

MUNI
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Authorship Verification using Cloze Test and Large Language Models

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Contract Cheating

- Also known as "assignment outsourcing"
- Students hire a third party to produce assignments for them
 - Or use generative AI when not permitted
- A form of plagiarism
 - Students submit someone else's work
 - Undetectable by current text-matching software tools
- Problem particularly in Anglo-Saxon educational setting
 - Grades heavily depends on individual assignments (essays, homework)
 - 3–8% of students commit contract cheating at least once
 - 2/3 of them are repeat offenders

Cloze Test for Authorship Verification

- Cloze test proved to be a useful tool for testing text comprehension. Some universities use it during a disciplinary procedure when a student is suspect from submitting a work authored by someone or something else (plagiarism, contract cheating, unallowed use of generative AI). Authors of the text are more likely to fill in correct words.
- The project aims to find a method that identifies words to be masked such that the cloze test can reliably discriminate between authors and non-authors. LLMs are trained to predict the word in given context. Previous experiments showed that nouns that the model would not guess correctly are good candidates.

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Ultimate Goal: Authorship Verifier

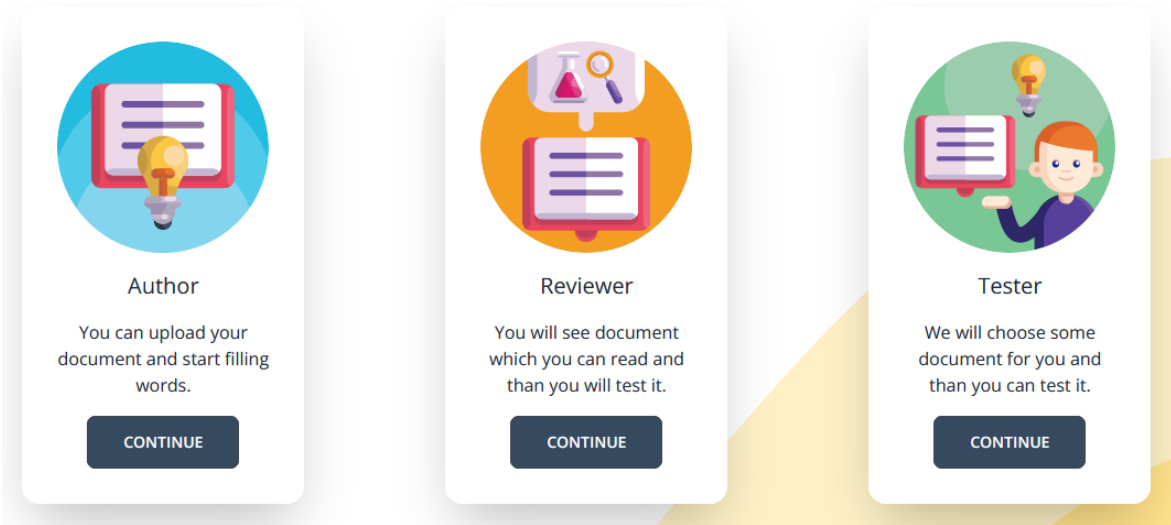
- A web application to support the disciplinary procedure
- A student suspect of contract cheating is invited for interview
 - His/her document is uploaded to the application
 - The application automatically masks some words
 - The student is asked to fill in the words (under supervision)
 - The application gives a probability of authorship
- Not perfect, but much better than what is common now

TAČR Project

- Project partners
 - Masaryk University, Faculty of Informatics
 - Charles University, Faculty of Social Sciences
 - Mendel University, Faculty of Business and Economics
- Application guarantor: IS MU
- Duration of the project: 09/2023 – 08/2026
- Budget for a student developer
 - FTE gross salary 47 000 CZK
 - Budget for part-time (60%), i.e. 24 hours per week
 - 1 or 2 students

Current Status and Next Steps

- Current status
 - Web application developed
 - aver.pef.mendelu.cz
 - A selection method
 - Designed, implemented and tested
 - Potential for improvements
 - Drawback: Processing a document takes too long (0,5 hour)



- Next steps
 - To extend the existing project by conducting more experiments with LLMs and users
 - To improve existing method (better discriminate between authors and non-authors)

Specific tasks

- Employ more language models to identify masked word (so far only MT-5 was used)
- Experiment with probability of the word in given context (so far only rank was used)
- Investigate the influence of language (English, German, etc.; native / non-native)
- Investigate the influence of time (authors forget their text and achieve lower scores)