

Tracking and analysis of interactions between learners and an editing software to understand how they integrate contents generated by external sources at the era of generative AI

Keywords

Learning analytics, human-system interactions tracking, external content appropriation

Context

When learners are supposed to work together to produce a common report, it is worth analyzing the way they collaborate to determine the individual contribution of each learner and most of all to assess their capability of joining their effort. In a past project, the interactions between each learner of a same group with a collaborative reporting platform (LabNbook <http://labnbook.fr>) have been analyzed to determine the strategy used by the team [Haddouche2023]. Two strategies have mainly been exhibited based only on the number of words each member of the group modifies: summative production or collaborative production. In the continuation of these first works, the goal of the project is to go a step forward the analysis of collaborative behaviors [Summers2005] among learners and to extend the scope of the research to address in a unified way a topical crucial issue: How to analyze the way learners leverage external sources of knowledge especially generative AI systems?

Subject

The main objective of the project is to analyze how learners collaborate based on their interaction with an editing platform. Previous works addressing this issue mainly focused on "basic" indicators as the number of modifications performed by each contributor on the document. A first research direction is to integrate other types of indicators (lexical, syntactic, structural, style, semantics, checking, ...) and to define a theoretical model to infer a learner profile based on the nature of the modifications done in the document and the frequency of the interactions with the platform.

The central contribution expected from this project is to extend this work to answer a crucial issue most of the teachers have to deal with: How to evaluate the production of a learner or a group of learners when (a part of) the content is provided by an external source, as Wikipedia, ChatGPT, copilot or even a learner from another group?

The idea is to define a unified strategy to evaluate not the output of a collaborative working session but the session itself, or in other words to evaluate the working method and not the achievement. To reach this goal, the external source of content will be considered as another collaborator of the team and the working method will be analyzed and evaluated based on the interaction between the learners and an editing platform. Two applicative contexts will be considered: the collaborative production of a practice report using the Labnbook platform and source code production in a programming environment (e.g. Eclipse, VSCode, etc.). The starting point of the analysis will be the paste of a paragraph or a piece of code in the report or the source code, and the identification of the learner behavior will be based on a tracking of the modifications made in the document and its environment to ensure a relevant integration of this external content. Whereas a collaborative editing platform is already available for the first applicative context, an add-on has to be developed for the programming environment (preferably in VSCode) to track all the modifications and actions performed by the learner.

This work will lead to a new evaluation paradigm of learners not based on the quality of their output but on their capability of making the most of existing intelligent assistants as ChatGPT [Qadir2023].

Duration and supervisors

The internship will last from 4 to 6 months and a continuation with a PhD is expected. The trainee will physically work at the IMT Atlantique – Brest (Lab-STICC laboratory) and will be supervised by the following team:

- Fahima DJELIL (IMT Atlantique, Lab-STICC)
- Maria-Teresa SEGARRA MONTESINOS (IMT Atlantique, Lab-STICC)
- Christian HOFFMANN (université Grenoble-Alpes, LIG)
- Grégory SMITS (IMT Atlantique, Lab-STICC)
- Jean-Marie GILLIOT (IMT Atlantique, Lab-STICC)

Month salary is around 580€.

Required skills

We are looking for a motivated student currently completing a Master or an engineering cursus in computational sciences and the following skills are required:

- communication: to collaborate and cooperate with the different members of the projects. Scientific reports will have to be written and a scientific publication in a learning analytics conference is targeted.
- programming: to implement the interaction sensors between the learner and the editing platform. TypeScript and Python will be the two programming languages used in this project.
- Scientific background in data science (NLP is a plus): to analyze the captured interactions.

To apply, send your CV and cover letter to Grégory Smits (gregory.smits@imt-atlantique.fr)

References

[Haddouche2023] Haddouche, A., Djelil, F., Hoffmann, C., Mandran, N., & D'ham, C. (2023, April). Proposal of Indicators for Measuring Collaborative Writing in a Digital Learning Environment. In *15th International Conference on Computer Supported Education* (Vol. 2, pp. 495-502). SCITEPRESS-Science and Technology Publications.

[Summers2005] Summers, J. J., Gorin, J. S., Beretvas, S. N., & Svinicki, M. D. (2005). Evaluating collaborative learning and community. *The Journal of Experimental Education*, 73(3), 165-188.

[Qadir2023] Qadir, J. (2023, May). Engineering education in the era of ChatGPT: Promise and pitfalls of generative AI for education. In *2023 IEEE Global Engineering Education Conference (EDUCON)* (pp. 1-9). IEEE.