RESEARCH CENTER
Lille - Nord Europe

FIELD

Activity Report 2019

Section Contracts and Grants with Industry

Edition: 2020-03-21

BONUS Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

Our current industrial contracts and granted projects are completely at the heart of the BONUS project. They are summarized in the following.

- *EDF (2015-2019, Paris)*: this project deals with demand-side management in smart grids with EDF, a major electrical power player in France. The Energy Management System (EMS) in the home receives the market and system signals and controls the loads, Heating, Ventilation and Air Conditioning systems (HVAC), storages and local generation units according to the user preferences. A large number of home users and appliances and several conflicting objectives have to be considered.
- *ONERA & CNES (2016-2020, Paris)*: the focus of this project with major European players in vehicle aerospace is put on the design of aerospace vehicles, a high-dimensional expensive multidisciplinary problem. Such problem needs the use of the research lines of BONUS to be tackled effectively and efficiently. Two jointly supervised PhD students (J. Pelamatti and A. Hebbal) are involved in this project.
- *In contact with Decathlon (2019, Lille)*: This project deals with scalable multi-objective optimization for the eco-design of material, clothing and sports shoes.
- *In contact with Vinci Autoroutes (2019, Paris)*: This project deals with the optimization of deep neural networks for computer vision.

DEFROST Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

We would like to acknowledge FACEBOOK company for the donation of $25,000 for our research (department FACEBOOK Reality Labs).

8.2. Bilateral Grants with Industry

We received an industry grant (CIFRE) with Robocath to work on autonomous catheter navigation. This grant will fund a PhD student for 3 years, starting in February 2019.

We have an ongoing bilateral project with the company InSimo on the simulation of suture.

FUN Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- Sencrop
  Participants: Brandon Foubert, Nathalie Mitton [contact person].

  This collaboration aims to develop a complete multi-technology bilateral wireless communication stack for agriculture sensor networks.
- Enedis and NooliTic
  Participants: Ibrahim Amadou, Nathalie Mitton [contact person].

  This collaboration aims to investigate a novel localization approach based on wireless propagations. It is a tri-partite contract between our Inria team, the SME NooliTic and Enedis.
- Expleo
  Participants: Ibrahim Amadou, Nathalie Mitton [contact person].

  This collaboration aims to transfer self-deployment protocols to Expleo.

INOCS Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

Utocat (2018-2020): Study optimization problems arising in the blockchain

8.2. Bilateral Grants with Industry

- Program PGMO funded by the Fondation Mathématiques Jacques Hadamard. EDF is the industrial partner (2017-2019)
- Program PGMO funded by the Fondation Mathématiques Jacques Hadamard. A generic framework for routing and scheduling problems (2019-2021)
- Program PGMO funded by the Fondation Mathématiques Jacques Hadamard. Integrated models for the dimensioning and location of charging electric vehicles stations in the presence of renewable energy sources: Models and Algorithms (2019-2020)

LINKS Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Grants with Industry

Strapdata C. Paperman is actively collaborating with the Strapdata company on efficient distributed graph database using an Apache novel technology to query distributed graph *Gremlin* that could benefit of the main product of Strapdata: Elassandra as a *database backend*.

LOKI Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

A research agreement between Synaptics Incorporated (San Jose, California) and Inria/Loki has been signed in September 2019, for a duration of nine months. The goal is to conduct joint studies on the impact of touchpads' characteristics (size, resolution) on the quality of interaction and users' performance.

8.2. Bilateral Grants with Industry

Géry Casiez and Mathieu Nancel have been awarded a Google Faculty Research Award for their project "Real-time Latency Measure and Compensation".

MAGNET Project-Team (section vide)

MEPHYSTO Team (section vide)

MODAL Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. COLAS company

Participant: Christophe Biernacki.

COLAS is a world leader in the construction and maintenance of transport infrastructure. This bilateral contract aims at classifying mixed data obtained with sensors coming from a study of the aging of road surfacing. The challenge is to deal with many missing (sensors failures) and correlated data (sensors proximity).

8.2. Bilateral Grants with Industry

8.2.1. EIT-Sysbooster: Nokia - Apsys/Airbus

Participant: Alain Celisse.

Nokia and Airbus are two worldwide known companies respectively working in communications and transport areas. The purpose of this contract is to perform root cause analysis to reduce (at the end) the number of failures.

RAPSODI Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

A new contractual collaboration between C. Cancès and IFPEN corresponding to the supervision of the PhD thesis of S. Bassetto started in January 2019. This contract is part of the Inria-IFPEN framework agreement.

8.2. Bilateral Grants with Industry

C. Bataillon (CEA) and L. Trenty (ANDRA) are involved in the EURAD project on corrosion modeling together with C. Cancès, C. Chainais-Hillairet, and B. Merlet. More details in Section 9.3 .

RMOD Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. Pharo Consortium

Participants: Esteban Lorenzano, Marcus Denker, Stéphane Ducasse
From 2012, ongoing.

The Pharo Consortium was founded in 2012 and is growing constantly. By the end 2019, it has 25 company members, 19 academic partners. Inria supports the consortium with one full time engineer starting in 2011. In 2018, the Pharo Consortium joined InriaSoft.

More at http://consortium.pharo.org.

8.2. Bilateral Grants with Industry

8.2.1. Berger-Levrault: Remodularization of Architecture

Participants: Nicolas Anquetil, Santiago Bragagnolo, Stéphane Ducasse, Anne Etien, Benoît Verhaeghe
From 2017, ongoing.

We started a new collaboration with the software editor Berger-Levrault about software architecture remodularization. The collaboration started with an end study project exploring the architecture used in the company in order to later migrate from GWT to Angular since GWT will not be backward supported anymore in the next versions. A PhD CIFRE thesis started in 2019: Benoît Verhaeghe, *Support à l'automatisation de la migration d'interface d'applications Web : le cas de GWT vers Angular*.

8.2.2. Arolla: Machine Learning-Based Recommenders to Support Software Evolution

Participants: Nicolas Anquetil, Stéphane Ducasse, Anne Etien, Oleksandr Zaitsev

We started a new collaboration with the council company, Arolla, about software evolution. Arolla has daily problems with identifying architecture, design, and deviations from those artifacts. The goal of the thesis is to experiment which learning techniques can help with semi-automatically extracting design and architectural aspects and their violations. A PhD CIFRE has started in 2019: Oleksandr Zaitsev, *Machine Learning-Based Tools to Support Software Evolution*.

A second CIFRE around legacy system cartography will start in 2020.

SEQUEL Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. Lelivrescolaire.fr

- Contract with http://Lelivrescolaire.fr; PI: Michal Valko

  Title: Sequential Machine Learning for Adaptive Educational Systems

  Duration: 3 years (Mar 2018 – Feb 2021)

  Abstract: This contract comes along the CIFRE grant on the same topic. Adaptive educational content are technologies which adapt to the difficulties encountered by students. With the rise of digital content in schools, the mass of data coming from education enables but also ask for machine learning methods. Since 2010, Lelivrescolaire.fr has been developing some learning materials for teachers and students through collaborative creation process. For instance, during the school year 2015/2016, students has achieved more than 8 000 000 exercises on its homework platform Afterclasse.fr. Our approach would be based on sequential machine learning: the algorithm learns to recommend some exercises which adapt to students gradually as they answer.
  Participants: Julien Seznec, Michal Valko.

8.1.2. Renault

- Contract with Renault; PI: Philippe Preux

  Title: Control of an autonomous vehicle

  Duration: 3 years (Dec 2017 – Nov 2020)

  Abstract: This contract comes along the CIFRE grant on the same topic. This work is done in collaboration with the NON-A team-project.
  Participants: Édouard Leurent, Odalric-Ambrym Maillard, Philippe Preux.

8.1.3. Critéo

- Contract with “Criteo”; PI: Philippe Preux

  Title: Computational advertizing

  Duration: 3 years (Dec 2017 – Jun 2019)

  Abstract: This contract comes along the CIFRE grant on the same topic. The goal is to investigate reinforcmeent learning and deep learning on the problem of ad selection on the Internet.

  Note: this contract came to its end because the PhD candidate quitted Critéo, hence aborting his PhD studies.
  Participants: Philippe Preux, Kiewan Villatel.

8.1.4. Share My Space

- Contract with “Share My Space”.

  Duration: 6 months
  Participant: Philippe Preux.

SPIRALS Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. ip-label

Participant: Romain Rouvoy [contact person].

A software exploitation license (2014–ongoing) of the APISENSE® crowd-sensing platform has been sold to the ip-label company. They use this platform as a solution to monitor the quality of the GSM signal in the wild. The objective is to provide developers and stakeholders with a feedback on the quality of experience of GSM connection depending on their location.

8.2. Davidson

Participants: Mohammed Chakib Belgaid, Romain Rouvoy [contact person], Lionel Seinturier.

This collaboration (2017–20) aims at proposing new solutions for optimizing the energy footprint of ICT software infrastructures. We want to be able to measure and assess the energy footprint of ICT systems while preserving various quality of service parameters, such as performance and security. We aim at proposing a testbed for assessing the energy footprint of various programming languages. This testbed will also incorporate frameworks for web and mobile programming. Finally, we want to be able to issue recommendations to developers in order to assist them in improving the energy footprint of their programs. This collaboration will take advantage of the PowerAPI software library.

The PhD of Mohammed Chakib Belgaid takes place in the context of this collaboration.

8.3. Orange #1

Participants: Philippe Merle [contact person], Lionel Seinturier.

This collaboration (2017–19) aims at defining a computational model for software infrastructures layered on top of virtualized and interconnected cloud resources. This computational model provides application programming and management facilities to distributed applications and services [39], [44]. This computational model defines a pivot model that enables the interoperability of various existing and future standards for cloud systems such as OCCI and TOSCA. This pivot model is defined with the Alloy specification language [62]. This collaboration takes advantage of the expertise that we are developing since several years on reconfigurable component-based software systems [75], on cloud systems [69], and on the Alloy specification language [67].

This collaboration with Orange Labs is a joint project with Jean-Bernard Stefani from the Spades Inria project-team.

8.4. Orange #2

Participants: Zakaria Ournani, Romain Rouvoy [contact person], Lionel Seinturier.

This collaboration (2018–21) aims at proposing new solutions for modeling the energy efficiency of software systems and to design and implement new methods for measuring and reducing the energy consumption of software systems at development time. We especially target software systems deployed on cloud environments.

The CIFRE PhD of Zakaria Ournani takes place in the context of this collaboration.

8.5. Amaris (now Mantu)

Participants: Sacha Brisset, Romain Rouvoy [contact person], Lionel Seinturier.

This collaboration (2018–21) aims at proposing new solutions for automatically spotting and fixing recurrent user experience issues in web applications. We are interested in developing an autonomic framework that learns and classifies the behaviors and figures out causality links between data such as web GUI events, support tickets and user feedback, source version management events (e.g. recent commits). The ultimate objective is to implement an AI-powered recommendation system to guide the maintenance and even to automatically predict and solve user issues.

The CIFRE PhD of Sacha Brisset takes place in the context of this collaboration.

VALSE Project-Team (section vide)