

Request for knowledge partners (29/04/2019)

Project title: real time Data Assisted Process Development And Production

Acronym: DAP²

Project ID	
Type	ICON
Period	2 years
Starting date	To be determined (Q4 2019 or Q1 2020)
Total project budget (EUR)	To be determined
Subsidy percentage	According to SBO- and O&O regulations
Partners	Confidential
Catalisti contact	Leentje Croes

Project description

Introduction

Chemical or pharmaceutical companies generate a lot of valuable data which are currently not fully explored because of laborious (pre-)processing activities and the limitations of the available software tools which are typically designed to meet one specific objective. Data generation, however, is going to intensify over the coming years with the growing number of sensors, software applications and data storage capacity. The urge to maximize data usage in a real-time manner is thus high to ensure improved process optimization and operational excellence.

Goal

This project aims to maximize data usage in a real-time manner for the benefit of chemical process development and manufacturing ensuring improved process optimization and operational excellence.

The main goal of the DAP² project will be to effectively implement real time data usage on several test-case processes/unit operations.

The consortium already includes four chemical/pharmaceutical companies, each providing a test case, and a technology company providing OT and IT architecture, integration and data analytics expertise.

The objective for 4 chemical/pharmaceutical companies doing this together is to learn from each other's cases.

This Request for Partners is copyrighted by Catalisti vzw and its contents may not be reproduced without the prior written approval of Catalisti. This Request for Partners reflects the status of the proposed project on its date of release and the information contained herein may not be fully up to date or accurate. All information contained herein constitutes valuable information of Catalisti and may not be used for any purposes other than the evaluation of a person's interest in participating in the proposed project.

- **Case 1: Detection of micro holes, micro defects and perforations in liquid containers**
 - Detection of shape defects / shape irregularities in liquid containers. The size of the defects/irregularities can range from 0.5 to 10 mm.
 - Detection of liquid on the outside of the container. The liquid can come from leaks from the container or from contamination from adjacent containers having a problem. The liquid outside the container stays as a thin layer on the container, smearing the outer surface of the container.
 - The liquid containers are made of a transparent, not rigid polymeric film. The liquid containers are travelling on a conveyor belt, and due to the movement of the belt, the liquid containers vary their position and orientation if we compare one with another. The speed of the conveyor belt is less than 30 m/min. The total time available for detection and processing of the acquired data per container is around 150 ms. The size of the liquid containers is of a few centimeters long, wide and high, containing around 30 ml of liquid. There are different liquids with different colors.
 - What device or technology can be used for the reliable detection and data capturing for the above case ? Hyperspectral imaging (combined with traditional?), scanning, IR, NIR, other ?
 - The device or technology needs to be affordable so that in the future many units of the device can be installed in the liquid container manufacturing lines.

- **Case 2: Automated detection of fouling via image recognition in large scale chemical reactor to optimize cleaning and production planning/scheduling**
 - Evaluate existing camera set-up (historical data/images are available not labeled)
 - Detection of fouling based on image recognition
 - Detection of fouling growth rate based on image recognition
 - Prediction of fouling rate and optimal cleaning moment based on image recognition
 - Link of fouling growth rate with operational degrees of freedom
 - Optimize operational degrees of freedom to minimize fouling and increase production capacity
 - Device UX interface for operator to take decision based on generated info

- **Case 3: Continuous Flow process optimization**
 - Adjustment of process parameters (such as temperature, pressure, pump rate, etc) in function of quality of the raw materials supply and performance of the process as measured by Raman or similar technology.
 - Automatically determine (and act upon) any process equipment deterioration

- **Case 4: Constant solvent volume switch**
 - Optimize and automate the current model based manual solvent switch processes, using real time data from DCSes, PAT Software, PI, etc.
 - Improve the models
 - (One of the) Challenges: Real Time Data acquisition architecture
 - Also involves spectroscopy data

This Request for Partners is copyrighted by Catalisti vzw and its contents may not be reproduced without the prior written approval of Catalisti. This Request for Partners reflects the status of the proposed project on its date of release and the information contained herein may not be fully up to date or accurate. All information contained herein constitutes valuable information of Catalisti and may not be used for any purposes other than the evaluation of a person's interest in participating in the proposed project.

Expertise required

While a technology company is part of the consortium already, additional competences will be needed.

The technology partner provides:

- Integration of, or (POC/Pilot type) development for data acquisition of and connectivity with OT & IT equipment and analytical systems (broad meaning: traditional analytics, ML/AI, Big Data, etc.)
 - This includes design and assessment of network and compute infrastructure architecture
- Practical result oriented Data Engineering and Data Science services
- Architect, implement, test and tune for on premise or hybrid cloud network, compute and storage performance

With this Request for Partners, we would like to invite **universities/knowledge institutes** that have expertise, technology or knowledge relevant to the project to respond to this request.

To reach the project goals, the current partners are particularly searching for expertise, concerning computer vision and data analytics:

1. Computer Vision

- Visual and spectral image processing, analysis and transformation into actionable information
- Working and installing advanced image and data capture technology

2. Advanced Analytics

- In order to learn from the data (see above) and eventually get to the (complex) event processing that is required data engineering, data science, advanced analytics expertise and research will be needed for all 4 cases.

It is still premature now for already specifying which exact advanced analytics disciplines will apply but it is anticipated that ML/AI, next to Big Data Analytics might be needed.

3. Other (optional)

- Design and implementation of user interfaces

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 contact lcroes@catalisti.be.

This Request for Partners is copyrighted by Catalisti vzw and its contents may not be reproduced without the prior written approval of Catalisti. This Request for Partners reflects the status of the proposed project on its date of release and the information contained herein may not be fully up to date or accurate. All information contained herein constitutes valuable information of Catalisti and may not be used for any purposes other than the evaluation of a person's interest in participating in the proposed project.

How to reply to this request

Please send your **proposal by email** before **May 9th (12h00)** to your association representative (see contact list below). An application (2-3 pages without attachments) should contain at least the following items:

1. Organisation and research group
2. Name and contact details of person submitting the proposal
3. Name and contact details of person(s) who will perform the actual tasks (if different from submitting person)
4. A proposal of your role in the project: for which expertise/assignments described above do you apply?
5. A description of your expertise/track record in the specific topic of this RfP, for which you are applying (at the 3 organisational levels as mentioned above, i.e. for the organisation and/or research group, for the person submitting the proposal, as well as for the executing person(s)) (preferably give the resumes of submitting and executing persons attached)
6. A description of your experience in carrying out similar assignments as those described in this Request for Partners (again at the 3 organisational levels)
7. A list of relevant funded projects (Catalisti, VLAIO, EU, ...) where you were a coordinator or partner
8. A commitment to prepare a full project proposal by **June 14th** together with the other project partners.
9. A commitment to start Q4 2019 or Q1 2020.

Contact List

- KU Leuven: Bert Lagrain (bert.lagrain@kuleuven.be);
- UAntwerpen: Ann Aerts (annfb.aerts@uantwerpen.be);
- UHasselt: Lieve De Doncker (lieve.dedoncker@uhasselt.be);
- UGent: Elisabeth Delbeke (bart.hommez@ugent.be);
- VUB: Philippe Westbroek (philippe.westbroek@vub.ac.be);
- Centexbel: Isabel De Schrijver (ids@centexbel.be);
- VITO: Karolien Vanbroekhoven (karolien.vanbroekhoven@vito.be);
- BBEU: Hendrik Waegeman (hendrik.waegeman@bbeu.org);
- Sirris: Benjamin Vandeputte (benjamin.vandeputte@sirris.be);
- Other: Leentje Croes (lcroes@catalisti.be)

This Request for Partners is copyrighted by Catalisti vzw and its contents may not be reproduced without the prior written approval of Catalisti. This Request for Partners reflects the status of the proposed project on its date of release and the information contained herein may not be fully up to date or accurate. All information contained herein constitutes valuable information of Catalisti and may not be used for any purposes other than the evaluation of a person's interest in participating in the proposed project.

Evaluation

The industrial partners, together with Catalisti, will review all proposals obtained before the deadline mentioned above. The industrial partners will make a selection of the best proposals based on the following criteria:

- your expertise in the requested expertise domain (5pt)
- your experience in carrying out similar assignments (3pt)
- your experience in other relevant funded projects as a coordinator or partner (3pt)
- complementarity with the other executing project partners (4pt)
- ability to start Q4 2019 - Q1 2020

After submission of your proposal, you can be contacted by telephone or invited to a live meeting (if this is deemed necessary by the industrial partners) to further elaborate your offer. *(Please note that the selection will be made primarily based on your written proposal, so please be complete and thorough, without anticipating on a further (live) elaboration of your proposal)*

The final decision will be communicated typically within 2 weeks after the deadline mentioned above but could take longer depending on the number of proposals and selection of a balanced project consortium. **Please do contact Leentje Croes (lcroes@catalisti.be or +32 472 889 776) if you have any questions concerning this RfP and the Catalisti procedures in general.**

Timing

The project proposal will be submitted to VLAIO on June 14th. Because of this timing, we will organise a meeting with the selected research partners as soon as possible. Please mark following potential meeting data in your agenda:

- May 13th 9h-10h (Antwerp)
- May 13th AM
- May 15th
- May 16th 9h-11h (Brussels, region Station Brussels North)
- May 20th AM
- May 21st
- May 22nd

This Request for Partners is copyrighted by Catalisti vzw and its contents may not be reproduced without the prior written approval of Catalisti. This Request for Partners reflects the status of the proposed project on its date of release and the information contained herein may not be fully up to date or accurate. All information contained herein constitutes valuable information of Catalisti and may not be used for any purposes other than the evaluation of a person's interest in participating in the proposed project.