Activity Report 2013

Section Contracts and Grants with Industry

AMIB Project-Team (section vide)

AVIZ Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Google Research Award

Participants: Jean-Daniel Fekete [correspondant], Petra Isenberg, Jeremy Boy, Heidi Lam.

Offering data access to the public is a strong trend of the recent years. Several free data providers or repositories are now online (e.g. http://data.gov.uk, http://stats.oecd.org, http://publicdata.eu, http://opendata.paris.fr, http://www.google.com/publicdata, http://www.data-publica.com), offering a rich set of data to allow citizens to build their own understanding of complex political and economic information by exploring information in its original form. However, these initiatives have had little impact directly on the public since working with this open data is often cumbersome, requires additional data wrangling, and the spreadsheets themselves take a long time to understand before useful further work can be done with them. This proposal focuses on public data visualization to offer more engaging environments for exploration of public data and to enable stronger democratic discourse about the data contents.

The goal of this proposed research project is to bridge the gap between generic visualization sites for public data and engaging content-specific visualization of this data which can be used and individually adapted to tell a story about public data. Through the design and deployment of rich and engaging interactive visualizations from public data sources we want to truly reach the goal of the public data movement: empowering the citizens and social actors by allowing them to better understand the world they are living in, to make informed decisions on complex issues such as the impact of a medical treatment on a dangerous illness or the tradeoffs offered of power plant technologies based on facts instead of assumptions.

For more information, see http://peopleviz.gforge.inria.fr/trunk.

COMETE Project-Team (section vide)

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

6. Bilateral Contracts and Grants with Industry

6.1. Safety Line

Following the "iMatch Contrôle Optimisation" event held at Inria Saclay on October 23rd (2012), a collaboration was initiated between COMMANDS and the startup Safety Line (http ://www.safety-line.fr), with a first contract on optimizing the ascent phase for commercial planes. A crucial aspect of this work is the identification of accurate and reliable models for the aerodynamic and thrust forces acting on the plane. For this study our partners at Safety Line provide us access to data recorded during several thousands of actual commercial flights, and COMMANDS recruited Stephan Maindrault as engineer to work on this project.

6.2. CNES

This contract between CNES and ENSTA lasted from February to December 2013, and was devoted to trajectory global optimization for an Ariane 5 launcher, using HJB techniques. The optimization was on the whole launch, including ballistic phases and the parameters of the intermediate GTO orbit, while maximizing the payload mass.

DAHU Project-Team (section vide)

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

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- Contract with IFPEN on multiscale finite elements for two-phase flows in porous media (in the framework of the PhD thesis of F. Ouaki, defended in 2013).

- Contract with EADS/IW on topology optimization for composite panels drapping (in the framework of the PhD thesis of G. Delgado, defended in 2013).

- Contract with Renault on geometry and topology optimization of structures (in the framework of the two PhD theses of Ch. Dapogny, with the co-advising of P. Frey, to be defended in 2013, and G. Michailidis, with the co-advising of F. Jouve, to be defended in 2014).

- Contract with EDF R&D on non destructive testing of concrete materials (in the framework of the PhD thesis of Lorenzo Audibert, to be defended in 2015)

- Houssem Haddar has a contract with EDF R&D on data assimilation for temprature estimates in nuclear reactors (in the framework of the PhD thesis of Thibault Mercier, to be defended in 2015)

- Houssem Haddar is coordinating the contract EDF R&D on non eddy current non destructive testing. This contract involves Zixian Jiang and a two years PostDoc, Kamel Riahi.

7.2. Bilateral Grants with Industry

7.2.1. FUI Projects

- Gregoire Allaire is in charge of the RODIN project. RODIN is the acronym of "Robust structural Optimization for Design in INdustry". This is a consortium of various companies and universities which has been sponsored by the FUI AAP 13 for 3 years, starting on July 2012. The industrial partners are: Renault, EADS, ESI, Eurodecision, Alneos, DPS. The academic partners are: CMAP at Ecole Polytechnique, Laboratoire J.-L. Lions at Paris 6 and 7 Universities, centre de recherches Bordeaux Sud-Ouest at Inria. The goal of the RODIN project is to perform research and develop a computer code on geometry and topology optimization of solid structures, based on the level set method.

- Houssem Haddar is in charge of DEFI part of the FUI project Nanolytix. This three years project started in October 2012 and involves Xenocs (coordinator), imXPAD, Arkema, Inria (DEFI) and CEA-Leti. It aims at building a compact and easy-to use device that images nonaparticles using X-ray diffraction at small or wide angles (SAXS and WAXS technologies). We are in charge of direct and inverse simulation of the SAXS and WAXS experiments.

- Houssem Haddar is in charge of the electormagnetic simulation work package of the FUI project Tandem. This three years project started in December 2012 and involves Bull-Amesys (coordinator), BOWEN (ERTE+SART), Ecole Polytechnique (CMAP), Inria, LEAT et VSM. It aims at constructing a radar system on a flying device capable of real-time imaging mines embedded in dry soils (up to 40 cm deep). We are in charge of numerical validation of the inverse simulator.

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

A collaboration with SAGEM Défense Sécurité, Etablissement de Massy, has been developed on the effect of time-delay in inertially stabilized platforms for optical imaging systems. This collaboration led to research contract made by Alban Quadrat, Silviu Iulian Niculescu and Hugues Mounier (L2S, University Paris Sud).

GALEN Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- **General Electric HealthCare**:
    - Compressed Sensing Digital Subtraction Rotational Angiography [PhD thesis H. Langet]
    - Guide-wire Segmentation and Tracking of in interventional Imaging [PhD thesis N. Honnorat]
- **Intrasene**: Modeling, segmentation and registration of low gliomas brain tumors [PhD thesis S. Parisot]
- **Siemens**: Graph-based Knowledge-based Segmentation of the Human Skeletal Muscle in MR Imaging [PhD thesis P-Y. Baudin]

GECO Project-Team (section vide)

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

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. Contrat Cifre with Geometry Factory

Mael Rouxel-Labbé's PhD thesis is supported by a Cifre contract with GEOMETRY FACTORY (http://www.geometryfactory.com). The subject is the generation of anisotropic meshes.

7.1.2. Commercialization of cgal packages through Geometry Factory

In 2013, GEOMETRY FACTORY (http://www.geometryfactory.com) had the following new customers for CGAL packages developed by GEOMETRICA:

GeoSoft (oil and gas, USA) : 2D constrained triangulation, AABB tree

British Geological Survey (oil and gas, UK) : 2D Meshes, Interpolation

Hexagon Machine Control (GIS, Sweden) 3D triangulations, point set processing

Thales (GIS, France) 2D constrained triangulation

GRACE Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Grants with Industry

- Within the framework of the joint lab Inria-ALU, Grace and Alcatel-Lucent collaborate on the topic of Private Information Retrieval: that is, retrieving data from a remote database while revealing neither the query nor the retrieved data. (This is not the same as data confidentiality, which refers to the need for users to ensure secrecy of their data, and is classically obtained through encryption, which prevents access to data in clear.) We are exploring applications of Locally Decodable Codes to Private Information Retrieval in the multi-cloud (multi-host) setting, to ensure both secure, reliable storage, and privacy of database queries. We will hire a PhD candidate in February 2014.

GRAND-LARGE Project-Team (section vide)

IN-SITU Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Grants with Industry

Mix3D - CIFRE Funding for Justin Mathew PhD thesis "New visualization and interaction techniques in spatial composition for mixing audio interfaces in the context of 3D spatial audio.", Coordinator: Stéphane Huot. Partners: Univ. Paris-Sud, ENS Louis-Lumière & DMS-Cinema. The project involves studying and designing new 'physical' and software interfaces for mixing spatial audio.

M3DISIM Team (section vide)

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

7. Bilateral Contracts and Grants with Industry

7.1. Contrats avec l'Industrie/Bilateral Contracts with Industry

- Modélisation et Résolution des problèmes de très grande taille dans les applications du yield management au réseau des télécommunications mobiles: CRE avec Orange Labs (responsable du suivi Orange Labs: Mustapha Bouhtou), signé en août 2013.

MEXICO Project-Team (section vide)

OAK Project-Team (section vide)

PARIETAL Project-Team (section vide)

PARSIFAL Project-Team (section vide)

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

7. Bilateral Contracts and Grants with Industry

7.1. Contract POEMS-CEA-LIST-2

Participant: Anne-Sophie Bonnet-Ben Dhia.

Start : 09/01/2010, End : 07/31/2013. Administrator : ENSTA.
This contract is about the scattering of elastic waves by a stiffener in an anisotropic plate.

7.2. Contract POEMS-CEA-LIST-DIGITEO

Participants: Anne-Sophie Bonnet-Ben Dhia, Sonia Fliss, Antoine Tonnoir.

Start : 10/01/2011, End : 09/30/2014. Administrator : ENSTA.
This contract is about the scattering of elastic waves by a local defects in an anisotropic plate. It consists on the funding of Antoine Tonnoir's Phd.

7.3. Contract POEMS-DGA

Participants: Anne-Sophie Bonnet-Ben Dhia, Sonia Fliss, Patrick Joly.

Start : 09/01/2011, End : 12/31/2013. Administrator : ENSTA.
This contract is about the waveguide in photonic crystals : we want to develop new mathematical and numerical tools for the characterization, the study and the computation of the guided modes in photonic crystals.

7.4. Contract POEMS-CEA-LIST

Participants: Marc Bonnet, Audrey Vigneron.

Start : 01/01/2013, End : 12/31/2015. Administrator : ENSTA.
This contract is about the modelisation of Eddy current by integral equations.

7.5. Contract POEMS-SHELL

Participants: Stéphanie Chaillat, Patrick Ciarlet, Luca Desiderio.

Start : 10/01/2010, End : 09/31/2016. Administrator : CNRS.
This contract is about fast direct solvers to simulate seismic wave propagation in complex media.

Popix Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

POPIX has a contract with Astrazeneca (November 2011 - November 2013)

POPIX has a contract with Lixoft (June 2011 - June 2014)

REGULARITY Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

The Tandem Project is a consortium involving several industrial companies (e.g. Bull Amesys) and some research laboratories (e.g. CMAP). The aim is to detect landmines from 3D radar images.

SECSI Project-Team (section vide)

<div align="center">

SELECT Project-Team

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7. Bilateral Contracts and Grants with Industry

7.1. Contract with EDF

Participants: Jairo Cugliari, Jean-Michel Poggi.

SELECT has a contract with EDF regarding wavelet analysis of the electrical load consumption for the aggregation and desagggregation of curves to improve total signal prediction.

7.2. Contract with SNECMA

Participants: Gilles Celeux, Rémy Fouchereau, Patrick Pamphile.

- SELECT has a contract with SAFRAN - SNECMA, an high-technology group (Aerospace propulsion, Aicraft equipment, Defense Security, Communications),regarding modelling reliability of Aircraft Equipment.

<div align="center" style="color:red">**Specfun Team**</div>

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Grants with Industry

The team is involved in two Common Research Agreements in the MSR–INRIA Joint Centre:

- *DDMF (Dynamic Dictionary of Mathematical Functions).*
  Goal: Automate exact computations of the mathematical formulas on the special functions of mathematical analysis and present them on an interactive mathematical dictionary online.
  Leader: F. Chyzak. Participants: A. Bostan, P. Lairez.
  Website: http://ddmf.msr-inria.inria.fr/.

- *Mathematical Components.*
  Goal: Investigate the design of large-scale, modular and reusable libraries of formalized mathematics. Developed using the Coq proof assistant. This project successfully formalized the proof of the Odd Order Theorem, resulting in a corpus of libraries related to various areas of algebra.
  Leader: G. Gonthier (MSR Cambridge). Participants: A. Mahboubi, E. Tassi.
  Website: http://www.msr-inria.fr/projects/mathematical-components/.

TAO Project-Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

- Thalès Air Systems (corr. Areski Hadjaz), related to Gaétan Marceau-Caron's CIFRE PhD, May 2011 - May 2014, 15kEuros per year.

- Modyrum (*Modélisation Dynamique d'un Réseau Médiatique*, related to Marco Bressan's postdoc), SME Augure, started Feb. 2013, 150kEuros.

  Participants: Marco Bressan, Cyril Furtlehner, Michèle Sebag.

- I-Lab METIS (*A general framework for decision making with uncertainty plus energy-specific applications*, related to Jérémie Decock's PhD, ARTELYS-Inria, Sept.2011 - Aug.2014, 40kEuros.

  Participants: Jérémie Decock, Jean-Joseph Christophe, Olivier Teytaud.

TOCCATA Team

7. Bilateral Contracts and Grants with Industry

7.1. Bilateral Contracts with Industry

7.1.1. CIFRE contract with Adacore

Participants: Claude Marché [contact], Andrei Paskevich, Claire Dross.

Jointly with the thesis of C. Dross, supervised in collaboration with the Adacore company, we established a bilateral collaboration contract, that started in January 2012 for 3 years.

The aim is to strengthen the usability of the *Alt-Ergo* theorem prover in the context of the GnatProve environment for the verification of safety-critical Ada programs [85]. A focus is made on programs involving Ada containers [86].

7.2. Bilateral Grants with Industry

7.2.1. Intel Grant

Participants: Sylvain Conchon [contact], Alain Mebsout.

S. Conchon has obtained an academic grant by Intel corporation on the development of the Cubicle model checker. The goal of this project was to develop a new version of Cubicle with significantly improved model-checking power. This required innovative algorithmic enhancements to be implemented and evaluated.