Ph.D. POSITION – Université d'Orléans, France
from September 2022

Contexte

Titre: Incrementally updating of attribute graphs with incomplete information
Supervisors: Mírian Halfeld Ferrari Alves and Jacques Chabin
Research laboratory: LIFO[1] (PAMDA team), Université d'Orléans, France
Theme: Databases (constraints, updates, graph database)

Founding. Ph.D. position financed by a 3-year French doctoral contract, indexed by the evolution of civil service salaries (approximately 1700 € gross monthly for a research activity alone). Additional missions carried out within the framework of the contract give rise to a monthly salary supplement.

Scientific context. This thesis is proposed in the context of the DOING[2] action of the GDR-MADICS. DOING action (Intelligent Data) brings together researchers interested in the transformation of data into information and then into knowledge. To achieve its objective, DOING encourages collaborative work by linking different fields: databases, artificial intelligence, natural language processing, etc.

One goal of our action is to propose a system for querying, updating and maintaining databases (particularly graph databases). This system preserves the coherence with respect to a set of constraints and proposes means of interrogation and maintenance which include analysis methods.

Subject

The proposed research work should address the maintenance and evolution of databases with incomplete information, and in particular, graph databases. The objective would be to consider constraints on property graphs (or attribute graphs), which include not only integrity constraints (dependencies on values), but also constraints related to the topology of the graph (see [2, 4]).

The initial idea is to adapt and extend the update policies proposed in our previous work ([1, 3, 5]) to the context of property graphs. The work aims at establishing validation and maintenance procedures to support an intelligent query system that would encompass data analysis.

Candidate Profile

The candidate should have a master's degree, or equivalent, in computer science. In particular: good skills in database theory, logic, and programming. A good English level is also required.

French is not mandatory for candidates with a very good level of English and willing to learn French for daily life in France.

The research work is conducted at the Laboratoire d'Informatique Fondamentale d'Orléans (LIFO), in France. Students should be physically present (i.e., the Ph.D. is not achievable by remote work).

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[1]https://www.univ-orleans.fr/lifo/?lang=en
[2]https://www.univ-orleans.fr/lifo/evenements/doing/

To apply

To apply: send your applications to
(1) mirian@univ-orleans.fr and
(2) jacques.chabin@univ-orleans.fr
with a detailed curriculum vitae, your transcripts (if possible with your ranking), and two references.

The application procedure follows steps defined by our Doctoral School. We set up selection cycles (with interview periods) as the first step. We plan the **first round of interviews** at about 28 MARCH (applications needed before 25 MARS).

References

[1] M. A. Abrão, B. Bouchou, M. Halfeld Ferrari, D. Laurent, and M. A. Musicante. Incremental constraint checking for XML documents. In *XSym*, number 3186 in LNCS, pages 112–127, 2004.

[2] A. Bonifati, G. H. L. Fletcher, H. Voigt, and N. Yakovets. *Querying Graphs.* Synthesis Lectures on Data Management. Morgan & Claypool Publishers, 2018.

[3] J. Chabin, M. Halfeld Ferrari, and D. Laurent. Consistent updating of databases with marked nulls. *Knowl. Inf. Syst.*, 62(4):1571–1609, 2020.

[4] W. Fan and P. Lu. Dependencies for graphs. In *Proceedings of the 36th ACM SIGMOD-SIGACT-SIGAI Symposium on Principles of Database Systems, PODS, Chicago, USA*, pages 403–416, 2017.

[5] M. Halfeld Ferrari Alves, C. S. Hara, N. P. Kozievitch, and F. R. Uber. Urban data consistency in RDF: A case study of Curitiba transportation system. In *LADaS@VLDB*, volume 2170 of *CEUR Workshop Proceedings*, pages 33–40. CEUR-WS.org, 2018.