

LORIA  
Evaluation from January 2011 to June 2016  
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Team KIWI (Knowledge Information and Web Intelligence)



## 1.1 Team KIWI

# *Knowledge Information and Web Intelligence*

## 1.2 Synopsis

### 1.2.1 Team Composition

#### Permanent Members

**CNU 27:** Anne Boyer [Team leader, Professor], Dominique Benmouffek [Ass. Prof.], Geoffray Bonnin [Associate Professor] from Sept. 2014, Armelle Brun [Ass. Prof.], Sylvain Castagnos [Ass. Prof.] from Sept. 2011, Azim Roussanaly [Ass. Prof.].

**CNU 71:** Audrey Knauf [Ass. Prof.] maternity leave in 2015/2016, Sahbi Sidhom [Ass. Prof.].

**CNU 61:** Samuel Nowakowski [Ass. Prof., HDR].

	PR	MCF	DR	CR	Total
2011	1	6	0	0	7
2016	1	8	0	0	9

#### Post-docs, and engineers

**Past:** Charif Alchiekh Haydar [ATER] Sept. 2014 - Aug. 2015, Brahim Batouche [PERICLES PIA Project] Jan. - Dec. 2014, Thomas Larguillier [ATER] Sept. 2011 - Aug. 2012

**Current:** Laura Infante Blanco [Dr Sport, PERICLES PIA] from Jan. 2014, Florian Marchal [KIWI funding] from Nov. 2015, Chan N. Nguyen [PERICLES PIA], Jan. 2014 - Feb. 2016.

#### Doctoral students

All the PhD Theses conducted in the KIWI team are funded by the projects the team is involved in. The team never got any state grant.

**Past:** Charif Haydar - def. 2014 - CIFRE, Sonia Benticha - def. 2015 Tunisian funding.

**Current:** Yacine Abboud from Nov. 2015 - Industrial partnership, Marharyta Aleksandrova from Dec. 2013 - co-mentorship with Nat. Tech. Univ. of Ukraine KPI - Campus France, Lina Fahed from Nov. 2012 - industrial partnership, Benjamin Gras from Jan. 2015 - Grand Nancy, Amaury L'huillier from Oct. 2014 - Region and Grand Nancy.

#### Associate members

Alain Lelu, [Professor, Université de Franche Comté], till Sept. 2014, CNU 71.

PhDs defended	2	On-going PhDs	5
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#### Team evolution

Two new assistant professors, Sylvain Castagnos and Geoffray Bonnin, have joined the team in 2011 and in 2014 respectively. One associate professor, Alain Lelu, retired in 2014.

### 1.2.2 Life of the team

Anne Boyer is the scientific leader of the team since its creation in 2008. The team is collaboratively organized, with some permanent members in charge of the various scientific axes: Human Factors in Information Retrieval (S. Castagnos), Predictive Modeling and User Characterizing (A. Brun), Hybrid Modeling (A. Roussanaly), Education and Digital (A. Boyer). In 2013, a two-days internal workshop was organized to discuss ongoing research, future works and team evolution in terms of scientific goals and collaborative work that could be launched (local, national and international). During this meeting, it has been decided that Education and Digital should become a hot topic for the team, as well as the investigation of gaze tracking and mining.

### 1.2.3 Research topics

#### Keywords

Artificial Intelligence, Machine Learning, Data Mining, Recommender Systems, Collaborative Filtering, User Modeling.

#### Research area and main goals

Recommender systems are the common focus of the works conducted in the team, since its creation in 2008. KIWI has been the first team in the lab to work on recommender systems.

The scientific focus is the automatic exploration of digital traces: logs, clickstreams, ratings, annotations, writing in blogs, etc. This exploration is based on models issued from machine learning, data mining, subjective logic, collaborative and content-based filtering; considering only traces or including human factors for their processing. The objective is to model the users behaviour (descriptive modeling), explain it (diagnostic analysis), predict its evolution (predictive modeling) or determine what actions to do to achieve a goal (prescriptive modeling).

Over the 5 past years, the research topics of have evolved from individual (user) to collective modeling (community), from modeling the instant to modeling the dynamic, from modeling a specific domain (cultural goods, educational resources) to cross-domain, from personalisation (user adaptation) to flexibility (adaptation to the context).

Application domains were mainly e-(m-)commerce and intranets. Since the integration of S. Castagnos, a new focus has been put on diversity models and human factors, with a special orientation to e-health (autism, alzheimer and elderly people). When G. Bonnin joined the team, one additional scientific topic has been included: how to design a significant collection of items, given a user's characteristics. The main related application domain is music playlists.

#### Specificities of the team

One main specificity of the team lies in its pluridisciplinarity. It can be found in the approaches studied and in its members (several CNU sections). This pluridisciplinarity is the way KIWI has chosen to take from the beginning of its constitution in 2008, in order to tackle the various scientific challenges KIWI faces. It allows to propose innovative and multidisciplinary approaches, especially in fields such as e-education or including human factors into recommender systems.

### 1.2.4 Main Achievements

The CROSSCULT H2020 project has been ranked 1st out of 137 proposals in 2015.

The KIWI team with the Sailendra firm, have took part in the PriceMinister Rakuten Challenge, that aimed at providing recommendations and have been ranked 1st in this challenge.

The KIWI team organized an international seminar 12/8/15 on Learning Analytics. Anne Boyer has been elected as the president of the UNIT foundation (Université Numérique Thématique en Sciences de l'Ingénieur et Technologie, dedicated to OER and LLL). C. Nguyen submitted a project at the Paris French Tech Ticket in 2015, ranked 25/700 and retained as a winner of the program. It will be supported during 1 year to create a start-up.

## 1.2.5 Research activities

### 1.2.5.1 Human Factors in Information Retrieval

**Description** Recommender systems have been proven to be efficient and useful by reducing the cognitive load and time required during data search and access. Over the past two decades, this improvement of human-computer interactions is mainly relying on increasing systems' accuracy.

A crucial aspect is missing within the literature evaluation metrics. They do not take into account human factors playing a role within the decision process (context, confidence, trust, explanations and need for diversity). Within this context, our goal is to design holistic intelligent systems that provide the right information at the right time, in the correct manner, in agreement with users' policy and with valuable arguments. New challenges consist in: (1) identifying human factors that play a role within decision making an/or maximize users' acceptance, adoption and satisfaction, (2) integrating these factors in machine learning algorithms.

**Main results** We focused on understanding into details the role and impact of some human factors on the decision-making process. We built a user study involving 250 users [5] and focused on the users' need for diversity. We proved that diversity is perceived by users and improve users' satisfaction. Nevertheless, diversity in the recommendation set can require additional explanations to users.

At the same time, we took an interest on how to provide modes of interaction that facilitate users' feedback. We proved that comparisons, instead of ratings, makes the interactions easier while reducing the imprecision of expressed preferences over time [59].

More recently, we studied the link between memory and gaze [121]. To infer what has been memorized by users, we aimed at identifying gaze features that best explain and efficiently predict visual memory. We found strong correlations between the memorized items and the number of fixation points and the relative angles saccade sum. In the medium term, these results will allow us to early detect neurodegenerative diseases, such as Alzheimer or Autism [122].

We aimed at conceiving new machine learning algorithms that improve the interaction and user satisfaction. As an example, we built a model that allows to measure the diversity brought by each consulted item over time, within any sequence of consultation [67]. This model is then used to automatically understand the user context in a privacy-preserving way [35].

At last, Haydar *et al.* investigated ways to model user trust and reputation, and to use it to improve and to reinforce the quality of recommendations according to the context [8, 46].

## Predictive Modeling and User Characterizing

**Description** This axis is dedicated to user characterization through clustering, representative users (leaders), atypical users, etc. to provide a simplified representation of the set of users, and to provide them with accurate recommendations. It is also dedicated to predicting users future behavior. We mainly focus on machine learning approaches to reach these goals.

**Main results** We have been the precursors in investigating the representation of the set of users with an unweighted graph to identify communities [3, 4] and in coping with data sparsity

[6]. More recently, we have identified representative users and have been the first to show that matrix factorization can be deviated from its original purpose to reach such a goal [25, 29] (PhD Thesis of M. Aleksandrova). In parallel, we have tackled the cold-start problem through MF and proposed original approach that has the advantage to not require any content information [30]. Recently, we focused on atypical users, who are so different of the others that they cannot receive any accurate recommendations. We have proposed new approaches to identify these users upstream the recommendations process [43] (PhD Thesis of B. Gras, in collab. with Sailendra).

To predict user preferences we have investigated  $K^{th}$ -order Markov Models [2]. In the frame of L. Fahed's Phd Thesis, we focus on distant events prediction. No work has focused yet on predicting distant events, due to complexity issues. We have tackled this problem and shown it could be solved with low-complexity algorithms [36]. We have been the precursors in investigating Kalman Filters, to predict the "trajectory" of users in the space of items [24, 11].

## Hybrid Modeling

**Description** Hybridization aims to combine knowledge sources to design users model to produce personalized recommendations. The key idea is to globally improve the quality of recommendations taking advantage of the specificities of each method. The issues addressed are: cold start problem, robustness to attacks, data sparsity, their fluctuation and massification.

Knowledge sources allow to infer relevant information (indicators and features). They can be linked to items including their contents and their uses, but also to users social connections in an online service. This informations can be explicit: ratings, votes, content metadata and declared social links. They may also be implicit: we estimate them from the use of any kind (access, frequency, duration, sharing, downloading, printing ...), the textual content of items or the interactions among users.

### Main results

S. Ben Ticha's thesis works highlighted several results on the performance of hybrid recommender systems combining collaborative filtering algorithm and content based approach. She has proposed a typology of features, based on dependent and non-dependent attribute classes with, for each of the observed subclass, a performance analysis using several techniques [109].

Charif Haydar's thesis work incorporates a study on hybridization between collaborative filtering and trust based approach that relies on explicit or implicit social links between users [8]. For implicit links, a modelling based on subjective logic has been proposed and tested [47].

Furthermore, hybridization has also been exploited in the PIA/PERICLES project (see below) for the recommendation of open educational resources. Both information about specific attributes of each resource and links between resources are exploited through a pageRank adapted algorithm [69].

## Education and Digital

**Description** This axis is dedicated to e-education and more precisely to the way to develop personnalized education for any learner, based on the collect and exploration of digital traces. It includes questions such as how to recommend pertinent open educational resources (OERs) to a specific learner given his academic background, educational preferences and learning objectives, or how to adapt digital tools to his profile. The KIWI team maily focuses on designing an OERs recommender and on Learning Analytics (KIWI is involved in this topic since 2013, mainly via the PIA 2 Pericles project) to provide teachers and learners with explicative, predictive and prescriptive analysis.

**Main results** The KIWI team is involved in several projects in the field of Education and Digital such as the PIA 2 e-education Périclès project (end in April 2016), the INTERREG IV Interlingua project (end in July 2015), the Erasmus+ D-Transform project (scientific coordination by Anne Boyer, end in September 2017). The challenges related to e-education are numerous, such as the determination of factors explaining the current situation in a dataset, the real-time recommendation based on hybrid modeling (refer to previous section), the atypical learners modeling (refer to section Armelle). The main contributions of the KIWI team are: 1) two recommendation algorithms, one for open repository of resources to provide to non identified users with OERs suggestions (on-going test on 2 national open repositories), and one to include into the virtual desk of a given student (first release of the software for open distribution in April 2016); 2) a tool to cartography an open resources and determine what is called “isolated” resources [17]; 3) various studies on impact of culture on e-education [32], on OERS as a lever for digital transformation of Higher Education (D-Transform O1 deliverables); 4) a satte of the art of Learning Analytics and their challenges (report for MENESR to be released in 2016).

### 1.3 Scientific production and quality

#### 1.3.1 Synthesis of publications

	2011	2012	2013	2014	2015	2016
PhD Thesis	0	0	0	1	1	0
Journal	3	3	1	4	2	0
Conference proceedings	17	14	20	21	13	1
Book chapter	2	1	3	3	2	0
Book (written)	0	0	0	1	0	0
Book or special issue (edited)	3	2	1	1	2	0
General audience papers	2	2	1	4	6	0

#### 1.3.2 List of top journals in which we have published

Social Network Analysis and Mining [6], Advances in Multimedia [4], International Journal On Advances in Life Sciences [8], Journal of Language Modelling [10], Revue d’Intelligence Artificielle (RIA) [2], Sciences et Technologies de l’Information et de la Communication pour l’Education et la Formation (STICEF) [7]

#### 1.3.3 List of top conferences in which we have published

**Web related conferences:** EC-Web [20], Web Intelligence [49, 29], Webist [22, 128, 45, 43].

**E-education related conferences:** EC-TEL [69, 18, 40], EDEN [17, 87], EIAH [88, 31].

**Data Mining related conferences:** KDIR [36], EGC [42, 38, 37, 82].

**AI related conferences:** ACM GECCO [25], SIGIR [46], ICTAI [35, 14], CORIA [24, 30, 33].

#### 1.3.4 Software

**The Event Prediction Tool** aims at predicting events in a sequence of events, while controlling the distance of prediction. It has been developed in the frame of the ARMURES project, and is implemented at Credit Agricole S.A., it exploits the sequence of verbatims published on the web. It has been developed in Java and its use is restricted to Credit Agricole S.A.

**Dr Sport** is the first full service dedicated to diagnosis of sport pathologies (from the analysis of the pathology to the orientation towards the nearest competent professionals). It relies on Artificial Intelligence techniques and is available on iOS, Android, and on a website. It has been developed in the frame of the collaboration with Dr Sport.

**PERICLES-Reco** is an open source software that has been developed in the frame of the PIA PERICLES project. It aims at providing recommendations of Open Educational Resources (EOR) to users of the portal of OER and to university students through their private Learning Management System (LMS).

## 1.4 The academic reputation and appeal

### 1.4.1 Prizes and Distinctions

In 2015, the KIWI team was involved in the Price Minister Rakuten competition, associated with the Sailendra company. This competition aimed at providing recommendations of products to users that visit the PriceMinister website. The algorithms proposed by KIWI and Sailendra have been ranked first among all challengers.

C. Haydar received a Best Paper Award at SOTICS 2013.

A. Boyer received the price of the laboratory awarded by Société Industrielle de l'Est in 2013.

C. Nguyen submitted a project at the Paris French Tech Ticket in 2015, ranked 25/700 and retained as a winner of the program. It will be supported for development during 1 year.

### 1.4.2 Editorial and organizational activities

#### 1.4.2.1 Steering Committees and Program Committees

All the permanent members of the team have been program committee of national and international conferences or steering committee members. A. Boyer: 30, A. Brun: 11, S. Castagnos: 9, best paper award committee, A. Roussanaly: 7, A. Lelu: 6, S. Nowakowski: 6, A. Knauf: 2, Geoffray Bonnin: 1 special edition of a journal. S. Sidhom: editions of ISKO-Maghreb.

#### 1.4.2.2 Conference Organisation

A. Boyer and S. Castagnos organized a special session at ISMIS'12. S. Sidhom is general chair of the ISKO-Maghreb Int. Symp. 2012)2015, he is also general chair of the Int. Conf. SIIE'2012, 2014 and 2015. S. Nowakowski is organiser of a special session in ePIC Forum conf. 2013.

All members of the team were organisation committee member for several conferences.

### 1.4.3 Services as expert or evaluator

**Expertises** A. Boyer was expert at the French ministry of higher education and research (Mission MINES), Oct. 2013- Dec. 2015. She is an expert for the French Ministry (DGRI/MEI) for bilateral calls since 2012 and an expert for PIA (Plan d'Investissement d'Avenir).

A. Brun is an expert of Swiss research projects COST 2013. S. Nowakowski was an expert for the national White paper on ePortfolio 2012, 2013. A. Boyer, A. Brun and A. Roussanaly are experts for the French ministry HER for CIR. A. Boyer and A. Brun are experts of ANR projects.

**PhD Committees** A. Boyer, A. Brun, A. Lelu, S. Nowakowski, A. Roussanaly were reviewer or examiners of PhD Theses of HDR in France and abroad.



**CNU** A. Boyer and A. Brun are members of the CNU 27.

**Charges de Mission** A. Boyer was chargée de mission at the French Ministry of HER. She is chargée de mission E-education of the LORIA lab. since Jan. 2016. She has been elected as the president of the UNIT foundation (Université Numérique Thématique).

**Local Responsibilities** A. Brun is the head of the Bachelor degree in Mathematics and Computer Science Applied to Human and Social Sciences (Licence MIASHS). A. Roussanaly is chargé de mission TICE at Université de Lorraine, since 2011

**Miscellaneous** S. Nowakowski is co-supervisor of 1 PhD Thesis in University of La Rochelle, started Sept. 2012. S. Sidhom is co-supervisor of 3 PhD Theses: 1 in Université Paris 8, 2 in ED. ENSI in Tunis since 2012.

The permanent members of the team are all reviewers of many conferences and journals.

#### 1.4.4 Invited Talks and others

A. Boyer, A. Brun gave an invited talk in CRESTIC lab (Reims) 2013 on recommender systems. S. Nowakowski was invited speaker 5 times in France and abroad, in universities, conferences and forums. He was an invited professor at Carl von Ossietzky Universität Oldenburg, 2014.

A. Boyer gave many invited talks abroad, for example at the “colloque e-éducation” organised by the university of Settat, Maroc 2014 at the ACE conference San Antonio, USA 2015, at the seminar CODAES about OER in Mexico, in November 2014, at the séminaire IGAENR, etc.

A. Roussanaly gave a talk at Plate-forme I.A., atelier EIAH and Printemps du Numérique 2015.

#### 1.4.5 Collaborations

A. Lelu has collaborated with the ISCC in 2011/2012 on Digital humanities, historical and prospective studies, in the framework of a part-time deal.

The team has strong collaborations and several joint publications with ‘Kyiv Polytechnic Institute’ Ukraine, Université des Sciences de Tunis, L3i Lab. from Université La Rochelle, concretized by the co-supervision of PhD Theses and joint publications.

A. Roussanaly has strong collaborations with Phuong Le Hong from Hanoi University of Science, through joint publications. Phuong was invited researcher of the KIWI team in 2013.

A. Brun has strong collaborations with Liana Razmerita, from the Copenhagen Business School, on user modeling and e-learning: joint publications and visiting periods.

The KIWI team is involved in the Laboratoire International Associé (LIA Linos) with Morocco, the kick-off meeting held in September, 2015.

KIWI is part of the ORPHEE e-education network (ANR funding).

S. Castagnos collaborates with C. Luxembourger from InterPsy lab. (Univ. Lorraine) A tool is being developed to help researchers to help researcher in psychology to lead their user studies.

S. Castagnos collaborates with T. Zalla, CNRS researcher in cognitive science and psychopathology (ENS ULM) on the A2M5AI project (ANR under submission).

#### 1.4.6 External support and funding

##### 1.4.6.1 European / international projects

**STIC Asia project** 2012-2013, in collaboration with Hong Kong Baptist University (Li Chen-Assistant Professor) and Asian Institute of Technology in Thailand (Raphael Duboz).

**EHR project** 2012- 2013, European project In RUS ERA NET program. Partner countries: France, Germany, Russia, Estonia.

**CROSSCULT project** 2016-2020, H2020 project. Partner countries: France, Greece, Italy,

Luxembourg, Malta Spain, UK.

**Interlingua Project** 2014-2015 - INTERREG IV. KIWI is the leader of Task 1. Partner countries: Belgium, France, Luxemburg, Germany).

**The (KA2) D-TRANSFORM** 2014-2017- KIWI is the scientific leader and leader of the sub-task O1-A3. Partner countries: France, Hungary, Italy, Spain, UK.

#### 1.4.6.2 National projects

**BASAR project** 2013-2016 - Scientific Cooperation Inter-Universitaire (PCSI project) Partner countries: Algeria, Bulgaria, Egypt and Lebanon.

**The PERICLES project** 2012-2016. PIA project The KIWI team is the leader of the research activities of the project and is leader of task SP3.

**Project with Sailendra** A collaboration with Sailendra (local firm) 2014-2017 on the identification of atypical and anticipator users. This collaboration has been financed by Grand Nancy, and 1 PhD Thesis has started in Jan. 2015.

**Project with Yupeek** A collaboration with Yupeek (local firm) 2014-2017, financed by Grand Nancy and by Region Lorraine, and 1 PhD Thesis has started in Oct. 2014.

**Dr Sport project** 2014-2015 between KIWI and a new Startup has been selected by the Lorraine Region. The result is a full service dedicated to diagnosis of sport pathologies.

**Project with Ministry HER** In this project (2014-2015) KIWI has two main goals. 1) investigate if the use of the digital tools increases students success. 2) providing a state of the art of Learning Analytics in France.

#### 1.4.6.3 Contracts on private funding

**CIFRE Womup** 2009-2012 -The collaboration between WOMUP Company and the KIWI team is concretized by a CIFRE grant, for a Phd Student.

**ARMURES Project** The ARMURES project 2012-2015 in collaboration with Crédit Agricole S.A, is dedicated to the the analysis of blogs and verbatim with the aim to improve the quality and reliability of customer and prospect models, modelling e-reputation of the firm, by analysing these blogs, detecting new discriminative criterion.

## 1.5 Involvement with social, economic and cultural environment

The KIWI team has been the subject of two France 3 TV shows: “c’est à savoir” in 2011 and “enquêtes de régions” : ’tous surveillés’ ? in 2013. The team has been involved in the Renaissance Nancy 2013 exhibit, by presenting the Precog software to more than 10,000 persons.

Each year the team participates to the exhibit “Village de la Science” and has participated to the “Nuits de la Science” in 2012.

## 1.6 The involvement in training through research

The staff members of the team teach several courses related to the research topics of the team: “Collective Intelligence / Intelligent Assistants”, “Ergonomics and Human-Computer Interaction” and “Cognitive technologies” in Master in Cognitive Science and Applications, “User Modeling and Recommender Systems” in Master Informatique, “ Pedagogical engineering – pedagogy and personal learning environments, Social networks and social media”, in M2 MEEF.

## Articles in International Peer-Reviewed Journal

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- [12] S. SIDHOM, N. KHEMIRI, “Specific ontologies for semantic indexing from natural language properties”, *EJDE - Electronic Journal of Digital Enterprise (ISSN: 1776-2960)* 1, 1776-2960 R291 (ISSN), July 2012, p. 1–8, <https://hal.inria.fr/hal-00782918>.

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## Major International Conferences

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□



## A Team TEAM

### *Appendix (HCERES mandatory requirement)*

#### Software

##### **Opinion leader detection (OLD)** A. Boyer, A. Brun.

The OLD software, developed in 2012, is a generic platform that detects leaders in a network of users. This software allows to determine either the number of leaders wanted, or the characteristics of leaders, or their minimal quality, etc.

This software is available on demand.

##### **Commun-IT** S. Castagnos.

This software, developed in PHP and Flex in 2012 in collaboration with two master students Gabin Personeni and Liang Qiao, is able to draw communities of users under the form of hyperbolic graphs. The input data is information about users and items. This data comes from various corpuses used and/or generated by KIWI algorithms. It is able to display the links between users according to their preference similarities, their social relationship, or the level of trust they have in each others. It is also able to display the list of recommendations coming from and computed for each user.

It has been designed to reach two objectives. First, it allows KIWI researches to graphically display results from their algorithms, thus facilitating discussions and demonstrations around their researches. Second, it will allow us to conduct user studies to measure the impact on users' acceptance and adoption rate when recommender systems are able to explain the origin of recommendations.

This software are available on demand.

##### **Precog** S. Castagnos, B. Gras. Collaborator : B. Hamann - Trainee in M1 in Cognitive Science.

This software, developed in 2013, has been designed to verify the existence of a link between memory and gaze data. On one hand, we collaborate with the University Hospital of Nancy to study memory troubles among elderly persons, with the goal of automatically diagnosing memory issues based on fixation points, saccades and scanpaths. On the other hand, we are working on predictive models to provide recommendations of educational resources in Intelligent Tutoring Systems, according to what the user looked at and what the system assumes to be memorized. Concretely, Precog allows users to play to the well-known game called "Concentration" (also known as Memory, Pelmanism, Shinkei-suijaku, or Pexeso). In the meantime, the system collects gaze data such as fixation points and durations. Then, it uses these pieces of data to predict which items will be memorized according to primacy and recency effects. Precog has been developed in C# so as to be compatible with a Tobii X1 Light eye-tracker and Tobii SDK. This prototype has been presented to more than 10,000 persons during the Renaissance Nancy 2013 exhibit. This software is available on demand.

**StreetViewer** S. Castagnos, A. L'Huillier. Collaborator: Maxime Amblard - Assistant Professor Université de Lorraine - Loria Laboratory, Florian Marchal Trainee - M1 in Cognitive Science.

This software has been developed in C# for the need of the Renaissance Nancy 2013 exhibit. It has been designed to study and illustrate the added value of gesture-based software in certain contexts. StreetViewer allows users to use the Google service called StreetView without keyboard or mouse. A set of gestures have been defined and interpreted as actions by the software. It helped us to analyse users' behaviors and understanding of such a system. StreetViewer is also available on demand.

**A.M.E.** S. Castagnos. Collaborators: Florian Marchal - Trainee M1 in Cognitive Sciences, Manon Demange - University of Strasbourg, Anaick Besozzi - CHU Nancy, Ghassan Watfa - CHU Nancy.

This software, developed in 2014, aims at analysing usages (movements, gaze data, clicks, timestamps, ...) while passing neuropsychological tests such as TMT, and to automatically detect cognitive and memory disorders. It is compatible with Leap Motion and Tobii X1 Light Eye-Tracker.

**Dr Sport** Castagnos, A. Boyer, L. Infante Blanco. Collaborator: Thierry Weizman - Sports Doctor.

Dr Sport is the first full service dedicated to diagnosis of sport pathologies (from the analysis of the pathology to the orientation towards the nearest competent professionals). It relies on Artificial Intelligence techniques and will be available on iOS, Android, and on a website.

**DANCE and DANCE Visualisator** S. Castagnos, A. L'Huillier. Collaborator: A. Kerangall - Trainee, L2 in Cognitive Sciences.

DANCE, developed in 2014, analyses the attributes of the items in users' recent history and monitors the relative diversity brought by their consultations over time.

DANCE Visualisator is a Java software that allows researchers to dynamically visualize results from DANCE.

**Music Recommender System** S. Castagnos, G. Bonnin, C. Alchiekh Haydar, A. L'Huillier. Collaborators: Joris Favier, Myriam Delaruelle, Gael Hopp, Elise Richard - Trainees in M2 MIAGE Distributed Information Systems.

The KIWI team has developed, in 2015, an online music recommender system as an evaluation framework for recommender algorithms.

## Academic appeal and reputation indicators

### Scientific Networks

KIWI is part of the ORPHEE e-education network (ANR funding).

### Invited Talks

Anne Boyer gave many invited talks, for example at the "colloque e-éducation" organised by the university of Settat Maroc 2014, at the ACE conference San Antonio USA 2015, at the seminar CODAES about OER in Mexico in 2014, at the séminaire IGAENR on the numerical transition at the Université Paris 2015, etc.

Samuel Nowakowski was an invited speaker 5 times in France and abroad, in universities, conferences and forums. He was also an invited professor at Carl von Ossietzky Universität Oldenburg in 2014.

Anne Boyer and Armelle Brun were invited speakers in CRESTIC lab (Reims) in 2013, on recommender systems.

Azim Roussanaly gave a talk at PFIA 2015: Plate-forme Intelligence Artificielle, Atelier EIAH & IA, at the Printemps du Numérique 2015 in Université Paris Ouest Nanterre La Défense.

## **Distinctions**

Charif Haydar received a Best Paper Award at SOTICS 2013.

A. Boyer received the price of the laboratory awarded by Société Industrielle de l'Est in 2013. In 2015, the KIWI team was involved in the Price Minister Rakuten competition, associated with the Sailendra company. This competition aimed at providing recommendations of products to users that visit the PriceMinister website. The algorithms proposed by KIWI and Sailendra have been ranked first among all challengers.

C. Nguyen submitted a project at the Paris French Tech Ticket in 2015. The project was ranked 25 over 700 submissions and retained as a winner of the program. It will be supported for development during 1 year.

## **PhD committees**

**Anne Boyer** was a reviewer of 5 PhD Theses in France. She has also been a committee member of 5 PhD theses in Université de Lorraine.

She has been a reviewer of 1 HDR in 2014 and a member of the HDR committee in Université de Lorraine in 2014.

**Alain Lelu** has been reviewer of 2 PhD Theses.

**Samuel Nowakowski** has been a member of 1 PhD Thesis committee and reviewer of 1 PhD Thesis.

**Armelle Brun** has been reviewer of 1 PhD Thesis in Australia.

**Azim Roussanaly** was reviewer of 1 PhD Thesis.

**Sahbi Sidhom** was the member of the committee of 1 PhD Thesis

## **Editorial and organizational activities**

### **Steering and program committees**

Anne Boyer was program committee member of about 30 international and national conferences and journals, including a workshop at WWW 2012 and at IJCAI 2015, SOTICS 2013 and several French conferences.

Armelle Brun was member of more than 11 program and scientific committees of conferences and journals, including Information Science, TSI, etc.

Alain Lelu was a member of about 6 scientific committees in conferences and journals.

Sylvain Castagnos was member of about 9 the scientific committees of conferences, including RecSys2013 and several French Conferences. He was also member of the CORIA 2013's best paper award committee and of the Doctorial Consortium track in ICMI 2014.

Azim Roussanaly was program committee member of 7 conferences.

Samuel Nowakowski was member of about 6 the scientific Committee of conferences and Member of the steering Committee of Alliance pour la Recherche en Education. Sahbi Sidhom is member of the program committee of several editions of ISKO-Maghreb.

Audrey Knauf was member of the program committee of VSST 2012, 2013 and member of SF-SIC (French Society of Communication and Information Sciences) and of RRI (French Research Network on Innovation).

Geoffroy Bonnin is member of the scientific committee of 1 special edition of one journal.

### **Conference organization**

Anne Boyer co-organized a special session of the ISMIS'12 Internationale Conference, she is a member of the organizing committees of the international conference Open and Flexible Higher Education (EADTU'13) and is co-chair of the 2nd Int. Seminar "Open Educational Resources, Impact and Incomes" (2014).

Sylvain Castagnos co-organized a special session of the ISMIS'12 Int. Conference, is a member of the organizing committee of the joint national conferences CIFED 2014 and CORIA 2014.

Sahbi Sidhom is general chair of the ISKO-Maghreb International symposium between 2012 and 2015, on "Concepts and Tools for Knowledge Management (KM)" and general chair of the Int. Conf. SIIE'2012, 2014 and 2015.

Samuel Nowakowski is organiser of a special session for project eHR in ePIC Forum conference 2013 and the organiser of a roundtable. He is the organiser of the workshop "Social networks - towards new competencies for teachers" in Journées du eLearning 2014.

Armelle Brun is a member of the organizing committee of CAP 2012 and of the joint national conferences CIFED 2014 and CORIA 2014.

Anne Boyer and Azim Roussanaly co-organized and co-animated the workshop within the forum about quality in HE, 2014.

### **Services as expert or evaluator**

#### **Expertises**

Anne Boyer was expert at the French ministry of higher education and research (HER) - Mission MINES, from Oct. 2013 until Dec. 2015.

She is currently an expert for the French Ministry (DGRI/MEI) for bilateral calls (PHC projects for example), since 2012.

She is also an expert for the PIA (Plan d'Investissement d'Avenir) , where she was pilot instructor of the CLAIRE and CAPA projects.

She was evaluator of ANR CONTINT projects in 2012, 2013. She is expert in the Transversal Workgroup "Distance and online learning of the EC", representing MESR.

Armelle Brun was an expert of the ANR in 2012 and 2015. She was also an expert of Swiss research projects COST 2013.

Samuel Nowakowski was an expert for the national White paper on ePortfolio - French Ministry of HER in 2012, 2013.

Anne Boyer, Armelle Brun and Azim Roussanaly are experts for the French research ministry for the "Crédit Impot Recherche" since 2011.

#### **CNU**

Armelle Brun is member of the CNU 27 since 2011

Anne Boyer is member of the CNU 27 since 2015

## Charges de Mission

Anne Boyer She has been elected as the president of the foundation UNIT (Université Numérique Thématique), winner of two national projects PIA IDEFI UTOP and IDEFI-N SONATE. She was chargée de mission at the French Ministry of higher education and research (Mission MINES), until Sept. 2013. She was in charge of several national projects such as the National Digital Universities. Some of these activities have led to the publication of articles that are not referenced here. She has contributed to the benchmarking study about digital universities coordinated by the Caisse des dépôts et consignations. She was in charge of open educational resources, open education, International and link with research. She is chargée de mission E-education of the LORIA lab. since Jan. 2016.

## Local Responsibilities

**Armelle Brun** is the head of the Bachelor degree in Mathematics and Computer Science Applied to Human and Social Sciences (Licence MIASHS). **Azim Roussanaly** is chargé de mission TICE at Université de Lorraine, since 2011

**Samuel Nowakowski** is chargé de mission TICE - UFR SHS Nancy, Université de Lorraine, Special Adviser in charge of the ICT in education and projects for the mutation of the learning spaces at the university –UFR SHS, Université de Lorraine. and Member of the Board of Federation Charles Hermite, Université de Lorraine.

## Scientific responsibilities

The KIWI team is its task leader in several international and national projects: KA 2 ((Strategic Partnerships)) D-TRANSFORM, INTERREG IV A Interlingua and PIA2 PERICLES.

### PhD co-supervision outside Université de Lorraine

Samuel Nowakowski is co-supervisor of Mr Hoang Ho Nam with University of La Rochelle, started in Sept. 2012. He is the manager of the Research and Innovation in eLearning Network - transdisciplinary network for research and innovation in eLearning for Université de Lorraine. Sahbi Sidhom is co-supervisor of 3 PhD Theses: Carole HENRY Université Paris 8, Rim Mseddi (ED. ENSI, Tunis) since 2012 and Azza Harbaoui (ED. ENSI, Tunis) since 2012. The permanent members of the team are all reviewers of many conferences and journals.

## External support and funding

The KIWI team is involved in many projects, whether international, national, with private firms or from public funding.

### A.0.4 European / international projects

**STIC Asia project** 2012-2013. S. Castagnos, A. Boyer in collaboration with Hong Kong Baptist University (Li Chen-Assistant Professor) and Asian Institute of Technology in Thailand (Raphael Duboz). The goal of this two-year project was to study the cultural impacts on users' interaction model with recommender systems.

**EHR project** ePortfolio for Human Resources - S. Nowakowski - European project In RUS ERA NET program - sept. 2012 to sept. 2013. The objectives are to extend the EU strategy by developing a media-oriented ePortfolio as the europass framework instruments are so far largely based on formal educational inputs. Partner countries: Germany, Russia, Estonia.

**CROSSCULT project** S. Castagnos - H2020 project, 2016-2020. It aims at empowering reuse of digital cultural heritage in context-aware crosscuts of European history. It aims at modifying the visitor experience inside museums through games and mobile applications. Partner countries:Greece, Italy, Luxembourg, Malta Spain, UK.

**Interlingua Project** A. Brun, A. Boyer -2014-2015 - INTERREG IV Project that aims to provide a service to students that study in a foreign language. This service provides them with help, when they face difficulties with a learning resource (course, exercise, etc.) in the language of study. This help is under the form of a similar learning resource in his/her mother language. Partner countries: Belgium, Luxemburg), Germany).

**The (KA2) D-TRANSFORM** The D-TRANSFORM project is an initiative co-funded by the European Erasmus+ program. Its goal is to set up a program on leadership development in e-learning, focused on university senior leaders (rectors and vice-rectors) gaining the knowledge of e-learning they require to achieve effective leadership and decision-making in that domain.

The project runs for 3 years, from 1 September 2014 to 1 September 2017 and involves 7 partners from 5 different countries (France, Italy, Spain, Hungary and United Kingdom).

This past year, the KIWI team was involved in the drafting of a guideline on E-education as an institutional strategy for the construction of the European Higher Education Area (Output 1). In this end, a case study, based on a questionnaire, involving higher education institutions from four different European countries was conducted

#### A.0.5 National projects

**BASAR project** A. Knauf - 2013-2016 - BASAR project (Bank of scenarios of learning hybrids, reusable and interoperable), Project of Scientific Cooperation Inter-Universitaire (PCSI), aims at the deployment of governance within the universities of Algeria, the Bulgaria, Egypt and the Lebanon for the implementation of an action plan integrating ICT in education and the recognition of educational services, related to the use of digital technology. 30/01/2016.

**The PERICLES project** The PIA PERICLES project (Projet pour l’Evaluation et la Recherche Informatisée autour des Compétences dans L’Enseignement Supérieur) (2012-2016) has been selected as part of the national program named “Investissements d’avenir”. The KIWI team is the leader of the research activities of the project with regard to the collection of data provided by the learners and the production of customized recommandations. (<http://www.e-pericles.org/pericles.html>) and leader of task SP3 : Data collection and recommendations providing.

**Project with Sailendra** A collaboration with Sailendra (local firm) has started in Jan. 2015 on the identification of atypical and anticipator users. This collaboration has been financed by Grand Nancy, and 1 PhD Thesis has started in Jan. 2015.

**Project with Yupeek** A collaboration with Yupeek (local firm) has started in Oct. 2014 on the identification of atypical and anticipator users. This collaboration has been financed by Grand Nancy and by Region Lorraine, and 1 PhD Thesis has started in Oct. 2014.

**Dr Sport project** The Dr Sport project has been selected by the Lorraine Region, the project is between KIWI and a new Startup. The result of this project is a first full service dedicated to diagnosis of sport pathologies (from the analysis of the pathology to the orientation towards the nearest competent professionals).



**Project with MESR** This project (2014-2015) between Ministère de l'Enseignement Supérieur et de la Recherche and KIWI has two main goals. 1) investigate if the use of the digital tools increases the level of success of students from “Bac Pro” in their higher studies. A thorough study on STAPS students has been conducted. 2) providing a state of the art of Learning Analytics in France: overview of the academic research, tools and use in universities.

#### **A.0.6 Contracts on private funding**

**CIFRE Womup** 2009-2012 - The collaboration between WOMUP Company and the KIWI team is concretized by a CIFRE grant, for a Phd Student 2009-2012 (Charif Alchiekh Haydar).

**ARMURES Project** 2012-2015 The ARMURES project (Applications de Recherche et de Modélisation d'Utilisateurs dans les Réseaux Sociaux), is a 3-year project in collaboration with Crédit Agricole S.A.. This project is dedicated to the the analysis of blogs and verbatim with the aim to improve the quality and reliability of customer and prospect models, modelling e-reputation of the firm, by analysing these blogs, detecting new discriminative criterion to be added to user models.



## B Team TEAM

### *SWOT*

**Delete this tips after filling!** *Ce Swot est une enquête entre nous. Il ne sera pas intégré au bilan HCERES mais il servira de guide. Votre analyse doit se porter sur votre équipe, votre département et sur le laboratoire.*

#### Points forts

##### **B.0.7 Critère 1 : Production et qualité scientifique**

L'équipe KIWI publie ses travaux dans plusieurs domaines à destination de plusieurs communautés, à la fois SHS et Informatique. De même, au sein de la communauté informatique, elle publie dans des conférences et journaux d'intelligence artificielle, de data-mining, de conférences et journaux liés au Web et dédiés expressément aux systèmes de recommandations.

##### **B.0.8 Critère 2 : Rayonnement et attractivité économique**

L'équipe KIWI est historiquement la première équipe du laboratoire à travailler sur les systèmes de recommandation. De la même façon, elle est une des équipes pionnières en France. Pour cette raison, les membres de l'équipe sont rapporteurs de thèses et HDR, invités dans de nombreuses conférences et séminaires, et sont membres de projets nationaux et européens.

Récemment l'équipe a orienté ses recherches vers la e-éducation et le digital. Elle est précurseur sur ce sujet en France, et dans ce cadre est membre de nombreux projets de recherche liés à cet aspect, et invitée à de nombreux séminaires. Elle est une des rares équipes en France à se positionner sur le sujet.

##### **B.0.9 Critère 3 : Interaction avec l'environnement social économique et culturel**

L'équipe KIWI a de fort liens avec le tissu local, notamment au travers des nombreuses collaborations et contrats qu'elle a avec des entreprises ou collectivités locales. Ces contrats financent soit des thèses, soit des activités de recherche d'appoint.

Elle participe également à de nombreuses actions de vulgarisation en lien avec ses recherches : village de la sciences, émissions radiophoniques, télévisuelles, etc.

##### **B.0.10 Critère 4 : Organisation et vie de l'entité**

L'équipe KIWI, composée de 9 permanents, est dirigée par Anne Boyer. 4 axes ont été identifiés dans l'équipe, avec chacun un responsable permanent. Les permanents se réunissent régulièrement, ce qui permet de prendre la majorité des décisions collectivement.

##### **B.0.11 Critère 5 : Implication dans la formation par la recherche**

La quasi totalité des permanents intervient en Master 2, dans les 2 Masters à composante informatique soutenus par le laboratoire : Master Informatique et Master Sciences de la Cognition et Applications. L'équipe intervient également dans le master MEEF, sur les aspects e-éducation et digital.

## **B.0.12 Autres**

### **Points faibles**

#### **B.0.13 Critère 1 : Production et qualité scientifique**

Les publications en journaux de l'équipe ne sont pas sa plus grande force, mais les journaux dédiés à des thématiques proches de nos travaux sont relativement rares.

#### **B.0.14 Critère 2 : Rayonnement et attractivité économique**

Les membres de l'équipe sont membres de comités scientifiques de peu de très grandes conférences classées A.

#### **B.0.15 Critère 3 : Interaction avec l'environnement social économique et culturel**

#### **B.0.16 Critère 4 : Organisation et vie de l'entité**

#### **B.0.17 Critère 5 : Implication dans la formation par la recherche**

## **B.0.18 Autres**

### **Risques**

#### **B.0.19 Critère 1 : Production et qualité scientifique**

Les travaux pluri-disciplinaires de l'équipe sont régulièrement à la frontière de nombreuses conférences et sont parfois mal perçus. Par ailleurs, étant donné qu'aucune communauté n'existe sur certains travaux précurseurs, ils peuvent ne pas être bien perçus dans certaines conférences.

#### **B.0.20 Critère 2 : Rayonnement et attractivité économique**

Les sujets de recherche sur lesquels l'équipe KIWI se penche, intéressent le tissu économique local et national. Cependant, cela revient à participer à beaucoup de contrats avec des industriels, impliquant une grande énergie liée aux interactions et aux souhaits/exigences des industriels. Cette énergie peut impacter les travaux de l'équipe.

#### **B.0.21 Critère 3 : Interaction avec l'environnement social économique et culturel**

#### **B.0.22 Critère 4 : Organisation et vie de l'entité**

Les permanents de l'équipe sont tous non seulement enseignants chercheurs (aucun chercheur à temps plein), mais chacun a également des charges administratives très lourde : au niveau local (charge de mission à l'Université, porteur de diplôme) et au niveau national (directeur de fondation).

#### **B.0.23 Critère 5 : Implication dans la formation par la recherche**

## **B.0.24 Autres**

Les financements de thèse de l'équipe sont financés exclusivement sur les projets dans lesquels l'équipe est investie. En 8 années d'existence, l'équipe n'a reçu aucun financement de bourse de thèse du ministère, malgré des candidats major de leurs M2. Si l'équipe faiblit en volume de projets, elle ne pourra plus financer de thèse.

## Opportunités

### **B.0.25 Critère 1 : Production et qualité scientifique**

### **B.0.26 Critère 2 : Rayonnement et attractivité économique**

L'équipe étant précurseur dans la e-éducation et le digital (Learning Analytics), elle a l'opportunité de devenir l'équipe de référence dans le domaine en France, mais aussi représentante des travaux français à l'étranger. Les nombreux projets dans lesquels elle est investie sont un premier pas.

### **B.0.27 Critère 3 : Interaction avec l'environnement social économique et culturel**

### **B.0.28 Critère 4 : Organisation et vie de l'entité**

### **B.0.29 Critère 5 : Implication dans la formation par la recherche**

### **B.0.30 Autres**

