

Request for Industrial Partners (12 January 2023)

Project title: Efficient learning for chemical applications

Acronym: EL4CHEM

Project ID	
Type	ICON
Period	2 years
Starting date	TBD
Total project budget	TBD
Subsidy percentage	according to SBO and O&O regulations
Catalisti contact	Laura-Lynn Fockaert (lfockaert@catalisti.be)

Project description

Introduction

EL4CHEM is a continuation of the research project DAP²CHEM, which was the first CATALISTI ICON-project to stimulate the transition of chemical/pharmaceutical companies towards 'Industry 4.0', i.e. the integration of digital technologies and automation into production and logistics and the use of 'Industrial Internet of Things (IIoT)', data analytics and digitized services in industrial processes. The DAP²CHEM project has generated fundamental knowledge for real time data usage through 'Artificial Intelligence (AI)' systems for improved process development, optimization and production excellence in the (chemical/pharmaceutical) processing industry. Furthermore, it expanded the knowledge base at Flemish research institutions concerning (hyperspectral) image processing and analysis, advanced analytics and AI, bridging the gap between (academic) fundamental knowledge and applicability in an industrial context.

In order to leverage this into standard way of working, we need to understand the viability, which brings new fundamental questions. Whereas DAP²CHEM focused on the development of new vision technologies for robust perception and the development of digital twins for data-driven control. The EL4CHEM project will research the possibilities of an AI-based control system for the newly developed vision technologies and to bring the developed digital twin models to a next level by focusing on efficient learning. Efficient learning includes among others; (i) transfer and meta learning, to learn additional tasks to the model, (ii) expand the models with predictive fault detection and control (to add context to the way a model interprets situations and thus anticipate on external conditions), and (iii) to increase the sensitivity and scalability of the models to make them more generic and usable for new products and processes. By EL4CHEM not only production efficiency will increase, while improving environmental footprint, but reshape the way industry manages knowledge and does process developments, shorting the time-to-market, and thus increasing competitiveness.

Goals

The DAP²CHEM project proved that models could be developed to handle different industrial use cases with varying data qualities and quantities. In the EL4CHEM project the consortium wants to build a new foundation on this established knowledge base layer by focusing on efficient learning. This step will be critical to make the use of these models & control strategies viable within industry since it will ensure efficient model building, transfer of knowledge, performance monitoring & model updates. For the robust perception part, one aims to move new vision technologies forward to enable vision-based control. Integrating vision and sensing to come to a control agent will be a new challenging part of the EL4CHEM project. For the data-driven control cases, one aims to optimize the validated designs for new experiments to perform additional tasks within new applications. An important challenge will be the translation, but also optimization of model building, model transfer and model maintenance as this should be highly efficient to make them industrially relevant. Furthermore, model-free algorithms as well as automated processing of the spectroscopic data for optimization and control are challenges related to this part of the project. The final aim of the EL4CHEM project is to shorten the time to scale to pilot plant.

Request

Catalisti is searching for additional industrial partners, with an interest to add an industrial case to the project. The current consortium is open for a wide variety of industrial cases related to real-time data assisted process control, data-driven design of experiments, and/or advanced vision technology on macro or micro/nano scale.

How to reply to this request

Please send an **email before February 9** to Laura-Lynn Fockaert (lfockaert@catalisti.be) and Luc Van Ginneken (lvanginneken@catalisti.be), and **briefly describe your interest and potential contribution** to the project. Based on all offers, the current industrial partners will determine together with Catalisti which partners can join the consortium. After submission of your offer, you will be contacted to further elaborate your offer by February 2 at the latest.

Important notice: Partners that wish to participate in Catalisti-supported projects are required to be member of Catalisti. For more information on membership and membership fees, please visit our website or contact the Catalisti contact persons (lfockaert@catalisti.be or lvanginneken@catalisti.be).

Contact

Please contact Laura-Lynn Fockaert (lfockaert@catalisti.be, +32 476 37 97 64) or Luc Van Ginneken (lvanginneken@catalisti.be, +32 477 97 99 47) if you have questions concerning this RfP.

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