AIDA

AIDA aims to design and evaluate new explainable AI methods to create material for online learning and e-assessment.

Creating exercises and tests is a heavy burden for teachers. They are increasingly spending time on creating new assessment material, next to their core task of interacting with students. Also, formulating test questions in educational settings for e.g., certification, requires training, experience, time and resources. One reason is that questions often become unusable after a single use, because they are shared over social media. Especially in high-stakes settings such as certifications or job tests that is problematic.

At the same time, a huge amount of questions and teaching materials are already digitally available. This raises the question if AI machine learning techniques coupled with natural language processing couldn't be leveraged to support the creation of questions and exercises and offer personalized, actionable insights to students and instructors.

Creating such an AI-driven support system for educators may be challenging for a number of reasons. For example, little research has been done on the automated generation of questions based on existing course material – particularly in minority languages. In addition, the user adoption of such a system is complicated as few teachers are familiar with the design, configuration and limitations of AI systems.

FRAMING THE RESEARCH OBJECTIVE

The AIDA project represented a strong partnership of industrial and academic partners to explore such applications for e-assessment in education, including an AI support component.

The project partners planned to built a proof of concept to be tested in real-life secondary schools and aiming to achieve four main innovation goals:

- Efficient AI-supported question generation.
- AI-driven e-learning personalization through an interactive interface.
- Increased user adoption.
- Insights mining for non-technical users, such as teachers.

AIDA mostly fits in the educational domain, with a focus on new technology to support teachers to be more efficient in preparing material for students (especially exercises and tests). A second focus was to improve the teachers' adoption of AI-driven tools through dedicated interface design and increased trust stemming from explainability. One of the additional goals was to automatically generate insights from interactions with online platforms such as a digital learning platform), which potentially has wider application areas.

THREE MAIN OUTCOMES

From the setup, the project was strongly industry driven, in particular through Televic Education and Lernova. It followed after a successfull bilateral collaboration between imec – IDLab (Text-to-Knowledge team) and Televic Education.

The project partners developed new algorithms and models for assisting teachers to make new exercises, focusing on multiple choice questions and grammar exercises. This work also resulted in several scientific publications.

Additionally, the project resulted in new and validated user interface designs for the integration of AI tools. These included strategies to mine insights for use in education, including student

monitoring for teachers, and human-machine interaction for students.

Lastly, the project resulted in working proof-of-concepts, including tools for distractor selection in the generation of multiple choice questions and grammar exercises for French and English. These were then integrated as AI-supported features in Televic's AssessmentQ platform.

Today's solution, after execution of the project as well as taking advantage of a considerable leap in the state of the art in natural language processing, allows for a considerably increased efficiency for teachers in preparing basic material for students to practice. However, for the really hard questions, or entirely open-ended questions, for example in reading comprehension, AI tools still fall short.

However, less than two months before the end of the project, ChatGPT was released. It soon became clear that the tools developed in the AIDA project were partly overclassed, including the factoid question generation tools and the distractor selection model. The grammar exercise generation tool, however, still outperformed simple prompting with ChatGPT, while being much more light-weight in terms of computation because of the use of a local model.

NEXT STEPS

Televic Education is further developing the insights of the project and strongly promoting their AI enhanced tools, whereas Lernova also relies on their lessons learned during AIDA for advancing the Lernova Academy. Both companies are considering bundling their expertise in a common trajectory.

Follow-up research has already been carried out by both UGent – IDLab (Text-to-Knowledge group), and KU Leuven – HCI (Augment team), and will be carried even further. Both research groups are currently involved in a new imec.icon project proposal. In addition, other tracks have opened up, including new collaborations on use cases in education within the second edition of the Flanders AI Research project.

SNRoof project partners:

FACTS

NAME	AIDA
OBJECTIVE	Design and evaluate innovative explainable AI methods to create material for online learning and e-assessment
TECHNOLOGIES USED	AI, natural language processing, neural networks, user studies, user interface design, dashboard design
TYPE	imec.icon project
DURATION	01/10/2020 – 31/12/2022
PROJECT LEAD	Filip Vanlerberghe, Televic Education
RESEARCH LEAD	Thomas Demeester, imec - IDLab Lab – UGent
BUDGET	2,065,000 EUR
PROJECT PARTNERS	Luzmo Academy (former Cumul.io), Televic Education, Lernova
RESEARCH PARTNERS	KU Leuven – HCI
RESEARCH GROUPS	imec – IDLab – UGent

The AIDA project was co-funded by imec, with project support from Agentschap Innoveren & Ondernemen. In addition, imec Smart Education funded an extension of the project in collaboration with ZAVO (Zorgzaam Authentiek Vooruitstrevend Onderwijs).

WHAT IS AN
IMEC.ICON PROJECT?

The imec.icon research program equals demand-driven, cooperative research. The driving force behind imec.icon projects are multidisciplinary teams of imec researchers, industry partners and/or social-profit organizations. Together, they lay the foundation of digital solutions which find their way into the product portfolios of the participating partners.