RESEARCH CENTER

FIELD
Perception, Cognition and Interaction

Activity Report 2018

Section Highlights of the Team

Edition: 2019-03-07

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CEDAR Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Conference Chair

Ioana Manolescu has been a general chair of the IEEE International Conference on Data Engineering (ICDE) 2018.

Keynotes

Ioana Manolescu has given invited keynote talks at the Extended Semantic Web Conference (ESWC) 2018 [25], and at the *34ème Conférence sur la Gestion de Données – Principes, Technologies et Applications* (BDA) 2018 [24].

PVLDB paper

A paper on "Optimization for active learning-based interactive database exploration" by Enhui Huang and co-authors has been accepted at PVLDB 2018 [10].

Prix de stage de l'Ecole Polytechnique

Camille Chanial, third-year (M1) student at Ecole Polytechnique, has been awarded a Prix de Stage for his work on the ConnectionLens prototype [9].

GRAPHIK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Highlights

- A new ANR project led by GraphIK on *Complex ontological Queries over Federated and heterogeneous Data (CQFD)* has been accepted. This project, starting in January 2019, is on a core issue for GraphIK and gathers main national teams on this subject. The consortium has a long standing history of research collaboration and the current project will build upon these results.

5.1.2. Awards

The work of two PhD students of our group was recognized by international event awards:

- Stathis Delivorias and co-authors were awarded the best paper award at the International Joint Conference on Rules and Reasoning (RuleML+RR 2018) for the paper entitled “On the k-Boundedness for Existential Rules”
- Bruno Yun participated to the 3rd Summer School on Argumentation (SSA 2018): Computational and Linguistic Perspectives, and got the best student paper prize for his presentation entitled “How can you Mend a Broken Inconsistent KB in Existential Rules Using Argumentation?” (no formal proceedings available).

BEST PAPERS AWARDS :
[23]
S. DELIVORIAS, M. LECLÈRE, M.-L. MUGNIER, F. ULLIANA.*On the k-Boundedness for Existential Rules*, in "RuleML+RR: Rules and Reasoning", Luxembourg, Luxembourg, September 2018, vol. LNCS, n^{o} 11092, p. 48-64, https://arxiv.org/abs/1810.09304 [*DOI :* 10.1007/978-3-319-99906-7_4], https://hal-lirmm.ccsd.cnrs.fr/lirmm-01921140

LACODAM Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Honorable Mention in the ACM SIGMOD Jim Gray Dissertation Award. ACM SIGMOD conference, June 2018 (L. Galárraga).

LINKS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Containment for RDF Schemas

The ShEx language for defining RDF schemas was proposed and developed earlier by the Links team in cooperation with the W3C. Slawek Staworko et al. now studied the containment problem for ShEx schemas for RDF documents. They showed at **PODS** [7] – the best database theory conference – that the problem is decidable, but co-NEXP-hard. This is joined work with P. Wieczorek from the University of Wrazlaw.

Foundations of AI: Knowledge Compilation

Florent Capelli et al. showed at **STACS** [15] – a top conferences in theoretical computer science – a new knowledge compilation procedure for quantified boolean formulas allowing to decide the satisfiability quantified boolean formulas with bounded tree width in polynomial time. This can be applied in particular to first-order database queries with quantifiers. This is joined work with S. Mengel from the CNRS in Lens.

Foundations of AI: Constrained Topologial Sort

Charles Paperman et al. showed at **ICALP** [8] – a top conferences in theoretical computer science – how to compute efficiently topological sorts of graphs under regular constraints. The problem was initially introduced in the context of preferential query answer for uncertain databases, where on usually wants to sort the query answers by some preferences, that are known only partially. It becomes then crucial to look for total orders on the answer set satisfying regular constraints that specify the preferences. Finding such an order for regular constraints was know to be infeasible in general. In this article, a class of regular constraints is identified for which this problem becomes tractable. A (partial) decidable dichotomy theorem is proven drawing the frontier between the kind of constraints which are feasible from those which are not. This is joined work with A. Amarilli from Telecom Paristech.

MAGNET Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Strengthening of the privacy aware machine learning activity with a new associate team with the Alan Turing Institute and the organization of a workshop at NeurIPS (formerly NIPS).
- New collaboration with Multispeech (Inria Nancy) on decentralized and private machine learning for speech processing leading to an ANR and an H2020 project.

5.1.1. Awards

AURÉLIEN BELLET received a best reviewer award (top 200 out of 3000) at the conference NeurIPS 2018.
PASCAL DENIS received a Distinguished Senior Program Committee award at IJCAI-ECAI 2018.

MOEX Project-Team (section vide)

ORPAILLEUR Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This year we would like to mention two publications as highlights of the year.

- The first highlight is related to the Snowball Inria Associated Team supervised by Adrien Coulet (see § 8.4.1). The participants to Snowball have obtained very good results in AI and Medicine which have been recently published in the selective journal "Scientific Reports" [4]. In addition, the same participants have obtained a "Grant Seed" funded by Stanford University, to pursue their research efforts in building fair and equitable predictive models for medicine (see http://medicine.stanford.edu/news/current-news/standard-news/presenceannouncesseedgrantawardees.html).
- The second highlight is related to the stay of Chedy Raïssi at NASA lab in 2018 (see § 8.4.3.1). Chedy Raïssi worked with some other researchers on a machine-learning model for classifying signals from local and global views of the light curves. The researchers had the idea of associating expert domain knowledge with the model and they were able to obtain very good results unseen until now (see https://aasnova.org/2018/12/07/using-machine-learning-to-find-planets/?fbclid=IwAR0UI9LcjlSYKh8JNDiJzztwK0OUqxkhtzdTGod20U10JLKO4vm6sPPU990). A publication on this work was accepted and published [2].

PETRUS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Creation of the Inria Innovation Lab 'OwnCare'

PETRUS has set up the OwnCare Inria Innovation Lab (IILab) with UVSQ and the Hippocad company in January 2018. The objective of this IILab is to industrialize PlugDB, a flagship software/hardware platform initiated in the SMIS team and today pursued in PETRUS, and deploy it in the medical/social field. A first deployment over 10.000 patients is planned in the Yvelines district (see Section 8.1.1 for details).

TYREX Project-Team (section vide)

VALDA Project-Team (section vide)

WIMMICS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Serena Villata has been invited to deliver an Early Career Spotlight Talk at the main conference in Artificial Intelligence (IJCAI), namely the 27th International Joint Conference on Artificial Intelligence [0], on July 2018 in Stockholm (Sweden). The topic of this invited Early Career Spotlight Talk, *Artificial Argumentation for Humans*, is detailed in the related publication [62].

BEST PAPER AWARD :

[51]

O. RODRÍGUEZ ROCHA, C. FARON ZUCKER.*Automatic Generation of Quizzes from DBpedia According to Educational Standards*, in "The 3rd Educational Knowledge Management Workshop (EKM 2018)", Lyon, France, April 2018, https://hal.inria.fr/hal-01758737

[0] https://www.ijcai-18.org/early-career-talks/

ZENITH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. VLDB Conference

The VLDB conference (http://vldb2018.lncc.br) was in Rio de Janeiro. Its organization is a major outcome of the SciDISC associate team, with key positions held by members of the project: F. Porto: general chair, P. Valduriez: sponsor chair and many SciDISC members in the local organization. E. Ogasawara and P. Valduriez were chairs of the LADaS VLDB workshop. E. Pacitti was chair of the VLDB workshop on Big Social Data and Urban Computing (BiDU). The VLDB conference was a great success with about 700 participants.

5.1.2. New Book

A. Joly co-authored the book "Multimedia Tools and Applications for Environmental & Biodiversity Informatics" [69], which demonstrates how the latest advancements in data science impact the wide range of environmental and biodiversity studies.

ALICE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

In February 2018, Sylvain Lefebvre created the MFX team (Matter from Graphics). The new team will focus on synthesizing and designing complex shapes for additive manufacturing.

5.1.1. Awards

Jérémie Dumas, who was advised by Sylvain Lefebvre within the ALICE team, received the 2018 PhD prize from IG-RV https://prixigrv2018.sciencesconf.org/.

AVIZ Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- Steve Haroz joined Aviz as a research scientist (SRP) for three years.
- Catherine Plaisant joined Aviz as an International Chair for 5 years.
- The team welcomed two invited professors (Claudio Silva and Michael McGuffin).
- Aviz members presented seven papers at IEEE VIS 2018 and won a best paper award at Eurovis 2018.
- Former Aviz PhD student Lonni Besançon received a PhD thesis prize honorable mention award from GDR, AFIG, AFRV, and EGFR for his thesis "An interaction Continuum for 3D Data Visualization."
- Aviz started an Associated Team with the ilab at the University of Calgary on the topic of Situated and Embedded Visualization.

EX-SITU Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- ANR ELEMENT project was accepted.
- CNRS PEPS project was accepted.
- ERC CREATIV was extended for a year.
- Wanyu Liu, Olivier Rioul, Joanna McGrenere, Wendy Mackay, and Michel Beaudouin- Lafon: Honorable Mention award at ACM CHI 2018 for “BIGFile: Bayesian Information Gain for Fast File Retrieval” [22]

GRAPHDECO Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

This year marked the start of the ERC Starting grant FunGraph coordinated by George Drettakis, on managing uncertainty in rendering of captured content. This activity already includes the principal investigator, one engineer (S. Morgenthaler), one postdoc (R. Deeb), and an intern (S. Diolatzis). The scientific production this year included three papers in ACM Transactions on Graphics (two at SIGGRAPH and one at SIGGRAPH Asia), three papers in Computer Graphics Forum (two at EGSR and one at Eurographics), and two papers at the ACM Symposium on Interactive 3D Graphics and Games.

4.1.1. Awards

George Drettakis received a medal from University Côte d'Azur for his ERC grant.

HYBRID Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- This year, the Hybrid team has again been strongly involved in the organization of the IEEE Virtual Reality Conference (IEEE VR) in 2018, with M. Marchal: Program Chair, F. Argelaguet: Workshops Chair, A. Lécuyer: Tutorials Chair.
- Hybrid was involved in the publication of a book [48] on Virtual and Augmented Reality, titled "Virtual Reality, Augmented Reality: myths and realities". This book was co-edited by B. Arnaldi and G. Moreau, with contributions [44] [42] [43] from F. Argelaguet, V. Gouranton, A. Lécuyer, M. Marchal, and J.M. Normand.
- Hybrid was involved in the organization of the ACM/Eurographics Symposium on Computer Animation (SCA), in Paris, July 2018, with M. Marchal serving as General Chair.
- Hybrid organized, together with Inria team Visages, a press conference in Paris on the topic of "Neurofeedback" in November 2018, followed by various media coverages.

5.1.1. Awards

- Maud Marchal is junior member of Institut Universitaire de France (IUF) since October 2018.
- Best Paper Award IEEE VR 2018 - Honorable Mention: Paper from Jeunet et al. [18]
- Best Paper Award Euro VR 2018 - Honorable Mention: Paper from Costes et al. [30]
- Best Demo Award IEEE 3DUI Contest 2018 - Runner-Up: Demo from Nouviale et al. [28]

ILDA Project-Team (section vide)

IMAGINE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

This is a transition year where the team has been actively involved in starting new projects with new PhD students along new research directions, which will be further emphasized in the future team ANIMA, due to start after the termination of the IMAGINE team in July 2019.

Figure 1. Filming rehearsals of jean-Francois Peyret's La fabrique des monstres, Théâtre de Vidy, Lausanne, January 2018.

We are now actively involved in the Performance Lab, a joint cross-disciplinary research program of IDEX Univ. Grenoble Alpes. In this new project started in January 2018 for three years, we will investigate "digital dramaturgies" mixing real-time computer graphics, augmented and virtual reality with live performances. We will also continue to develop our Kino Ai video capture, analysis and editing system.

As a follow-up to ADT ULTRAHD, we recorded three weeks of rehearsals from the play "La fabrique des monstres", a theatre adaptation of Mary Shelley's Frankenstein by Jean-Francois Peyret (Fig. 1). Our Kino Ai system was used to automatically generate six hours of cinematographic rushes from those recordings. Those rushes were edited by professional film editors into three short documentaries and published online (see episode 1, episode 2 and episode 3 to watch the full movies).

5.1.1. Awards

In December 2018, PhD laureate Guillaume Cordonnier was awarded the prestigious ETH Zurich Postdoctoral Fellowship and will join the Computer Graphics Lab's simulation group in 2019.

5.1.2. Patents

As part of Youna Le Vaou's CIFRE PhD thesis with PSA, we filed a joint patent application:

Y La Vaou, S Masfrand, M Mika, S Hahmann, J-C Léon: Procédé de modification de la forme d'un objet virtuel tridimensionnel représenté dans un espace immersif et système immersif mettant en œuvre ledit procédé, December 2018.

This new result will also be submitted for publication at an international conference in 2019.

LOKI Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Personnel

Géry Casiez has been appointed junior member of the Institut Universitaire de France.

Géry Casiez has been appointed at the rank of Adjunct Professor by the University of Waterloo, Canada (2018-2020).

5.1.2. Publications

Loki presented 6 papers at ACM CHI and 1 paper at ACM UIST, the most prestigious conferences in our field.

5.1.3. Awards

"Honorable mention" (top 4% of the 2500+ submissions) from the ACM CHI conference to the paper "Storyboard-Based Empirical Modelling of Touch Interface Performance", from A. Goguey, G. Casiez, A. Cockburn, & C. Gutwin .

BEST PAPERS AWARDS :

[19]

A. GOGUEY, G. CASIEZ, A. COCKBURN, C. GUTWIN.*Storyboard-Based Empirical Modeling of Touch Interface Performance*, in "Adjunct Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI 2018), Demonstration", Montreal, Canada, April 2018 [*DOI :* 10.1145/3170427.3186479], https://hal.inria.fr/hal-01736699

MANAO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Our paper on instant computation of transport maps was accepted for presentation at the prestigious conference Siggraph Asia and will be published in the journal ACM Transcations on Graphics [5].

5.1.1. Awards

Best paper and presentation award at EGSR 2018 .
BEST PAPERS AWARDS :
[3]
P. BARLA, R. PACANOWSKI, P. VANGORP.*A Composite BRDF Model for Hazy Gloss*, in "Computer Graphics Forum", 2018, vol. 37 [*DOI :* 10.1111/CGF.13475], https://hal.inria.fr/hal-01818666

MAVERICK Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- the paper "MNPR: A Framework for Real-Time Expressive Non-Photorealistic Rendering of 3D Computer Graphics" [13], co-authored by Santiago Montesdeoca, Hock Soon Seah, Amir Semmo, Pierre Bénard, Romain Vergne, Joëlle Thollot and Davide Benvenuti, has received the "Best Paper Award" during the conference Expressive 2018.
- the paper "High-performance By-Example Noise using a Histogram-Preserving Blending Operator" [4], co-authored by Eric Heitz and Fabrice Neyret, has received the "Best Paper Award" during the conference High-performance Graphics 2018.
- the paper "A New Microflake Model with Microscopic Self-Shadowing for Accurate Volume Downsampling" [5], co-authored by Guillaume Loubet and Fabrice Neyret, has received the "Best Paper Award" during the conference Eurographics 2018.

MFX Team

5. Highlights of the Year

5.1. Highlights of the Year

Academic Life

We had 3 publications in the top journal in our field, ACM Transactions on Graphics, including 2 from the proceedings of the ACM SIGGRAPH conference [11], [12], [13].

Cédric Zanni has been awarded an ANR JCJC 2018 project entitled IMPRIMA (Implicit modeling for additive manufacturing). IMPRIMA aims at exploring representations for the modeling, visualization and processing of both geometry and control fields for material properties within the authoring pipeline for additive manufacturing. The project will effectively start in March 2019.

Sylvain Lefebvre co-organized the first multidisciplinary workshop on academic research in additive manufacturing within the Lorraine area, which hosted 70 participants over two days. The two days workshop started on May 31, 2018 at Inria-Nancy Grand Est and was co-organized with Sandrine Hoppe (LRGP), Samuel Kenzari (IJL) and Hakim Boudaoud (ERPI). See https://www.inria.fr/centre/nancy/agenda/workshop-fa.

Creativ'Lab

Figure 1. The new MFX space within the Creativ'Lab.

The newly created experimental space for the MFX team was finished in September 2018. We are gradually moving our equipment. We worked to maximize usability and create a logical layout, organized in several spaces: one for powder devices, one for resin machines and another for filament 3D printers.

This new lab will greatly improve our capability to experiment, produce and test results.

5.1.1. Awards

Jérémie Dumas, who was advised by Sylvain Lefebvre and defended in February 2017, received the 2018 PhD prize from IG-RV (https://prixigrv2018.sciencesconf.org/).

MIMETIC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Franck Multon has been recruited as full-time researcher with a national coordination task for the Olympic Games 2024 (SportInria project). He is the national contact for Performance2024, a national initiative from the French Ministry of Sports, and the French Ministry of Research (MESRI) to support fundamental and applied research in collaboration with sports federation for the Olympic Games 2024. Together with Richard Kulpa and Benoit Bideau, they have been responsible to write a call for national proposals "Liv Lab Sports" from the French Ministry of Sports, to develop areas where people can test and train to sports using new technologies, such as virtual and augmented reality. MimeTIC is also globally involved in the Sciences2024 project leaded by Ecole Polytechnique to enhance collaborations between research groups and French Sports federations. All these involvements demonstrate the national visibility of MimeTIC as a leading research group in applying new technologies for sports.

Two papers on the topic of drone cinematography were presented at SIGGRAPH 2018, the main conference in Computer Graphics and Interaction. The first paper focused on reactive path planning techniques in a specific parametric space (Toric Space) to move cinematographic drones with respect to dynamic targets and obstacles, and to coordinate the motion of multiple drones. The second paper focused on static path planning techniques to construct aesthetic overviews of buildings by integrating viewpoint quality metrics and motion quality metrics.

The team released the CusToM OpenSource Software. Customizable Toolbox for Musculoskeletal simulation (CusToM) is a MATLAB toolbox aimed at performing inverse dynamics-based musculoskeletal analyzes. This type of analysis is essential to access mechanical quantities of human motion in different fields such as clinic, ergonomics and sports. CusToM exhibits several features. It can generate a personalized musculoskeletal model, and can solve from motion capture data inverse kinematics, external forces estimation, inverse dynamics and muscle forces estimation problems with a high level of customization for research purposes. It is also designed for non-expert users interested in motion analysis. CusToM is an OpenSource Software with a github repository available with no restriction.

5.1.1. Awards

Best presentation award for Amaury Louarn in ACM Motion Interaction and Games in Cyprus, November 2018, for the paper "Automated Staging for Virtual Cinematography" .

Kimea project has been granted by national innovation committee: "French IoT La Poste challenge" in June 2018.

BEST PAPERS AWARDS :

[45]

A. LOUARN, M. CHRISTIE, F. LAMARCHE.*Automated Staging for Virtual Cinematography*, in "MIG 2018 - 11th annual conference on Motion, Interaction and Games", Limassol, Cyprus, November 2018, p. 1-10 [*DOI :* 10.1145/3274247.3274500], https://hal.inria.fr/hal-01883808

POTIOC Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Inner Garden will be presented at CES 2019 for which the Ullo company won an award ”Tech for a better world”
- Publication of "Virtual Reality and Augmented Reality: Myths and Realities" [42]. This book has been written by 30 academics and engineers working in french labs and companies under the supervision of Bruno Arnaldi (INSA Rennes), Pascal Guitton (Potioc) and Guillaume Moreau (Centrale Nantes). It discusses various aspects : hardware, software, applications, ethics issues... It covers the previous 10 years and give some prospective elements for the future. (the french edition is also available [41]).
- Winner of Bourse Déclic jeunes, Fondation de France, Lauren Thévin

5.1.1. Awards

- Best Demonstration award IHM 2018 [61],
- Hackathon BR41N.IO, 7th BCI Meeting 2018, Asilomar, May 20-21st 2018, 1st winning group, Léa Pillette
- UIST conference hackathon winner, Berlin, Germany, October 2018, Aurélien Appriou
- Student Travel Award (Asilomar BCI Meeting, California) (May 2018), Jelena Mladenovic
- Student Travel Award (UbiComp conference, Singapore) (October 2018), Jelena Mladenovic

TITANE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

The TITANE project-team has been evaluated by Inria in October 2018. We obtained three new ANR projects, the renewal of a collaborative contract with Google and a new Cifre PhD thesis with Dorea technology. Since September 2018 Pierre Alliez is head of science (délégué scientifique) of the Inria Sophia Antipolis center. He is also full paper co-chair of the Eurographics 2019 conference.

ALMAnaCH Team (section vide)

COML Team (section vide)

MULTISPEECH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

E. Vincent has co-edited a 500-page book on audio source separation and speech enhancement, which provides a unifying view of various established and recent methods [64].

5.1.1. Awards

2018 ISCA Award for the best paper published in *Computer Speech and Language* (2013–2017) [1].

Best paper award of MISSI 2018 (11th International Conference on Multimedia and Network Information Systems) [44].

BEST PAPERS AWARDS :

[1]

J. BARKER, E. VINCENT, N. MA, H. CHRISTENSEN, P. GREEN.*The PASCAL CHiME Speech Separation and Recognition Challenge*, in "Computer Speech and Language", February 2013, vol. 27, n^{o} 3, p. 621-633 [*DOI :* 10.1016/J.CSL.2012.10.004], https://hal.inria.fr/hal-00743529

[44]

K. SMAÏLI, D. FOHR, C. GONZÁLEZ-GALLARDO, M. GREGA, L. JANOWSKI, D. JOUVET, A. KOMOROWSKI, A. KOZBIAL, D. LANGLOIS, M. LESZCZUK, O. MELLA, M. A. MENACER, A. MENDEZ, E. LINHARES PONTES, E. SANJUAN, D. SWIST, J.-M. TORRES-MORENO, B. GARCIA-ZAPIRAIN.*A First Summarization System of a Video in a Target Language*, in "MISSI 2018 - 11th edition of the International Conference on Multimedia and Network Information Systems", Wrocław, Poland, September 2018, p. 1-12, https://hal.archives-ouvertes.fr/hal-01819720

PANAMA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

The 2018 **prix de thèse Signal, Image et Vision** was jointly awarded by the Club EEA, the GRETSI and the GdR ISIS to **Mrs Marwa Chafii** for her thesis entitled : *Étude d'une nouvelle forme d'onde multiporteuses à PAPR réduit*. This thesis was conducted within the IETR Lab at CentraleSupélec on the campus of Rennes, under the supervision of Jacques Palicot, Professeur, CentraleSupélec, Rennes and Rémi Gribonval, Directeur de recherche, Inria, Rennes.

5.1.2. Other highlights

Frédéric Bimbot is the new Editor-in-Chief of the journal "Speech Communication".
BEST PAPERS AWARDS :
[2]
M. CHAFII.*Study of a new multicarrier waveform with low PAPR*, CentraleSupélec, October 2016, https://hal.archives-ouvertes.fr/tel-01399509

SEMAGRAMME Project-Team (section vide)

AUCTUS Team

5. Highlights of the Year

5.1. Highlights of the Year

- David Daney and Cyril Dané (AIO) were invited to the Élysée Palace to present the Numii system,
- Anna Pugach and David Daney have filed a patent entitled “Intelligent Textile Adapted for Motion and/or Deformation Detection”

Chroma Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Best student paper, 15th International Conference on Control, Automation, Robotics and Vision, Nov 2018, Singapore, Singapore (ICARCV 2018), Pavan Vasishta, Dominique Vaufreydaz, Anne Spalanzani

5.1.2. Other highlights of 2018

- Success for several project applications in the field of Autonomous Vehicles : ANR"Hianic", PIA Ademe "CAMPUS", FUI "STAR" and "TORNADO".
- In 2018, Chroma published several papers in Artificial Intelligence A+ ranked conferences: CVPR [21], NIPS [27], ICML [26], AAMAS [32].
- Strong involvement of Chroma in the IEEE/RSJ IROS 2018 Conference (Madrid, October 2018, more than 4000 people): C. Laugier was Program co-chair and co-organized three interconnected events on Autonomous Vehicles: a one day Workshop having attracted more than 360 people [0], an Industrial Forum involving international companies (e.g. Renault, Nvidia, Baidu, EasyMile, Ambarella, etc) and having attracted about 80 people, and an Autonomous Vehicles Demonstration involving 5 international teams (including Chroma with our Autonomous Renault Zoe car) [0] [46].
- First participation to the international RoboCup competition (Montréal, Juin, 2018) : we created the 'LyonTech' team to compete in the robocup@Home Pepper league. We ranked 5th over 21 participants. LyonTech is composed of members from Chroma (F. Jumel, L. Matignon, J. Saraydaryan, O. Simonin, C. Wolf) and two engineers from CPE Lyon (R. Leber) and LIRIS lab/CNRS (E. Lombardi). In October 2018, we qualified for the next RoboCup final, to be organized in Sydney, on July 2019.
- Participation in several International Award Committees (C. Laugier): Several IEEE/RSJ IROS 2018 Award Committees (Best Paper Award, Fellow Award, Harashima Award, Distinguished Service Award, Young Professional Award), IEEE ICARCV 2018 Best Paper Award Committee, IEEE Chapter Award Committee 2018.
- French Robotics GDR : co-animation of the new GT « Apprentissage et Robotique » by Christian Wolf (with David Filiat), started in November 2018 ; O. Simonin will chair, with F. Charpillet (Inria Larsen), the next National Conference on Robotics Reseacrh (JNRR), on October 2019.

BEST PAPERS AWARDS :
[36]
P. VASISHTA, D. VAUFREYDAZ, A. SPALANZANI.*Building Prior Knowledge: A Markov Based Pedestrian Prediction Model Using Urban Environmental Data*, in "ICARCV 2018 - 15th International Conference on Control, Automation, Robotics and Vision", Singapore, Singapore, November 2018, p. 1-12, https://arxiv.org/abs/1809.06045 , https://hal.inria.fr/hal-01875147

[0]See website: http://project.inria.fr/ppniv18
[0]see website: http://avdemo.car.upm-csic.es/

DEFROST Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Award from the Robotics Society of Japan

We received a best paper award from the *Robotics Society of Japan* for the paper entitled "Software toolkit for modeling, simulation, and control of soft robots" that have been published in the *Advanced Robotics* journal. This paper presents the SoftRobots plugin as a first unified software framework dedicated to modeling, simulation and control of soft robots.

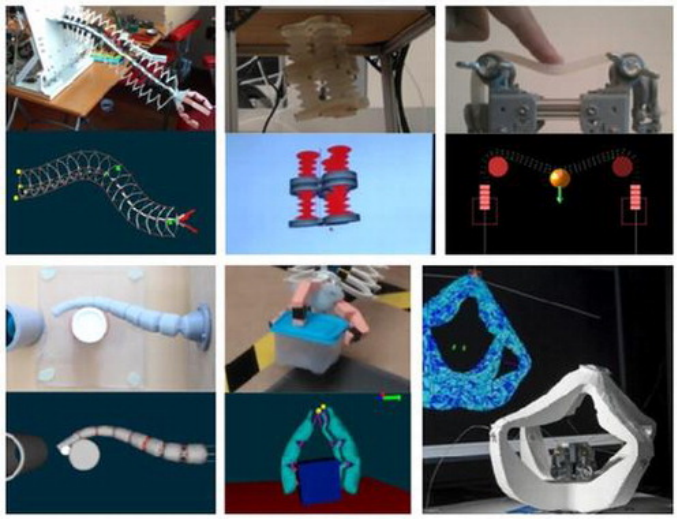

Figure 2. A unified software framework dedicated to modeling, simulation and control of soft robots [2].

5.1.2. Development of a New Open-Source Plugin for SOFA - Model Order Reduction

The plugin Model Order Reduction (MOR) was developed based on the work of the paper [11]. It allows to reduce a SOFA finite element model to gain simulation speed while keeping a good accuracy. It can be used in the SOFA community not only for robotics, but for any application where computational time is an issue, e.g. medical simulations. It is distributed under the GPL license and is available on github: https://github.com/SofaDefrost/ModelOrderReduction.

The plugin is a combination of C++ and Python Code. The user can define the reduction parameters using a python Script or a Graphical User Interface (GUI).

5.1.3. Echelon III: A compliant manipulator

We have participated to the grand challenge of RobotSoft conference that took place in Linorvo, Italy. We have build a robot dedicated to the manipulation competition and we got the 2nd place. A new version of the robot has been developed for the Inria Showroom, installed at Euratechnology in Lille. This version, equipped with a camera, demonstrates the ability of the robot to perform inspection tasks in a limited workspace. We plan to build a new version in 2019 to use it as a research platform, in particular to test planning and control algorithms.

Figure 3. From a computationally intensive simulation to a surrogate version saving accuracy

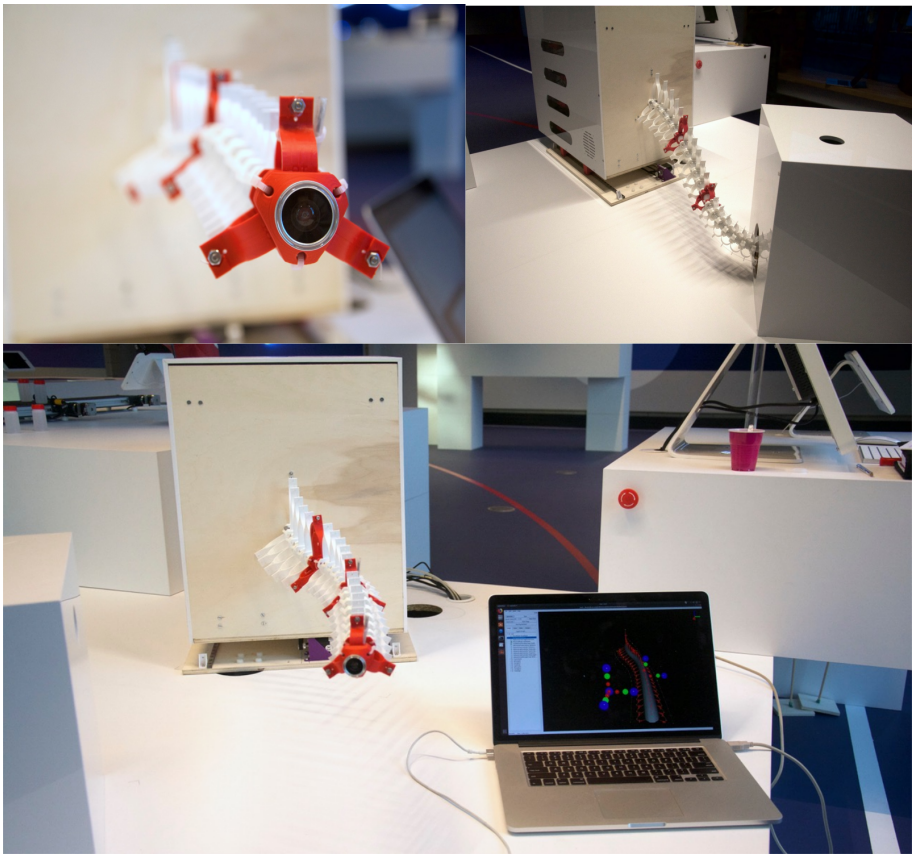

Figure 4. Echelon III in action

5.1.4. Collaboration with Allison Okamura's team at Stanford

This year we had a very close collaboration with the CHARM Lab directed by Allison Okamura at Stanford University. This collaboration resulted in two exchanges: A Stanford PhD student, Margaret Koehler came for 6 months from September 2017 to February 2018 in the team in Lille and Christian Duriez left 7 months of February to August 2018, (thanks to a Fulbright fellowship). We mainly investigated two projects: the haptic rendering on deformable interfaces (A publication in the RAL journal has just been accepted and will be published in 2019) and on the project "Vine Robot" (eversion locomotion). Our teams continue to work on these project. We have also applied to the "Equipe Associée" program.

BEST PAPERS AWARDS :

[2]

E. COEVOET, T. MORALES BIEZE, F. LARGILLIERE, Z. ZHANG, M. THIEFFRY, M. SANZ-LOPEZ, B. CARREZ, D. MARCHAL, O. GOURY, J. DEQUIDT, C. DURIEZ.*Software toolkit for modeling, simulation, and control of soft robots*, in "Advanced Robotics", 2017, https://doi.org/10.1080/01691864.2017.1395362

FLOWERS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- PY Oudeyer was awarded the prize Inria of Académie des Sciences (category young researchers, http://www.academie-sciences.fr/fr/Laureats/laureats-2018-prix-inria.html)
- The Poppy Education ecosystem of educational robotics kits, associated technologies and educational community created by the Flowers team has been transferred to the newly created Poppy Station association (the creation process being coordinated by Didier Roy), gathering large scale national organizations including Ligue de l'enseignement, Hesam, IFE, EPFL, Arts et Métiers ParisTech, CESI, Le Cnam, Generation Robots, Pollen Robotics, Konex inc, see https://www.poppystation.org/
- PY Oudeyer co-authored with his collaborator Jacqueline Gottlieb (Columbia Univ., NY) a review article [22] in the high impact journal Nature Reviews Neuroscience, entitled "Towards a neuroscience of active sampling and curiosity", https://www.nature.com/articles/s41583-018-0078-0
- PY Oudeyer co-organized (with J. Gottlieb, A. Shankar and P. Zurn) the international conference "Curiosity: Emerging Sciences and Educational Innovations" at University of Pennsylvania, US, gathering researchers from multiple disciplines (neuroscience, psychology, artificial intelligence, HCI, robotics, philosophy, education) around the topic of curiosity, learning and education. https://www.sp2.upenn.edu/sp2-event/curiosity-emerging-sciences-and-educational-innovations.

HEPHAISTOS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Science

- strong advances on the analysis of cable-driven parallel robots (section 7.1.1)
- collaboration with lawyers on the ethical and legal aspects of assistance robotics
- strong collaboration with the medical community on walking analysis, rehabilitation (section 7.2.1) and activities detection (section 7.3)

5.1.2. Experimentation

- completion of the first version of our immersive environment for rehabilitation (section 7.2.1)
- continuation of the daily activities monitoring in a day hospital (section 7.3)

5.1.3. Awards

J-P. Merlet has received the best paper award at the Eucomes conference .
BEST PAPERS AWARDS :
[15]
J.-P. MERLET.*Some properties of the Irvine cable model and their use for the kinematic analysis of cable-driven parallel robots*, in "EUCOMES", Aachen, Germany, 2018, https://hal.archives-ouvertes.fr/hal-01965230

LARSEN Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

BEST PAPER AWARD :
[17]
A. GAIER, A. ASTEROTH, J.-B. MOURET.*Data-efficient Neuroevolution with Kernel-Based Surrogate Models*, in "GECCO 2018 - Genetic and Evolutionary Computation Conference", Kyoto, Japan, July 2018, https://arxiv.org/abs/1804.05364 [*DOI :* 10.1145/3205455.3205510], https://hal.inria.fr/hal-01768248

PERVASIVE Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

James Crowley has received the ICMI Sustained Achievements award at the 2018 International Conference on Multimodal Interaction at Boulder Colorado in Oct. 2018.

RAINBOW Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

- Julien Pettré is coordinator of the H2020 ICT CrowdBot project which started in Jan 2018
- Claudio Pacchierotti is the unit PI of the new H2020 FET-OPEN project "H-Reality," started on October 2018. The project gathers 5 academic partners - Univ. Birmingham (UK, coordinator), TU Delft (NL), CNRS (France) - as well as 2 industrial partners - Ultrahaptics (UK) and Actronika SAS (France)
- Claudio Pacchierotti has been elected Secretary of the Eurohaptics Society

5.1.1. Awards

- Firas Abi Farraj was finalist for the IEEE/RSJ IROS 2018 Best Paper Award on Safety, Security and Rescue Robotics
- Claudio Pacchierotti has been selected as "Top 1% Reviewer" by field, 2018 Peer Review Awards, Publons (https://publons.com/awards/2018/esi/?name=Pacchierotti&esi=23)
- Louise Devigne was one of the five finalists of Best Paper Award for the IEEE SMC 2018 conference for the paper [60]
- Louise Devigne received the Best Paper Award of the IFRATH Handicap 2018 conference [80]
- Salma Jiddi received the Best Demo Award at the Asia Pacific Workshop on Mixed and Augmented Reality, APMAR'18, Taipe, Taiwan [63]

RITS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Mohammad Abualhoul, with the paper , won the Runner-up Best Paper Award at ICVES 2018 (2018 IEEE International Conference on Vehicular Electronics and Safety, September 12-14, Madrid, Spain).
BEST PAPERS AWARDS :
[17]
M. ABUALHOUL, E. TALAVERA MUNOZ, F. NASHASHIBI.*The Use of Lane-Centering to Ensure the Visible Light Communication Connectivity for a Platoon of Autonomous Vehicles*, in "ICVES'2018 - 20th IEEE International Conference on Vehicular Electronics and Safety", Madrid, Spain, September 2018, https://hal.inria.fr/hal-01888549

LINKMEDIA Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Our activities in relation with fake news was highlighted in a number of occasions such an audition at the French National Assembly by the parliamentary group *Économie numérique de la donnée, de la connaissance et de l'intelligence artificielle*, at the Forum des sciences cognitives in Nancy, in a press conference organized by the CNRS in May 2018, through a Fake News hackathon organized in Rennes by Irisa and Inria, through many articles in the press as well as during the European cyber-week conference held in November 2018.

5.1.1. Awards

- Miaojing Shi was selected as the Forty under Forty Talents by French Tech hubs China.
- Miaojing Shi was in the final pitch (in progress) of the 2018 Innovation Awards by Comité France Chine.

MAGRIT Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

Vanishing point detection is and old problem of computer vision. We introduced this year a new method based on the a contrario methodology to solve this problem. By fractioning the 2-D search of meaningful vanishing points into three 1-D searches of meaningful events (Zenith line, Horizon line, and Vanishing points), we not only achieve state-of-the-art performance w.r.t. computation times and accuracy of the horizon line, but also yields more relevant vanishing points than the previous top-ranked methods. This work was presented at ECCV 2018 [23] and the associated code is freely distributed.

MORPHEO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

MORPHEO created holograms for an augmented reality application developed for the clothing retailer Zara. This application enables the brand's customers to enjoy a virtual and interactive shopping experience via their smartphones in one of the 120 stores across the world taking part in this experiment. Last January, all of the holograms presented in the Zara AR application were captured using the Kinovis 4D platform. The challenge with regard to the acquisition of the 12 sequences created was to accurately reproduce the models in sweeping movements and with complex clothing effects due to the materials and styles chosen.

PERCEPTION Project-Team

4. Highlights of the Year

4.1. Highlights of the Year

- As an ERC Advanced Grant holder, Radu Horaud was awarded a Proof of Concept grant for his project Vision and Hearing in Action Laboratory (VHIALab). The project started in February 2018 for a duration of 12 months. Software packages enabling companion robots to robustly interact with multiple users are being developed.
  Website: https://team.inria.fr/perception/projects/poc-vhialab/
- The 2018 winner of the prestigious ACM Special Interest Group on Multimedia (SIGMM) Rising Star Award is Perception team member Dr. Xavier Alameda-Pineda. The award is given in recognition of Xavier's contributions to multimodal social behavior understanding.
  Website: http://sigmm.org/news/sigmm_rising_star_award_2018
- A book was published by Academic Press (Elsevier), entitled "Multimodal Behavior Analysis in the Wild", co-edited by Xavier Alameda Pineda, Elisa Ricci (Fondazione Bruno Kessler and University of Trento) and Nicu Sebe (University of Trento). The book gathers 20 chapters written by 75 researchers from all over the world [53].

SIROCCO Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- The paper [20] has received the best student paper award at the European Signal Processing (EUSIPCO) conference, Roma, Sept. 2018.
- The video light field dataset captured by the team has been retained by MPEG-I as test dataset (April 2018) [24].

BEST PAPERS AWARDS :
[20]
M. RIZKALLAH, F. DE SIMONE, T. MAUGEY, C. GUILLEMOT, P. FROSSARD.*Rate Distortion Optimized Graph Partitioning for Omnidirectional Image Coding*, in "EUSIPCO 2018 - 26th European Signal Processing Conference", Rome, Italy, September 2018, p. 1-5, https://hal.inria.fr/hal-01807613

STARS Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

Abhijit Das, Antitza Dantcheva and Francois Brémond were winners of the Bias Estimation in Face Analytics (BEFA) Challenge at the European Conference on Computer Vision (ECCV 2018).

THOTH Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Awards

- Alberto Bietti received the Jean-Claude Dodu 2018 prize at Journees SMAI-MODE, Autrans.
- Pauline Luc was one of the top-200 reviewers at NeurIPS 2018.
- Grégory Rogez and Cordelia Schmid received an Amazon Academic Research Award.
- Cordelia Schmid received the Koenderink prize for fundamental contributions in computer vision that have withstood the test of time at ECCV 2018.

5.1.2. Dissemination

- The team co-organized PAISS 2018, an international AI summer school in Grenoble. This event brought together 200 participants representing 44 different nationalities. The participants were selected from 700 applications, with 60% students, 15% academics, and 25% industrials. 25% of these participants were women.

WILLOW Project-Team

5. Highlights of the Year

5.1. Highlights of the Year

5.1.1. Prizes and Awards

Antoine Miech, winner of a 2018 Google Fellowship.

5.1.2. Visibility

- J. Ponce co-organized the PRAIRIE AI Summer School, Grenoble, 2018, which brought together 200 participants representing 44 different nationalities, and selected from 700 applications, with 60% students, 15% academics , and 25% industrials. 25% of these participants were women.
- I. Laptev served as Program Chair for the IEEE Conference on Computer Vision and Pattern Recognition, Salt Lake City, USA, 2018. CVPR is the largest computer vision conference. The 2018 edition has 3,309 paper submissions, 979 accepted papers and 6,128 registered attendees.
- J. Ponce has been a key person in creating the PRAIRIE Institute for AI research in Paris, announced on the occasion of the AI for Humanity summit organized by President Emmanuel Macron in 2018 (https://www.inria.fr/en/news/news-from-inria/launch-of-the-prairie-institute). He has also been a key player in bringing together its industrial and international partners.