Activity Report 2014

Section Contracts and Grants with Industry

ALPAGE Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Contracts with Industry

Alpage has developed several collaborations with industrial partners. Apart from grants described in the next section, specific collaboration agreements have been set up with the following companies:

- Verbatim Analysis (license agreement, transfer agreement, "CIFRE" PhD, see section 4.3),
- Lingua et Machina (DTI-funded engineer, see section 4.4),
- viavoo (PhD of Marion Baranes, employed at viavoo, which started in 2012 on automatic normalisation of noisy texts),
- Yseop ("CIFRE" PhD of Raphael Salmon which started in 2012 on automatic text generation)
- CEA-List (PhD of Quentin Pradet on the annotation of semantic roles in specific domains. The thesis has finished on the 12/31/2015 (defense on the 02/06/2015).
- Proxem (consulting)

ALPINES Project-Team (section vide)

ANGE Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- SAUR (company which manages water supplies): ANGE was involved in a 24.000 euro–contract with the Inria project-team BIOCORE (Sophia-Antipolis). This project relies on the optimisation of hydrodynamics in a lagoon in order to depollute it.

- ADEME (national agency for environment and resource management): ANGE participated to a study upon the contribution of algae in the production of energy in France till 2030.

- La Compagnie du Vent (subsidiary of GDF-Suez): in the framework of the "Salinalgue" project aiming at reducing greenhouse gas emission, ANGE and BIOCORE carried out a study upon microalgae production (10.000 euros for each team).

7.2. Grants with Industry

The PhD thesis of P. Ung is granted by CNRS, by AMIES (French agency for mathematics in interaction with companies and the society), by EDF and by GeoHyd (now a part of ANTEA–group) whose mission is the management of integrated natural resources. The PhD comprises simulations of concrete cases by means of the EDF software Telemac.

<p style="text-align:center; color:red;">**ANTIQUE Team**</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. RTOS Contract

Title: Static Analysis of a Fragment of an Operating-System with ASTRÉEA

Type: Service contract

Duration: June 2014 - December 2014

Partners: École Normale Supérieure (France), CNRS (France), Airbus France (France)

Inria contact: Antoine Miné

Abstract: The aim of the contract is to study the formal verification of the safety of a fragment of a small real-time multi-task operating system. The verification will be performed using the ASTRÉEA analyzer, by adapting and extending the model of parallel executions developed at École Normale Supérieure.

<p style="text-align:center; color:red;">**AOSTE Project-Team**</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. *Kontron PhD CIFRE thesis*
Participants: Mohamed Bergach, Robert de Simone.

Kontron Toulon (formerly Thales Computers) has a strong interest in finding optimal (or at least efficient) mapping of applications extensively based on FFT computations (mostly radar detection), onto GPGPU architectures of the Intel IvyBridge/Haswell family (that ar ethen integrated into avionic subsystems at Kontron). This is the main topic of Mohamed Bergach PhD thesis, which should be defended in late Spring 2015. A publication is under submission.

7.1.2. *Airbus PhD CIFRE thesis*
Participants: Liliana Cucu-Grosjean, Cristian Maxim.

As part of a larger collaborative programme between Inria and Airbus, the PhD thesis of Cristian Maxim has started in March 2014. This thesis will propose a methodology for obtaining probabilistic worst-case execution times distributions by characterizing the appropriate properties of Airbus applications and platforms. This first year is dedicated to the familiarization of Cristian Maxim to the Airbus applications and platforms.

7.1.3. *Astrium/CNES PostDoc*

The objective of our collaboration with Airbus Defence and Space and the CNES is to determine how the design and implementation of embedded software and system/network configuration can be largely automated in an aerospace context. The objective is to reduce the design and validation costs (especially in case of system evolutions), while preserving an assurance level superior to that of the Ariane 5 flight program. We are exploring automation of the real-time allocation, scheduling, and code generation using the novel algorithms developed and implemented in the Lopht tool. The application of such techniques also requires extensions at the level of system specification formalisms. This collaboration has funded the post-doctoral period of Raul Gorcitz (started in September 2013, reconducted for one year).

<p style="color:red; text-align:center">ARAMIS Project-Team</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. Air-Liquide Medical Systems

Participants: Mario Chavez [Correspondant], Xavier Navarro.

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

Founded 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..

CASCADE Project-Team (section vide)

CLASSIC Project-Team (section vide)

<div align="center">**CLIME Project-Team**</div>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- Clime is partner with INERIS (National Institute for Environmental and Industrial Risks http://www.ineris.com/en) in a joint cooperation devoted to air quality forecast. This includes research topics in uncertainty estimation, data assimilation and ensemble modeling.

  Clime also provides support to INERIS in order to operate the Polyphemus system for ensemble forecasting, uncertainty estimations and operational data assimilation at continental scale.

- Clime is partner with IRSN http://www.irsn.fr/, the French national institute for radioprotection and nuclear safety, for inverse modeling of emission sources and uncertainty estimation of dispersion simulations. The collaboration aims at better estimating emission sources, at improving operational forecasts for crisis situations and at estimating the reliability of forecasts. The work is derived at large scale (continental scale) and small scale (a few kilometers around a nuclear power plant).

- Clime takes part to a joint Ilab with the group SETH (Numtech http://www.numtech.fr/). The objective is to (1) transfer Clime work in data assimilation, ensemble forecasting and uncertainty estimation, with application to urban air quality, (2) identify the specific problems encountered at urban scale in order to determine new research directions, (3) carry out nowcasting rain events from radar images.

CRYPT Team (section vide)

DEDUCTEAM Exploratory Action (section vide)

DYOGENE Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. MSR-Inria Joint Lab

- Social Information Networks and Privacy
  Online Social networks provide a new way of accessing and collectively treating information. Their efficiency is critically predicated on the quality of information provided, the ability of users to assess such quality, and to connect to like-minded users to exchange useful content.

  To improve this efficiency, we develop mechanisms for assessing users' expertise and recommending suitable content. We further develop algorithms for identifying latent user communities and recommending potential contacts to users.

- Machine Learning and Big Data
  Multi-Armed Bandit (MAB) problems constitute a generic benchmark model for learning to make sequential decisions under uncertainty. They capture the trade-off between exploring decisions to learn the statistical properties of the corresponding rewards, and exploiting decisions that have generated the highest rewards so far. In this project, we aim at investigating bandit problems with a large set of available decisions, with structured rewards. The project addresses bandit problems with known and unknown structure, and targets specific applications in online advertising, recommendation and ranking systems.

7.1.2. CRE with Orange

CRE contract titled "Distribution of the SINR in real networks" between Inria and Orange Labs have been realized. P. Keeler was hired by Inria as a research engineer within this contract. It is a part of the long-term collaboration between TREC/DYOGENE and Orange Labs, represented by M. K. Karray, for the development of analytic tools for the QoS evaluation and dimensioning of operator cellular networks.

GALLIUM Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. *The Caml Consortium*

Participants: Xavier Leroy [correspondant], Damien Doligez, 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 11 member companies:

- CEA
- Citrix
- Dassault Aviation
- Dassault Systèmes
- Esterel Technologies
- Jane Street
- LexiFi
- Microsoft
- Multitudine
- 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.

GAMMA3 Project-Team

5. Bilateral Contracts and Grants with Industry

5.1. Bilateral Contracts with Industry

- Dassault Aviation, *Extraction de la topologie et simplification des détails géométriques*, P. Laug et H. Borouchaki, 66 k-euros, 2013-2015.

<p style="text-align:center;color:red;font-weight:bold;">GANG Project-Team</p>

6. Bilateral Contracts and Grants with Industry

6.1. Alcatel-Lucent Bell Labs

Participants: François Durand, The-Dang Huynh, Leonardo Linguaglossa, Laurent Viennot.

Gang has a strong collaboration with Alcatel-Lucent. We notably collaborate with Fabien Mathieu and Diego Perino who are former members of Gang that have joined Alcatel-Lucent. A Cifre grant allows to fund the PhD thesis of The-Dang Huynh to study ranking techniques and their application to social networks. An ADR (joint research action) is dedicated to content centric networks and forwarding information verification. The PhD thesis of Leonardo Linguaglossa is funded by this contract. We also collaborate with Ludovic Noirie on voting systems.

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

<p style="text-align:center">**HIPERCOM2 Team**</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. OCARI2

Participants: Ichrak Amdouni, Pascale Minet, Cédric Adjih, Ridha Soua.

Partners: EDF, Inria.

The OCARI (Optimization of Ad hoc Communications in Industrial networks) project, funded by ANR, started in February 2007 and ended in 2010, EDF the coordinator decided to continue the project that deals with wireless sensor networks in an industrial environment. It aims at responding to the following requirements which are particularly important in power generation industry and in warship construction and maintenance:

- Support of deterministic MAC layer for time-constrained communication,
- Support of optimized energy consumption routing strategy in order to maximize the network lifetime,
- Support of human walking speed mobility for some particular network nodes, (e.g. sinks).

The development of OCARI targets the following industrial applications:

- Real time centralized supervision of personal dose in electrical power plants,
- Condition Based Maintenance of mechanical and electrical components in power plants as well as in warships,
- Environmental monitoring in and around power plants,
- Structure monitoring of hydroelectric dams.

To meet the requirements of supported applications (remote command of actuators, tele-diagnostic...), new solutions are brought to manage several communication modes, ranging from deterministic data transfers to delay tolerant transfers. A key issue is how to adapt routing algorithms to the industrial environment, taking into account more particularly limited network resources (e.g.; bandwidth), node mobility and hostile environment reducing radio range. The OCARI project aimed at developing a wireless sensor communication module, based on IEEE 802.15.4 PHY layer.

In 2014, Inria took part with EDF to the specification of a simplified OCARI stack for a porting to a 32 bit platform and provided support to the SME in charge of developing this stack.

7.2. Bilateral Grants with Industry

Participants: Paul Muhlethaler, Gerard Le Lann.

This work aims at improving the reliability of some SAGEM communications systems.

<p style="text-align:center;color:red;font-weight:bold;">LIFEWARE Team</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contract with General Electric Transportation

Research contract on "Energy optimization in mass transport". Accompagnying contract for the CIFRE thesis of David Fournier [3] (2011-2014).

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

Collaboration with Merrimack Pharmaceuticals on spatial-temporal modeling of drug action.

MATHERIALS Team

6. Bilateral Contracts and Grants with Industry

6.1. Contracts and Grants with Industry

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

<p style="text-align:center;color:red;font-weight:bold;">MATHRISK Project-Team</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

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

7.2. Bilateral Grants with Industry

- Chair X-ENPC-UPMC-Société Générale "Financial Risks" of the Risk fondation : A. Alfonsi, B. Jourdain, B. Lapeyre

MIMOVE Team (section vide)

MOKAPLAN Team (section vide)

<p style="color:red; font-weight:bold; text-align:center">MUSE Team</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- "Improving the quality of recommendation using semi-structured user feedback" CIFRE contract with Technicolor for thesis of Sara el Aouad from May 2014 to April 2017.
- "Crowdsourced Home Network Diagnosis" CIFRE contract with Technicolor for thesis of Diego da Hora from February 2014 to January 2017.
- "Exploiting Network Content-awareness to provide novel added value services" contract under the Inria-Alcatel Lucent Bell Labs common Lab (ADR ICN) to fund the doctoral thesis of Giuseppe Scavo from November 2013 to October 2016.
- "Automated Network Troubleshooting Based on Collaboration of Home Devices" CIFRE contract with Technicolor for thesis of Stephene Wustner from Feb 2012 to Nov 2014.

7.2. Bilateral Grants with Industry

- "Home Network Troubleshooting with the Fathom Measurement Platform" in collaboration with Christian Kreibich (ICSI), gift from Google/M-lab, 2013-2014.

MUTANT Project-Team (section vide)

MYCENAE Project-Team (section vide)

PARKAS Project-Team (section vide)

PI.R2 Project-Team (section vide)

POLSYS Project-Team (section vide)

POMDAPI Project-Team

6. Bilateral Contracts and Grants with Industry

6.1. Bilateral Contracts with Industry

RTE (Réseau de Transport de l'Électricité) and ANRT (Association Nationale de la Recherche et de la Technologie) are funding the PhD thesis of C. Josz (Cifre agreement).

Andra is funding the PhD thesis of S. Ali Hassan (an agreement that is part of an *accord Cadre* between Inria and Andra).

IFP Énergies Nouvelles (*Institut Français du Pétrole Énergies Nouvelles*) supports a collaboration on numerical methods for the flow simulation in porous media with fractures for modeling sedimentary basins or oil reservoirs. This collaboration concerns J. E, Roberts and J. Jaffré on the Inria side and I. Faille and A. Fumagalli on the IFPEN side.

PROSECCO Project-Team (section vide)

QUANTIC Team (section vide)

RAP Project-Team

5. Bilateral Contracts and Grants with Industry

5.1. Contracts

- CELTIC-Plus Saser "Safe and Secure European Routing'. RAP participates in the section on optical networks. Participants include Orange labs, Alcaltel-Lucent, Telecom Institute, ENSSAT as well as a number of German laboratories. Duration three years.
- Contrat de recherche externalisé avec ORANGE SA "Scheduling Global OS". Duration three years 2014-2016.
- PGMO project "Systèmes de véhicules en libre-service: Modélisation, Analyse et Optimisation" with G-Scop (CNRS lab, Grenoble) and Ifsttar. From 1 to 3 years. Starting at 1/10/2013.
- PhD grant CJS (Contrat Jeune Scientifique) Frontières du vivant of INRA for Emanuele Leoncini.
- 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.

5.2. Bilateral Grants

- The project RNA "Connectivity and distances in models of random networks and applications" is jointly funded by Inria through the Associate Team program, and Quebec's FQRNT team grant CARP. https://who.rocq.inria.fr/Nicolas.Broutin/aap-rna.html. Duration 2013-2014.

<p align="center" style="color:red">REGAL Project-Team</p>

6. Bilateral Contracts and Grants with Industry

6.1. Bilateral Contracts with Industry

- Orange Lab, 30,000 euros for 1 PhD Students (CIFRE), Ralucca Diaconu
- Renault, 60,000 over 3 years (2013 - 2016) for a CIFRE. In the context of a Cifre cooperation with Renault, we are supervising with Whipser the PhD of Antoine Blin on the topic of scheduling processes on a multicore machine for the automotive industry. The goal is to allow real-time and multimedia applications to cohabit on a single processor. The challenge here is to control resource consumption of non real-time processes so as to preserve the real-time behavior of critical ones. As part of this cooperation, we will use the Bossa DSL framework for implementing process schedulers that we have previously developed.

6.2. Bilateral Grants with Industry

6.2.1. *Joint industrial PhD: CRDTs for Large-Scale Storage Systems, with Scality SA*

We have started a joint CIFRE (industrial PhD) research with the French start-up company Scality, as described above (under "Large-Scale File Systems").

The objective of this research is to design new algorithms for file and block storage systems, considering both the issues of scaling the file naming tree to a very large size, and the issue of conflicting updates to files or to the name tree, in the case of high latency or disconnected work.

6.2.2. *EMR CREDIT, with Thales.*

Franck Petit and Swan Dubois participate to the creation of the EMR (Equipe Mixte de Recherche) *CREDIT*, (Compréhension, Représentation et Exploitation Des Interactions Temporelles) between LIP6/UPMC and Thales.

Nowadays, networks are the field of temporal interactions that occur in many settings networks, including security issues. The amount and the speed of such interactions increases everyday. Until recently, the dynamics of these objects was little studied due to the lack of appropriate tools and methods. However, it becomes crucial to understand the dynamics of these interactions. Typically, how can we detect failures or attacks in network traffic, fraud in financial transactions, bugs or attacks traces of software execution. More generally, we seek to identify patterns in the dynamics of interactions. Recently, several different approaches have been proposed to study such interactions. For instance, by merging all interactions taking place over a period (e.g. one day) in a graph that are studied thereafter (evolving graphs). Another approach was to built meta-objects by duplicating entities at each unit of time of their activity, and by connecting them together.

The goal of the EMR is to join both teams of LIP6 and Thales on these issues. More specifically, we hope to make significant progress on security issues such as anomaly detection. This requires the use of a formalism sufficiently expressive to formulate complex temporal properties. Recently, a vast collection of concepts, formalisms, and models has been unified in a framework called Time-Varying Graphs. We want to pursuit that way. In the short run, the challenges facing us are: (1) refine the model to capture some interaction patterns, (2) design of algorithms to separate sequences of interactions, (3) Identify classes of entities playing a particular role in the dynamics, such as bridges between communities, or sources and sinks.

<p style="text-align:center">**REO Project-Team**</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Grants with Industry

7.1.1. CIFRE convention

Participants: Céline Grandmont, Nicolas Pozin, Irène Vignon-Clementel.

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

<div align="center" style="color:red">

RITS Team

</div>

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. Valeo financed the PhD thesis of G. Trehard under the framework of Valeo internal project *"V50"* and is currently a major financing partner of the "GAT" international Chaire / JointLab. Technology transfer is also a major collaboration topic between RITS and Valeo.

- GAT JointLab: Inria is a main partner of this Joint Lab which is composed of Valeo, SAFRAN, Peugeot-Citroën, Inria, Armines and IFSTTAR. GAT will focus on the development of Automated driving architectures for implementation on real prototypes equipped with near-to-market sensors provided by the industrial partners.

- AKKA Technologies: a strong partnership was born as a result of Link & Go project funded by the Yvelines Department CG78. The Link & Go has become a common platform for development between Inria and AKKA. These two institutions are now partners in several research projects and established a roadmap for joint developments around the automatic full-by-wire driving.

- ROBOSOFT – EasyMile: Robosoft is a spin-off of Inria created in 1985. Partners in several national and European research programs, RITS and Robosoft share the same vision on the automated urban transportation needs and modalities. They coped on the design and development of the Cycab and are currently collaborating – together with EZ Mile – on the development of on-demand automated transportation based on automated shuttles; this includes technology transfer especially in laser-based navigation systems.

- *YAMAHA Motor Company (YMC)*: a MoU was signed in 2012 between YMC and RITS giving the two parties the framework to work on the *New generation of AGV*. The previous similar cooperation (2000-2010) led to a 750 000 Euros financing program that allowed the development of several AGV platforms. The new agreement settles the basis of more advanced collaboration more focused on machine intelligence and on the design of innovative electric AGV dedicated to mass transportation in urban areas. The EU-CityMobil-2 project is an ideal opportunity to maintain technical exchanges within the cooperation.

- AXTER Automation: RITS has signed a MoU with AXTER Technologies for the cooperation on the autonomous navigation in indoor environments for automated industrial vehicles.

- YoGoKo: This is the newly created spin-off of RITS team. It has been created by Thierry Ernst, previous researcher of RITS and the initiator of the telecommunications activities in the team. YoGoKo is specialized in the design and development of V2X telecommunication architectures and software based on recent IETF internet protocols (e.g., IPv6) and cooperative ITS norms of ISO/CEN/ETSI. RITS is equipping its mobile prototypes with YoGoKo's products and they are solid partners in French research programs.

SECRET Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- **High Tech Communications Services** ($09/13 \rightarrow 09/14$)
  Recovering a convolutional encoder followed by a block interleaver
  19 kEuros.

7.2. Bilateral Grants with Industry

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

SIERRA Project-Team

6. Bilateral Contracts and Grants with Industry

6.1. 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 challeges 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-Rocquencourt and Grenoble) and four MSR sites (Cambridge, New England, Redmond, New York).

Technicolor, CIFRE PhD student: "User profiling from unstructured data".

6.2. Bilateral Grants with Industry

A. d'Aspremont, AXA, "mécénat scientifique, chaire Havas-Dauphine", machine learning.

A. d'Aspremont, Société Générale - fondation ENS, "mécénat scientifique".

A. d'Aspremont, Scientific committee, Thales Alenia Space. Evaluation program in control, signal processing, etc.

A. d'Aspremont, Projet EMMA at Institut Louis Bachelier. Collaboration with Euroclear on REPO markets.

<div align="center" style="color:red">**SISYPHE Project-Team**</div>

6. Bilateral Contracts and Grants with Industry

6.1. SciWorks Technologies contract: development of K-Assessor

Participants: Habib Jreige, Michel Sorine.

Development of K-Assessor. This contract ended in November 2014. The software K-Assessor has been developed with SciWorks Technologies for the monitoring and supervision of *master GC*, a prototype system of Fresenius-Kabi dedicated to glycemic control assistance based on the control algorithm CGAO_v2, we have previously developed [43].

Distribution of ISTL. ISTL is a software that we developed for numerical computation of the inverse scattering transform for electrical transmission lines. In addition to the inverse scattering transform, it includes a numerical simulator generating the reflection coefficients of user-specified transmission lines. With the aid of a graphical interface, the user can interactively define the distributed characteristics of a transmission line. ISTL is now distributed by SciWorks Technologies.

<p style="text-align:center; color:red;">**SMIS Project-Team**</p>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

The SMIS project has a long lasting cooperation with Gemalto, the world's leading providers of microprocessor cards. Gemalto provides SMIS with advanced hardware and software smart card platforms which are used to validate numbers of our research results. In return, SMIS provides Gemalto with requirements and technical feedbacks that help them adapting their future platforms towards data intensive applications. While no bilateral contract exists between Gemalto and SMIS, we are partners in several projects. Meanwhile, we are developing partnerships with SMEs capable of building ad-hoc hardware prototypes conforming to our own design.

7.2. DMSP3 Yvelines District Grant (Nov 2013 - Nov. 2014)

Partners: Inria-SMIS (coordinator), Gemalto, UVSQ, Santeos.
SMIS funding: 75k€.
Electronic Health Record (EHR) projects have been launched in most developed countries to increase the quality of care while decreasing its cost. Despite their unquestionable benefits, patients are reluctant to abandon their control of highly sensitive data to a distant server. The objective of the DMSP project is to complement a traditional EHR server with a secure and mobile personal medical folder (1) to protect and share highly sensitive data among trusted parties and (2) to provide a seamless access to the data even in disconnected mode. The DMSP architecture builds upon the technology designed in the PlugDB project. This architecture has been designed and developed under grant DMSP1 ended in 2010. It has been experimented in the context of a medical-social network providing care and services at home for elderly people. The experiment in the field, founded by grant DMSP2, lasted from September 2011 to December 2012 with volunteer patients and practitioners in the Yvelines district. The goal of grant DMSP3 (Nov 2013 - Nov 2014) is to correct the imperfections observed during DMSP2 and port our prototype in an open hardware platform with the final objective to set up a technology transfer. This project is being audited by ARS-Ile de France (the Regional Healthcare Agency) and CG78 (General Council of Yvelines District), in order to envision the opportunity of a larger deployment.

7.3. Cozy Cloud bilateral contract (Dec 2014 - Nov. 2015)

Partners: Cozy Cloud, Inria-SMIS
SMIS funding: 50k€.
Many personal data end up today on servers where they can be scrutinized by companies and governmental agencies. To face this situation, the most emblematic initiative is the Personal Cloud paradigm. Roughly speaking, the Personal Cloud is an architecture which gives users the ability to store their complete digital environment, synchronize it among various devices and share it with other users and applications under their control. It reflects the expectation of the individuals for the emergence of privacy-by-design next-generation storage and computing services. Cozy Cloud is a French startup providing such a personal Cloud platform. The Cozy product is a software stack that anyone can deploy to run his personal server in order to host his personal data and web services. Cozy defines itself as the "Android of personal servers". While centralizing all personal data in the holder's hand is a natural way to reestablish his control on his privacy, this represents an unprecedented threat in case of attacks by an intruder, especially for individuals who are not security experts. The objective of this bilateral contract is typically to address this issue by integrating the PlugDB solution into the Cozy stack. Roughly speaking, the Cozy data system will be modified in such a way to store only encrypted files and each file access will be intercepted and routed to PlugDB. PlugDB will act as a doorkeeper for the whole individual dataspace by managing the files' metadata, the access control rules defined on these metadata, the decryption keys and the user/application authentication.

7.4. Cozy Cloud CIFRE contract (Oct 2014 - Sept 2017)

Partners: Cozy Cloud, Inria-SMIS
SMIS funding: 30k€.
In relation with the bilateral contract mentioned above, a CIFRE PhD thesis has been started by Paul Tran Van. The objective is to capitalize on the Cozy-PlugDB platform to devise new access and usage control models to exchange data among devices of the same user (devices may have different levels of trustworthiness) and among different users. A particular focus will be put on the enforcement of the access and usage control rules in this thesis.

TEMPO Team (section vide)

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

A 5-month contract with the company Metaware to provide support for Metaware's use of Coccinelle ended in February 2014. This contract resulted in numerous improvements in Coccinelle of interest to the general Coccinelle user community, including better handling of declarations involving multiple variables and better pretty printing of the gernated code.

The PhD of Koutheir Attouchi [10] on managing resources in the context of Smart Home gateway was supported by a CIFRE grant with Orange Labs.

Together with Julien Sopena from REGAL, we are collaborating with Renault, in the context of the PhD of Antoine Blin (CIFRE), on hierarchical scheduling in multicore platforms for real-time embedded systems. This work is a dissemination of our previous research on the Bossa domain-specific language [6].

<p align="center" style="color:red">**WILLOW Project-Team**</p>

7. Bilateral Contracts and Grants with Industry

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

Participants: Leon Bottou [MSR], 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 2013-2016 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.

7.2. 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.