RESEARCH CENTER
Paris

FIELD

Activity Report 2017

Section Contracts and Grants with Industry

Edition: 2018-02-19

ANTIQUE Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Grants with Industry

Xavier Rival received a Facebook Faculty Award (2017).

AOSTE2 Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Grants with Industry

The Airbus CIFRE grant which started on March 2014, provides full support for the PhD thesis of Cristian Maxim. The thesis concerns the statistical timing analysis while different variability factors are taken into account. The proposed methods are built on top of existing statistical approaches while proving appropriate programs for training these methods and thus learning from the history of the execution.

8.2. Bilateral Grants with Industry

The IFPEN grant which started on December 2014, provides full support for the PhD thesis of Salah-Eddine Saidi. The thesis concerns the automatic parallelization and scheduling approaches for co-simulation of numerical models on multi-core processors. The goal of the first research topic is to propose multi-core scheduling solutions for the co-simulation in order to accelerate its execution. The second research topic aims at proposing multi-core scheduling solutions in order to enable the execution of co-simulation under real-time constraints in the context of Hardware-in-the-Loop validation.

CASCADE Project-Team (section vide)

GALLIUM Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. The Caml Consortium

Participants: Xavier Leroy [**contact**], Damien Doligez, Michel Mauny, Didier Rémy.

The Caml Consortium is a formal structure where industrial and academic users of OCaml can support the development of the language and associated tools, express their specific needs, and contribute to the long-term stability of Caml. Membership fees are used to fund specific developments targeted towards industrial users. Members of the Consortium automatically benefit from very liberal licensing conditions on the OCaml system, allowing for instance the OCaml compiler to be embedded within proprietary applications.

The Consortium currently has 16 member companies:

- Aesthetic Integration
- Ahrefs
- Be Sport
- Bloomberg
- CEA
- Citrix
- Dassault Aviation
- Docker
- Esterel Technologies
- Facebook
- Jane Street
- Kernelyze LLC
- LexiFi
- Microsoft
- OCamlPro
- SimCorp

For a complete description of this structure, refer to http://caml.inria.fr/consortium/. Xavier Leroy chairs the scientific committee of the Consortium.

8.1.2. The OCaml Foundation

Participant: Michel Mauny.

Throughout 2017, Michel Mauny has been preparing the project of an OCaml Foundation, which should support OCaml in a more efficient way than the existing Caml Consortium could do, thanks to the facilities and flexibility provided by the recently created Inria Foundation. The goal is to raise enough funds to effectively support the development and evolution of OCaml, and to animate and grow its user and teaching communities.

8.1.3. Scientific Advisory for OCamlPro

Participant: Fabrice Le Fessant.

OCamlPro is a startup company founded in 2011 by Fabrice Le Fessant to promote the use of OCaml in the industry, by providing support, services and tools for OCaml to software companies. OCamlPro performs a lot of research and development, in close partnership with academic institutions such as IRILL, Inria and Univ. Paris Sud, and is involved in several collaborative projects with Gallium, such as the Bware ANR, the Vocal ANR and the Secur-OCaml FUI.

Since 2011, Fabrice Le Fessant has been a scientific advisor at OCamlPro, as part of a collaboration contract for Inria, to transfer his knowledge on the internals of the OCaml runtime and the OCaml compilers. Fabrice has left Inria in October 2017 to join OCamlPro on a full-time position.

PARKAS Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

Polly Labs contract with ARM, 2015-2019, with the participation of Qualcomm, Xilinx and Facebook (human resources, consulting services and and hiring former PARKAS members).

PI.R2 Project-Team (section vide)

POLSYS Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Grants with Industry

Until the mid 2000's, multivariate cryptography was developing very rapidly, producing many interesting and versatile public-key schemes. However, many of them were soon successfully cryptanalysed (a lot have been done in this group). As a consequence, the confidence in multivariate cryptography cryptosystems declined. It seems that there have emerged new important reasons for renewal of the interest in a new generation of multivariate schemes. In the past two years, the algorithms for solving the Discrete Logarithm Problem over small characteristic fields underwent an extraordinary development. This clearly illustrates the risk to not consider alternatives to classical assumptions based on number theory. In parallel, two of the most important standardization bodies in the world, NIST and ETSI have recently started initiatives for developing cryptographic standards not based on number theory, with a particular focus on primitives resistant to quantum algorithms. An objective here is then to focus on the design of multivariate schemes.

The team is involved in the industrial transfer of post-quantum cryptography. The maturation project, called HFEBOOST, is supervised by SATT-LUTECH.

SATT-LUTECH specializes in the processing and transfer of technologies from research laboratories of its shareholders: Inria, CNRS, University of Technology of Compiègne, National Museum of Natural History, Institute Curie, Université Panthéon-Assas, Paris Sorbonne University and National School of Industrial Creation).

The team has recently developed, in partnership with a mobile application development company (WASSA), an Android app for smartphones (Samsung S5 type) that uses multivariate cryptography. The application has been tested mid-November in a series of experiments supervised by DGA and French Ministry of Defense. The experiment gathered a total of hundred participants from various operational units. This is a first milestone in the maturation project whose goal is to create a start-up.

7.2. Public Contracts

CEA LETI / DSYS / CESTI

In smart card domain, the emanations of a component during a cryptographic computation may compromise the information that is directly or not linked to the secret keys. The most part of the side channel attacks are based on statistical tools that exploit relations between the handled data and the signals. However these methods do not take advantage of all the signal information. The goal is to study the existing algorithms in pattern and speech recognition and to apply them to signals related to cryptographic computations. The objective will be to improve the attacks efficiency and resolve more complex problems.

PROSECCO Project-Team (section vide)

SECRET Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Grants with Industry

- **Thales** ($02/14 \rightarrow 01/17$)
  Funding for the supervision of Julia Chaulet's PhD.
  30 kEuros.

MATHERIALS Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Contracts and grants with Industry

Many research activities of the project-team are conducted in close collaboration with private or public companies: CEA, SANOFI, IRDEP, EDF, IFPEN. The project-team is also supported by the Office of Naval Research and the European Office of Aerospace Research and Development, for multiscale simulations of random materials. All these contracts are operated at and administrated by the École des Ponts.

MATHRISK Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Grants with Industry

- Consortium PREMIA, Natixis - Inria
- Consortium PREMIA, Crédit Agricole CIB - Inria

7.2. Bilateral Contracts with Industry

- Chair Ecole Polytechnique-ENPC-UPMC-Société Générale "Financial Risks" of the Risk fondation . Participants: A. Alfonsi, B. Jourdain, B. Lapeyre
- AXA Joint Research Initiative on Numerical methods for the ALM, from September 2017 to August 2020, Participant: A. Alfonsi.

MOKAPLAN Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. Optimal Transport applied to altimetric data dynamic interpolation

(S. Legrand V. Duval L. Chizat J-D. Benamou).

This collaboration between CLS and and funded by CNES intends to test on Column of Tropospheric Humidity data Optimal transportation interpolation techniques for balanced and unbalanced data.

QUANTIC Project-Team (section vide)

SIERRA Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

Microsoft Research: “Structured Large-Scale Machine Learning”. Machine learning is now ubiquitous in industry, science, engineering, and personal life. While early successes were obtained by applying off-the-shelf techniques, there are two main challenges faced by machine learning in the “big data” era: structure and scale. The project proposes to explore three axes, from theoretical, algorithmic and practical perspectives: (1) large-scale convex optimization, (2) large-scale combinatorial optimization and (3) sequential decision making for structured data. The project involves two Inria sites (Paris and Grenoble) and four MSR sites (Cambridge, New England, Redmond, New York). Project website: http://www.msr-inria.fr/projects/structured-large-scale-machine-learning/.

7.2. Bilateral Grants with Industry

- A. d’Aspremont: AXA, "mécénat scientifique, chaire Havas-Dauphine", machine learning.
- F. Bach: Gift from Facebook AI Research.

ANGE Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

A contract has been made (120.000 euros) with SAUR, IAV (Institut d'Aménagement de la Vilaine) and Agence de l'eau Loire-Bretagne in collaboration with SciWorks Technologies. It deals with the modelling and the simulation of chlorides entry in the Vilaine reservoir.

The ANR project Hyflo-Eflu relies on a collaboration with the company "HydroTube Energie". It comprises the recruitment of a young engineer (J. Ledoux) and regular meetings with industrial (Bordeaux) and academic partners (Nantes).

The ANR project ESTIMAIR includes the SME NUMTECH for a commercial deployment of the project results.

The EIT Digital project Env&You involves the SME NUMTECH and the startup Ambiciti, whose products rely on the results of this European project.

8.2. Bilateral Grants with Industry

P. Quémar's PhD thesis is funded by EDF (CIFRE). His PhD is entitled "3D numerical simulations of environmental hydrolics: application to Telemac".

J. Thorey's PhD thesis was funded by EDF R&D (CIFRE). The title of PhD thesis was: "Ensemble forecasting using sequential aggregation for photovoltaic power applications".

ARAMIS Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. Air-Liquide Medical Systems

Participants: Mario Chavez [Correspondant], Xavier Navarro.

Project title: Real-time characterisation of respiratory states from EEG

Funded in 2014

Amount: 370 K€

Coordinator: Thomas Similowski

Other partners: UPMC, Inserm UMR 1158

Abstract: The project aims at developing a real-time brain computer interface (BCI) for the monitoring of respiratory states from scalp EEG data of healthy volunteers and patients, recorded at the laboratory, hospital ward, operating room or intensive care units.

8.2. Bilateral Grants with Industry

8.2.1. Carthera

Participants: Stéphane Epelbaum [Correspondant], Alexandre Carpentier, Anne Bertrand, Marie Odile Habert.

Project title: Open label phase 1/2 study evaluating the safety and usefulness of transient opening of the blood-brain barrier using low intensity pulsed ultrasounds generated by the implantable device SONOCLOUD in patients with mild Alzheimer's disease

Funded in 2016

Amount: 400 K€

Coordinator: Stéphane Epelbaum

Other partners: UPMC, AP-HP

Abstract: This project aims at opening the blood brain barrier (BBB) in 10 mild Alzheimer's disease patients in order to improve the clearance of beta-amyloid and tau deposits in their brain as suggested in mice models of the disease. This first in man study will evaluate the safety and efficacy of an implanted device, SONOCLOUD, to open the BBB 7 times in each participant. Efficacy will be evaluated on the ability of the method to decrease the amyloid load evidenced by AV45 Positron Emission Tomography (PET), increase the brain metabolism analyzed by Fluorodeoxyglucose PET and improve cognition. If successful, this study will pave the way for future trials in which drugs can be used in addition to BBB opening to maximize their effect.

MAMBA Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

Industrial contract with SANOFI on the modelling of employees population dynamics and turnover.

MYCENAE Project-Team (section vide)

REO Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. Air Liquide Santé International

Participants: Céline Grandmont, Nicolas Pozin, Irene Vignon Clementel.

CIFRE convention and contract with Air Liquide Santé International (March 2014 - December 2017) in the context of the ANRT on "Multiscale lung ventilation modeling in health and disease", for the PhD thesis of Nicolas Pozin.

8.1.2. Philips Research

Participants: Miguel Ángel Fernández Varela, Jean-Frédéric Gerbeau, Alexandre This.

CIFRE convention and contract with Philips Research for the PhD thesis of Alexandre This (January 2016 - December 2018) on fusion data/simulation for the assessment of mitral regurgitation.

8.1.3. Kephalios & Epygon

Participants: Gautier Bureau, Miguel Ángel Fernández Varela, Jean-Frédéric Gerbeau, Ludovic Boilevin-Kayl, Marina Vidrascu.

REO is an academic partner of the industrial project MIVANA, dedicated to the development of new technologies for mitral valve treatment. It is led by the start-up company Kephalios, with the participation of the start-up company Epygon, by the company MDB Texinov and the research institute IFTH. In this framework, REO has two bilateral contracts with Kephalios and Epygon on the modeling and simulation of two medical devices for mitral valve repair.

8.1.4. Instem/NOTOCORD

Participants: Muriel Boulakia, Damiano Lombardi, Jean-Frédéric Gerbeau, Fabien Raphel, Eliott Tixier.

REO partners with the software company NOTOCORD. The collaboration started in 2013 the framework of the LabCom "cardioXcomp". In 2016, the ANR funding came to an end, and NOTOCORD was acquired by the company Instem. Our collaboration with Instem/NOTOCORD continues as a bilateral partnership with the purpose of developing the software cardioXcomp dedicated to the safety pharmacology industry. This project is also supported by a grant by AMIES (Agency for Interaction in Mathematics with Business and Society).

SERENA Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

Three contracts with EDF accompanying the PhD theses of Amina Benaceur, Nicolas Pignet, and Riccardo Milani.

One contract with CEA accompanying the PhD thesis of Frédéric Marazzato.

One contract with ANDRA accompanying the PhD thesis of Sarah Ali Hassan (ended, Ph.D. defended in June 2017).

One contract with IFP Energies Nouvelles, in the framework of the Inria–IFP Energies Nouvelles "contrat cadre".

Three-parts contract Inria–EDF–Sciworks Technologies (from April 2017) on "Form-L for the formalization of constraints of complex systems".

TAPDANCE Team (section vide)

ALPINES Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

- Contract with Total, February 2015 - February 2018, that funds the PhD thesis of Hussam Al Daas on enlarged Krylov subspace methods for oil reservoir and seismic imaging applications. Supervisor L. Grigori.
- Contract with IFPen, February 2016 - February 2019, that funds the Phd thesis of Zakariae Jorti on adaptive preconditioners using a posteriori error estimators. Supervisor L. Grigori.
- Contract with IFPen, October 2016 - October 2019, that funds the Phd thesis of Julien Coulet on the virtual element method (VEM). Supervisor F. Nataf and V. Girault.

DYOGENE Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. CRE with Orange

One year contract titled "Scheduling effect on the distribution of QoS over cells in 4G wireless cellular networks" between Inria and Orange Labs have been realized in 2017. It is a part of the long-term collaboration between TREC/DYOGENE, represented by B. Blaszczyszyn and Orange Labs, represented by M. K. Karray, for the development of analytic tools for the QoS evaluation and dimensioning of operator cellular networks. The developed solutions are implemented in Orange dimensioning toolbox *CapRadio* 6.2.1 . Antoine Brochard was hired by Inria as a research engineer thanks to this contract.

8.1.2. CRE with Huawei

18-month contract titled "Mathematical Modeling of 5G Ultra Dense Wireless Networks" between Inria represented by B. Blaszczyszyn (PI) and F. Baccelli, and Huawei. It aims at investigating obstacle-based shadowing fields in the spatial models of cellular networks and efficient scheduling policies. Paul Keeler was hired by Inria as a research engineer thanks to this contract.

8.1.3. Contract with the Ministry of Defense

The contract supports a PhD student Alexandre Hollocou hired in 2015, co-advised by M. Lelarge.

8.1.4. CIFRE with Nokia

Contract with Nokia started in 2015 for the co-advising by B. Blaszczyszyn of a PhD student of Nokia, Dalia-Georgiana Herculea.

8.1.5. CIFRE with Orange

Contract with Orange started in 2017 for the co-advising by B. Blaszczyszyn of a PhD student of Orange, Quentin Le Gall.

8.2. Bilateral Grants with Industry

8.2.1. Google Tides

Ana Busic and Sean Meyn received jointly in 2015 a Google Faculty Research Award for their research on Distributed Control for Renewable Integration in Smart Communities. The corresponding grant allowed us to cover some part of the scholarship of the PhD student **Sebastien Samain**. in 2017.

EVA Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

8.1.1. CNES contract

Participants: Pascale Minet, Ines Khoufi.

Inria and CNES co-funded a study of one year in the framework of the CNES Launchers Research and Technology program. This study deals with the improvement and performance evaluation of a solution of wireless sensor networks in a spatial environment, based on the IEEE 802.15.4e standard of TSCH (Time Slotted Channel Hopping).
In space launch vehicles, a NASA study shows that the mass per channel of 0.45 kg for a wiring approach can be reduced to 0.09 kg for a wireless approach.8 A question arises: which wireless technology is able to meet the requirements of space launch vehicles in terms of latency, throughput and robustness. The IEEE 802.15.4e amendment has been designed to meet such requirements. More specifically, the Time Slotted Channel Hopping (TSCH) mode of the IEEE 802.15.4e standard that has been designed for industrial automation, process control and equipment monitoring, appears very promising for space launch vehicles. More precisely, the study for CNES deals with:

- Avoiding collisions on shared slots: see the PEMWN 2017 conference.
- Building an IEEE 802.15.4e TSCH network: see the EUCASS 2017 publication.
- Increasing the reliability of an IEEE 802.15.4e TSCH network: see the NCA 2017 publication.
- Scheduling transmissions in an IEEE 802.15.4e TSCH network: see the VTC-Fall 2017 publication.

GANG Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. Collaboration with Nokia Bell Labs

Gang has a strong collaboration with Bell Labs (Nokia). We notably collaborate with Fabien Mathieu who is a former member of GANG and Nidhi Hegde. An ADR (joint research action) is dedicated to content centric networks and forwarding information verification. The PhD thesis of Leonardo Linguaglossa was funded by this contract.

This collaboration is developed inside the Alcatel-Lucent and Inria joint research lab.

MIMOVE Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Grants with Industry

"Monitoring and diagnosis of Internet QoE", Google Faculty Award to R. Teixeira (Inria) and D. Choffnes (Northeastern University), 2017.

RAP2 Team

5. Bilateral Contracts and Grants with Industry

5.1. Bilateral Contracts with Industry

- Contrat de recherche externalisé avec ORANGE SA "Scheduling Global OS”. Duration three years 2014-2017.
- PhD grant CJS (Contrat Jeune Scientifique) Frontières du vivant of INRA for Renaud Dessalles.
- PhD grant from Fondation Sciences Mathématiques de Paris for Wen Sun.
- PhD grant from Brazilian Government for Guilherme Thompson.
- CELTIC+ Contract “SENDATE”.

REGAL Project-Team

6. Bilateral Contracts and Grants with Industry

6.1. Bilateral Contracts with Industry

Regal has two CIFRE contracts with Scality SA:

- Vinh Tao is advised by Marc Shapiro and Vianney Rancurel. He works on highly available geo-replicated file systems, building on CRDT technology. He defended his thesis in December 2017.
- Dimitrios Vasilas is advised by Marc Shapiro and Brad King. He works on secondary indexing in large-scale storage systems under weak consistency.

Regal has two CIFRE contracts with Magency SA:

- Damien Carver is advised by Julien Sopena and Sébatien Monnet. He works on designing kernel-level mechanisms that automatically give more memory to the most active containers.
- Lyes Hamidouche is advised by Pierre Sens and Sébatien Monnet. He works on efficient data dissemination among a large number of mobile devices.

Regal has one contract with Orange within the I/O Lab joint laboratory:

- Guillaume Fraysse is advised by Jonathan Lejeune, Julien Sopena, and Pierre Sens. He works on distributed resources allocation in virtual network environments.

WHISPER Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Contracts with Industry

- Orange Labs, 2016-2018, 120 000 euros. The purpose of this contract is to apply the techniques developed in the context of the PhD of Antoine Blin to the domain of Software Defined Networks where network functions are run using virtual machines on commodity multicore machines.
- Thales Research, 2016-2018, 45 000 euros. The purpose of this contract is to enable the usage of multicore architectures in avionics systems. More precisely, our goal is to develop optimizations for a software TDMA hypervisor developed by Thales that provides full time-isolation of tasks. The PhD of Cédric Courtaud is supported by a CIFRE fellowship with Thales Research.
- OSADL, 2016-2017, development of the Prequel patch query language, 20 000 euros. OSADL is an organization headquartered in Germany that promotes and supports the use of open source software in the automation and machine industry. The project is in the context of the OSADL project SIL2LinuxMP bringing together various companies in automotive and embedded sytems with the goal of developing methodologies for certifying the basic components of a GNU/Linux-based RTOS.

ALMANACH Team

8. Bilateral Contracts and Grants with Industry

8.1. Industrial Collaborations

- **Verbatim Analysis**: this Inria start-up was co-created in 2009 by BS. It uses some of ALPAGE/ALMAnaCH's free NLP software (SxPipe) as well as a data mining solution co-developed by BS, VERA, for processing employee surveys with a focus on answers to open-ended questions. A new Inria startup, **opensquare**, was co-created in December 2016 by BS with 2 senior specialists of HR consulting. It is dedicated to designing, carrying out and analysing employee surveys as well as HR consulting based on these results. It uses a new employee survey analysis tool, *enqi*, which is still under development.
- **Facebook**: A collaboration on text simplification ("français Facile À Lire et à Comprendre", FALC) is starting with Facebook's Parisian FAIR laboratory. It should start with a co-supervised (CIFRE) PhD thesis in collaboration with UNAPEI, the largest French federation of associations defending and supporting people with special needs and their families (the CIFRE application has just been submitted). This collaboration is expected to be part of a larger initiative involving (at least) these three partners as well as the relevant ministries.
- **Bluenove**: A contract with this company has been signed, which initiates a collaboration in the integration of NLP tools (e.g. chatbot-related modules) within Bluenove's plateform Assembl, dedicated to online citizen debating forums. It involves a total of 24 months of fixed-term contracts (12 months for an engineer and 12 months for a research ingineer).
- **Science Miner**: ALMAnaCH (following ALPAGE) has been collaborating since 2014 years with this company founded by Patrice Lopez, a specialist in machine learning techniques and initiator of the GROBID and NERD (now entity-fishing) suites. Patrice Lopez provides scientific support on the corresponding software components in the context of the Parthenos, EHRI and Iperion projects, as well as in the context of the Inria anHALytics initiative, aiming at providing a scholarly dashboard on the scientific papers available from the HAL national publication repository.
- **Konverso**: A collaboration with this start-up is starting, focused on chatbots and text generation. One of our objectives with this collaborations is to initiate a larger initiative involving ALMAnaCH and several small companies, whose goal will be the development of open-source, NLP-enhanced chatbot modules. This is because such developments are complex and would benefit from such a mutualisation initiative. In turn, an open-source chatbot engine would allow startups and ALMAnaCH to more rapidly develop and deploy high-performance application-specific chatbots. The first concrete outcome of this collaboration is our joint submission to the call for projects published by the DILA (French government agency) for exploring the relevance of deploying a chatbot on the public information plateform service-public.fr.
- There exists at least one formal collaboration between a company and EPHE involving future ALMAnaCH members. It involves **Insight-Signals**, an EPHE start-up that "designs data analytics and decision support systems that integrate the complexity of humans' behaviour and their interactions".
- **Trooclick**: A direct and active collaboration with this company is now strengthened by the "RAPID" ANR project VerDI on the automatic detection of omissions in news reports and other types of texts. This project will come to an end in February 2018.
- ALMAnaCH members have recently initiated discussions with other companies (Fujitsu, HyperLex, Fortia Financial Solutions...), so that additional collaborations might start in the near future. They have also presented their work to companies interested in knowing more about the activities of Inria Paris in AI and NLP (Google, Toyota, Samsung...).

COML Team

8. Bilateral Contracts and Grants with Industry

8.1. Bilateral Grants with Industry

- Grant from MSR (Zero Resources Challenge, 2017) - 5K€
- AWS Grant (Zero Resources Challenge, 2017) - 20K€

RITS Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

VALEO Group: a very strong partnership is under reinforcement between VALEO and Inria. Several bilateral contracts were signed to conduct joint works on Driving Assistance, some of which VALEO is funding. This joint research includes:

- The PhD thesis of Pierre de Beaucorps and the post-doc of Thomas Streubel under the framework of VALEO project "Daring"
- *SMART* project: on the *Design and development of multisensor fusion system for road vehicles detection and tracking*. This project funds the internship of Alfredo Valle.
- A CIFRE like PhD thesis is ongoing between VALEO and Inria (Maximilian JARITZ), dealing with multisensor processing and learning techniques for free navigable road detection.
- VALEO is currently a major financing partner of the "GAT" international Chaire/JointLab in which Inria is a partner. The other partners are: UC Berkeley, Shanghai Jiao-Tong University, EPFL, IFSTTAR, MPSA (Peugeot-Citroën) and SAFRAN.
- Technology transfer is also a major collaboration topic between RITS and VALEO as well as the development of a road automated prototype.
- Finally, Inria and VALEO are partners of the PIA French project CAMPUS (Connected Automated Mobility Platform for Urban Sustainability) including SAFRAN, Invia and Gemalto. The aim of the project is the development of autonomous vehicles and the realization of two canonical uses-cases on highways and urban like environments.

Renault Group: Collaboration between Renault and RITS re-started in 2016. Different research teams in Renault are now working separately with RITS on different topics.

- A CIFRE like PhD thesis is ongoing between Renault and Inria (Farouk GHALLABI) The thesis deals with the accurate localization of an autonomous vehicle on a highway using mainly on-board low-cost perception sensors.
- Another CIFRE PhD thesis begun on November 2017 (Imane MATHOUT).

AKKA Technologies: Collaboration with AKKA since 2012 (for the Link & Go prototype).

- Inria and AKKA Technologies are partners in the COCOVEA and the VALET projects (ANR projects).
- A new CIFRE PhD thesis (Luis ROLDAO JIMENEZ) dealing with 3D-environment modeling for autonomous vehicles begun in October 2017.

Valda Team (section vide)

WILLOW Project-Team

8. Bilateral Contracts and Grants with Industry

8.1. Facebook AI Research Paris: Weakly-supervised interpretation of image and video data (Inria)

Participants: Jean Ponce, Minsu Cho, Ivan Laptev, Josef Sivic.

We will develop in this project (Facebook gift) new models of image and video content, as well as new recognition architectures and algorithms, to address the problem of understanding the visual content of images and videos using weak forms of supervision, such as the fact that multiple images contain instances of the same objects, or the textual information available in television or film scripts.

8.2. Google: Learning to annotate videos from movie scripts (Inria)

Participants: Josef Sivic, Ivan Laptev, Jean Ponce.

The goal of this project is to automatically generate annotations of complex dynamic events in video. We wish to deal with events involving multiple people interacting with each other, objects and the scene, for example people at a party in a house. The goal is to generate structured annotations going beyond simple text tags. Examples include entire text sentences describing the video content as well as bounding boxes or segmentations spatially and temporally localizing the described objects and people in video. This is an extremely challenging task due to large intra-class variation of human actions. We propose to learn joint video and text representations enabling such annotation capabilities from feature length movies with coarsely aligned shooting scripts. Building on our previous work in this area, we aim to develop structured representations of video and associated text enabling to reason both spatially and temporally about scenes, objects and people as well as their interactions. Automatic understanding and interpretation of video content is a key-enabling factor for a range of practical applications such as content-aware advertising or search. Novel video and text representations are needed to enable breakthrough in this area.

8.3. Google: Structured learning from video and natural language (Inria)

Participants: Simon Lacoste-Julien, Ivan Laptev, Josef Sivic.

People can easily learn how to change a flat tire of a car or assemble an IKEA shelve by observing other people doing the same task, for example, by watching a narrated instruction video. In addition, they can easily perform the same task in a different context, for example, at their home. This involves advanced visual intelligence abilities such as recognition of objects and their function as well as interpreting sequences of human actions that achieve a specific task. However, currently there is no artificial system with a similar cognitive visual competence. The goal of this proposal is to develop models, representations and learning algorithms for automatic understanding of complex human activities from videos narrated with natural language.

8.4. MSR-Inria joint lab: Image and video mining for science and humanities (Inria)

Participants: Guilhem Cheron, Ivan Laptev, Maxime Oquab, Jean Ponce, Josef Sivic, Cordelia Schmid [Inria Lear].

This collaborative project brings together the WILLOW and LEAR project-teams with MSR researchers in Cambridge and elsewhere. The concept builds on several ideas articulated in the “2020 Science” report, including the importance of data mining and machine learning in computational science. Rather than focusing only on natural sciences, however, we propose here to expand the breadth of e-science to include humanities and social sciences. The project we propose will focus on fundamental computer science research in computer vision and machine learning, and its application to archaeology, cultural heritage preservation, environmental science, and sociology, and it will be validated by collaborations with researchers and practitioners in these fields.

In October 2013 a new agreement has been signed for 2013-2017 with the research focus on automatic understanding of dynamic video content. Recent studies predict that by 2018 video will account for 80-90% of traffic on the Internet. Automatic understanding and interpretation of video content is a key enabling factor for a range of practical applications such as organizing and searching home videos or content aware video advertising. For example, interpreting videos of "making a birthday cake" or "planting a tree" could provide effective means for advertising products in local grocery stores or garden centers. The goal of this project is to perform fundamental computer science research in computer vision and machine learning in order to enhance the current capabilities to automatically understand, search and organize dynamic video content.