

HABILITATION THESIS REVIEWER'S REPORT

Masaryk University

Applicant

Mgr. Tomáš Foltýnek, Ph.D.

Habilitation thesis

Information Technologies for Countering Academic Fraud

Reviewer

Dr. Antoni Jaume Capó

Reviewer's home unit, institution

University of the Balearic Islands

As a reviewer, I would like to emphasize that my assessment primarily focuses on the Information Technologies (IT) dimension of the habilitation thesis, which aligns with my own research expertise. While the thesis addresses academic integrity from interdisciplinary perspectives that include educational, institutional, and ethical considerations, my evaluation concentrates on the scientific, methodological, and technological contributions related to Computer Science and Artificial Intelligence.

Given the transformative impact that Artificial Intelligence is currently having on higher education, I paid particular attention to those contributions addressing AI-generated content, machine-obfuscated plagiarism, authorship verification, and the use of Large Language Models for academic integrity purposes. From this perspective, the habilitation thesis presents a highly coherent and impactful research program that has substantially advanced the state of the art in the application of Information Technologies to academic integrity. The candidate has successfully contributed to several major research areas, including plagiarism detection, source code analysis, semantic text processing, authorship verification, machine learning, and the challenges created by generative Artificial Intelligence.

Particularly noteworthy is the candidate's ability to transform technological developments originating in Computer Science into practical solutions and evidence-based recommendations for Educational Sciences and academic policy. This translational character significantly increases the scientific and societal value of the research presented in the thesis. The candidate successfully demonstrates how advances in natural language processing, semantic analysis, machine learning, and large language models can be leveraged to better understand and counter academic misconduct, while simultaneously acknowledging the limitations of purely technological approaches.

The introductory chapters deserve special mention. The sections devoted to Causes of Academic Fraud and the Role of IT and Extent and Consequences of Misconduct provide an excellent conceptual framework that allows the reader to understand both the motivations underlying academic misconduct and the role that information technologies can play in mitigating these behaviors. These chapters successfully establish the rationale that underpins the technological developments presented throughout the thesis. Equally valuable is the Systematic Literature Review, which provides a comprehensive overview of the state of the art and effectively positions the candidate's contributions within the broader scientific landscape.

One of the major strengths of this habilitation thesis is the coherence of the research program. Although the individual publications address different manifestations of academic misconduct, they collectively contribute to the development of a comprehensive technological framework for supporting academic integrity. Moreover, the research demonstrates a clear evolution from traditional plagiarism detection approaches towards contemporary challenges associated with artificial intelligence and large language models.

Academic Plagiarism Detection: A Systematic Literature Review represents one of the most influential contributions of the candidate's research career. Published in ACM Computing Surveys, one of the most prestigious journals in Computer Science, the article has accumulated an exceptional number of citations, exceeding 450. Such impact demonstrates its recognition as a fundamental reference within the research community.

The importance of this publication extends beyond its citation count. The article provides a rigorous and systematic synthesis of a fragmented field, establishing a comprehensive taxonomy of plagiarism detection approaches, methodologies, and challenges. It identifies key research directions and offers a conceptual framework that has been widely adopted by subsequent researchers. In my opinion, this publication is clearly positioned at the frontier of knowledge and represents a landmark contribution to Computer Science research related to academic integrity.

The publication Testing of Support Tools for Plagiarism Detection addresses a critical issue frequently overlooked in academic literature: the real-world performance of plagiarism detection systems. Rather than proposing a novel detection algorithm, the study systematically evaluates existing tools under realistic operational conditions.

From an IT perspective, the experimental design is particularly robust. Multiple detection platforms, languages, and plagiarism scenarios are evaluated using a common assessment framework. Such large-scale benchmarking provides valuable evidence regarding the capabilities and limitations of systems that are routinely used by educational institutions worldwide. Furthermore, this work illustrates the candidate's commitment to translational research, as the outcomes directly support decision-making processes within universities and educational organizations.

The publication Cross-Language Source Code Plagiarism Detection Using Explicit Semantic Analysis and Scored Greedy String Tiling represents a significant technical contribution to source code analysis and educational technology. Detecting plagiarism across programming languages is substantially more challenging than monolingual source code comparison due to syntactic and structural differences.

The proposed methodology combines Explicit Semantic Analysis with Scored Greedy String Tiling to capture semantic similarities that remain hidden to traditional syntactic approaches. The experimental evaluation includes several programming languages and plagiarism scenarios, demonstrating the effectiveness of semantic representations for identifying conceptual equivalence between programs. This work exemplifies the application of advanced Computer Science techniques to practical educational challenges and demonstrates the candidate's ability to develop innovative solutions to complex technical problems.

The publication Detecting Machine-Obfuscated Plagiarism can be considered a pioneering contribution addressing a challenge that has become increasingly relevant with the emergence of AI-powered text manipulation tools. The study investigates situations in which automated paraphrasing systems are employed to disguise copied content and evade conventional plagiarism detection tools.

The experimental design is particularly noteworthy. Multiple machine learning techniques, text representations, and classification approaches are systematically evaluated using machine-obfuscated datasets. The results demonstrate that semantic analysis methods can successfully identify concealed plagiarism despite extensive lexical modifications. In retrospect, this work anticipated many of the challenges that later emerged with the widespread adoption of generative AI technologies.

The publication Identifying Machine-Paraphrased Plagiarism further extends this line of research by incorporating modern artificial intelligence techniques, including transformer-based language models. The work investigates whether machine-generated paraphrases can be reliably distinguished from original writing using advanced natural language processing approaches.

The experimental framework compares traditional similarity measures with state-of-the-art neural language models, providing valuable insights into the strengths and limitations of different detection strategies. The results demonstrate the growing importance of semantic understanding for plagiarism detection and highlight the increasing relevance of artificial intelligence methods for maintaining academic integrity in digital environments.

Among the candidate's recent contributions, Testing of Detection Tools for AI-Generated Text is arguably one of the most timely and impactful. The publication addresses a question that has become central to higher education following the emergence of large language models: can AI-generated text be reliably detected?

The experimental design is comprehensive and methodologically rigorous. A broad range of AI detection systems are evaluated using multiple categories of documents, including human-written texts, AI-generated texts, translated content, paraphrased texts, and edited outputs. The study provides objective evidence regarding the actual performance of commercial and research-oriented AI detectors.

The importance of the work lies not only in the evaluation itself but also in its principal conclusion: current AI-generated text detection systems exhibit significant limitations and should not be considered sufficiently reliable for high-stakes academic decision-making. This finding has important implications for educational policy, assessment design, and academic governance. The publication constitutes an excellent example of how Computer Science research can directly inform evidence-based educational practice.

Finally, Authorship Verification Using Cloze Test with Large Language Models represents, in my opinion, one of the most innovative contributions included in the habilitation thesis. The study proposes a novel approach that moves beyond the traditional paradigm of content detection and instead focuses on authorship verification.

The experimental design is elegant and highly original. Large language models are employed to automatically generate and evaluate cloze-test questions that assess whether an individual genuinely possesses the knowledge reflected in a submitted text. This approach shifts the focus from determining whether a text was generated by AI towards verifying whether the claimed author understands the content.

The significance of this contribution extends beyond its excellent performance metrics. The work proposes a potentially sustainable future direction for academic integrity research. As generative AI systems continue to improve and increasingly challenge conventional detection methods, authorship verification approaches may provide a more robust and educationally meaningful alternative. From the perspective of Artificial Intelligence and Information

Technologies, this publication demonstrates methodological innovation, practical applicability, and strong potential for future development.

While the thesis demonstrates remarkable breadth, scientific rigor, and practical impact, a potential limitation stems from the nature of the research field itself rather than from the candidate's work. Many of the technological solutions investigated address a rapidly evolving landscape in which generative AI systems continuously improve their ability to produce human-like content. This creates an ongoing technological arms race between content generation and content verification technologies. Consequently, some detection-oriented approaches may require continuous reassessment and adaptation as future generations of foundation models emerge. Nevertheless, the candidate explicitly acknowledges these challenges and, through his recent work on authorship verification and Large Language Models, demonstrates a clear awareness of the need to move beyond traditional detection paradigms towards more robust and sustainable approaches to academic integrity.

Overall, the habilitation thesis demonstrates scientific maturity, methodological rigor, international visibility, and substantial interdisciplinary impact. The candidate has established a recognized research program that advances the state of the art in Information Technologies for academic integrity while simultaneously producing significant benefits for Educational Sciences and higher education practice. Particularly impressive is the successful transfer of advanced Computer Science methodologies into educational contexts, thereby creating a research portfolio with both scientific excellence and societal relevance.

In my assessment, the scientific quality of the publications, the coherence of the research program, the international visibility of the results, and the candidate's sustained contributions to emerging challenges related to Artificial Intelligence clearly demonstrate scholarly excellence at the level expected for habilitation. The thesis provides compelling evidence of the candidate's capacity to lead an independent, internationally recognized, and highly impactful research agenda.

Reviewer's questions for the habilitation thesis defence (number of questions up to the reviewer)

1. Looking back at the evolution of your work, what do you consider to be your most significant scientific contribution from an Information Technologies perspective?
2. Which of the challenges identified in your habilitation thesis remain largely unsolved and deserve greater attention from the research community?
3. One of the strengths of your research is its translational nature. What were the main challenges when translating Computer Science methods into practical solutions for educational institutions?
4. How do you foresee plagiarism detection evolving as AI-generated and AI-assisted writing becomes increasingly common?
5. Is plagiarism detection gradually becoming less relevant than authorship verification in contemporary higher education?
6. Your study Testing of Detection Tools for AI-Generated Text concluded that current AI detectors are insufficiently reliable for high-stakes decision-making. Do you view this limitation as a temporary technological challenge or as a fundamental limitation of AI-generated text detection?
7. Should universities continue investing in AI detection technologies, or should they focus their efforts on alternative assessment and verification methods?
8. Are current plagiarism detection systems prepared to address the latest generation of AI-based rewriting tools?
9. How has the emergence of generative AI transformed your own research agenda and priorities?

10. Which entirely new research questions have emerged as a direct consequence of recent advances in large language models?
11. Your authorship verification framework based on cloze tests and Large Language Models shows very promising results. However, every assessment method can potentially be circumvented. To what extent do you believe the proposed cloze-test approach can be gamed or manipulated by students, particularly with the assistance of generative AI systems, and what countermeasures could be implemented to mitigate such risks?

Conclusion

The habilitation thesis entitled *Information Technologies for Countering Academic Fraud* by Mgr. Tomáš Foltýnek, Ph.D. **fulfils** requirements expected of a habilitation thesis in the field of Informatics.

Date: 18/08/2026

Signature: