions of interest via email to nour.el-mawas@univ-lille.fr and danial.hooshyar@gmail.com should include:

- A curriculum vitae which also includes the name and e-mail address/telephone number for (preferably) two or more references;
- A cover letter (in English) which explains your interest in the position and your qualifications;
- Academic records ;
- A copy of your Master's thesis. In case the thesis is not yet available, a summary and table of contents of the thesis and an additional writing piece.

The deadline for application is the 2nd May 2021. The doctoral studies will start in September 2021.

More information about the application process: https://www.ut.ee/en/phd-educational-science