LIFE (is MaDE of ChoiCes)
Univ. Grenoble Alpes

#4 – Summer 2018

3 questions to… LIFE PIs

Sihem AMER-YAHIA
Research director at CNRS. Head of the SLIDE team at LIG.

Dr. AMER-YAHIA, you are the head of data science in LIFE, can you explain about your research in data science, and the ambition in LIFE project?

The work of my team at LIG is to develop large-scale data processing and exploration models and algorithms. We work closely with domain experts to extract high quality insights. In LIFE, we collaborate with medical experts to extract and validate the exploration of health trajectories of patient cohorts. To enable that, we are building an end-to-end data pipeline able to extract, clean, and transform raw patient data, mine health trajectories from that data, and visualize mined trajectories. Given the large volumes of raw patient data, we developed new scalable algorithms for mining and summarizing sequences of treatments and health statuses. We also developed clustering algorithms that account for the temporal dimension of trajectories. we are currently focusing on the exploration and visualization layers and on involving medical experts in validating use cases.

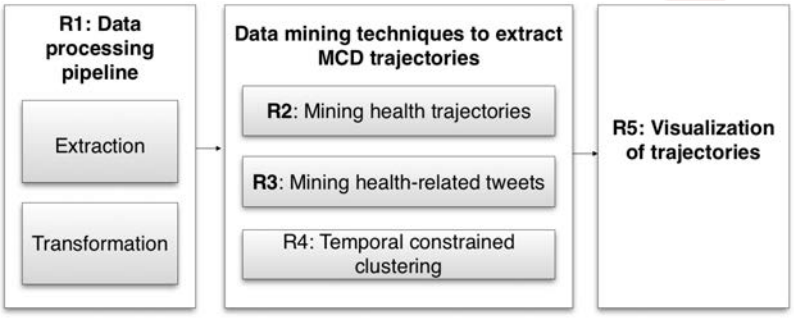
What is the plan to lead this mission to success?

There are two key aspects for successful Data Science: the availability of large amounts of various datasets and the availability of domain experts to help to craft and validate relevant use cases. We are lucky to have both in LIFE.

I hired two post-docs, Behrooz Omidvar-Tehrani and Son Mai Thai, with complementary skills. Behrooz focuses on data extract and preparation and on mining and visualizing trajectories. Son focuses on temporal clustering algorithms and on developing new human-in-the-loop methods to obtain feedback from doctors. We are in the process of refining our trajectory mining and exploration to meet their needs. The plan is to deliver a tool that will enable on-the-fly trajectory extraction and exploration for any cohort of interest and without delay.

What are the expected outcomes that will be of particular interest for the investigation of health and disease trajectories?

We expect to have an end-to-end data pipeline that takes raw patient data and enable their exploration of their health trajectories. To target specific cohorts, doctors can specify constraints such as age and location, patients who received Oxygen treatment, dead patients, etc. They can focus on specific time periods and also receive trajectories of similar cohorts. This flexibility will enable them to "slice and dice" the exploration and obtain summarized and detailed trajectories quickly and on-demand.



@ life.univ-grenoble-alpes.fr

@LIFE_UGA

Seen in the press

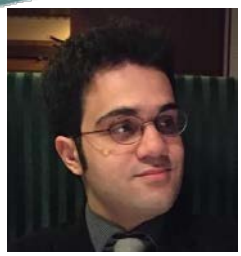
Interview in "Le Monde"
Hélèna REVIL, Postdoctoral researcher, Laboratory PACTE/CNRS
Title: "Non-recours : des aides sociales qui n'atteignent pas leurs bénéficiaires"

Jobs

LIFE is growing up!
- Jonathan GAUCHER, HP2
- Emie SEYVE, IAB team SLAMA

LIFE will gladly welcome
- Alicia GUILLIEN, IAB team SLAMA
- PHAM Duong Hung, CEA LETI

LIFE hires!
- PhD student in AGEIS team
- Postdoc in AECC team



LIFE
at the heart of interdisciplinarity by
Behrooz OMIDVAR-TEHRANI

Post-doctoral Researcher in University of Grenoble Alpes, SLIDE team at LIG

Could you tell us why you chose data science and explain your research activities?

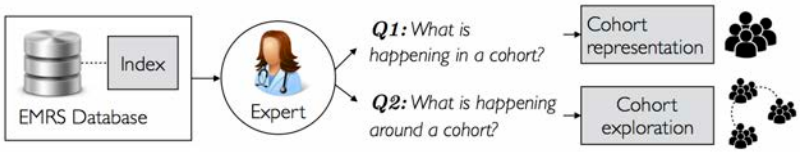
By 2020, humans will generate 40 zettabytes of data. Only 2% of this whole data has been analyzed to date. This has been always a great motivation for me to develop methodologies and tools which facilitate discovering insights from data. Specifically, my research interest is on user data and groups of users to analyze their collective behavior. In LIFE, I am working on novel approaches to analyze cohorts of patient trajectories in an efficient and effective way. The aim is to involve medical experts into the analysis loop in order to obtain more customized results which serve their specific needs.

Why LIG and Sihem's team?

Sihem's team has a strong focus on exploration models for large-scale data. This is a perfect fit with my research theme on interactivity and aggregated analytics. I've always been motivated to apply my research on a more human-oriented sector, such as health. Being a member of Sihem's team and LIFE project enables this interesting opportunity.

What will be the impact of your researches in LIFE project?

My research helps medical experts in answering two following principal questions: "what is happening in a cohort?", "what is happening around a cohort?" The former corresponds to "knowledge representation" and the latter to "data exploration".



Published so far...

Joyeux-Faure M *et al*. Continuous Positive airway Pressure reduces night-Time Blood Pressure and Heart rate in Patients With Obstructive Sleep apnea and resistant Hypertension: The rHOOSaS randomized Controlled Trial : Front. Neurol. 2018;9:318

Revol B *et al*. Ticagrelor and Central Sleep Apnea : Journal of the American College of Cardiology. 2018 ; 71(20):2378-9

Pépin JL *et al*. Adherence to Positive Airway Therapy After Switching From CPAP to ASV: A Big Data Analysis : J Clin Sleep Med. 2018 Jan 15;14(1):57-63

Amer-Yahia S *et al*. Exploration of User Groups in VEXUS : ICDE demo. 2018

Mai TS *et al*. Scalable Active Temporal Constrained Clustering : EDBT. 2018

Mai TS *et al*. Scalable Active Constrained Clustering for Temporal Data : DASFAA. 2018

Mai TS *et al*. Scalable Interactive Dynamic Graph Clustering on Multicore CPUS : TKDE. 2018

Hoghoughi N *et al*. Histone variants: essential actors in male genome programming : J Biochem. 2018 Feb 1;163(2):97-103

Khochbin S *et al*. Chromatin Structure: Composition and Function During Spermiogenesis : Encyclopedia of Reproduction. 2nd Edition

Rousseaux S *et al*. Oncogenesis by Unprogrammed Gene Activation A Critical Evaluation of Cancer Testis Genes : Encyclopedia of Cancer. 2018. 3rd Edition

Life PhD defenses...

Lisette KIKKERT,
UGA/UMC Groningen, 04/30/2018
Title: Gait characteristics as indicators of cognitive impairment in geriatric patients.
Grad School: EDISCE (UGA) and Share (UMC Groningen)
Direction: C. LAMOTH, T. HORTOBAGY (UMCG), N. VUILLERME (UGA)

Wish you a happy summer holidays !

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