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Alexandre Rademaker

In April 2010, I obtained my Ph.D. at PUC-Rio with the thesis "A Proof Theory for Description Logics". During my Ph.D., I did two internships at Microsoft Research between April and July 2008 and SRI International between February and July 2009. I am a Research Scientist at IBM Research (Brazil Lab). I am also a professor at Applied Mathematics School at Getulio Vargas Foundation, teaching courses for masters and undergrad programs (Natural Language Processing, Information Retrieval, Introduction to Programming, Functional Programming, Discrete Mathematics, Logic, Type Theory, etc.) and supervising undergrad and master students. My research areas are Natural Language Processing (lexical semantics, computational semantics, and language resources), Knowledge Representation, and Proof Theory. I am especially interested in Dependent Types and Functional Programming, which focuses on implementing tools and Libraries in the Lean. My main contributions are the Portuguese Corpora in the Universal Dependencies initiative and the Portuguese Wordnet (OpenWordnet-PT). I have also worked with Formal Methods and Category Theory for Ontology alignments. I actively contribute to many open-source projects, many of which can be found on GitHub.

Education

2005–2010 **PhD**, *PUC-Rio*, Rio de Janeiro, PhD in Informatics
Thesis "A proof theory for Description Logics" under the supervision of Edward Hermann Haeusler.

2003–2005 **Master**, *Universidade Federal Fluminense*, Niterói, Master in Computer Science
Dissertation "Uma ferramenta formal para especificação e análise de arquiteturas de software" under the supervision of Christiano de Oliveira Braga.

2001–2002 **MBA**, *Fundação Getulio Vargas*, Rio de Janeiro, MBA in E-Business

1995–2001 **Bsc**, *Universidade Federal do Rio de Janeiro*, Rio de Janeiro, Bsc in Informatics
Monograph "Um simulador de leilões: simulador de leilões para experimentos científicos em Economia" under the supervision of Eber Schmitz and Viviane Torres da Silva.

Professional Experience

2012– **Research Scientist**, *IBM Research Brazil Lab*, Rio de Janeiro
I played a pivotal role in projects with Oil and Gas (O&G) companies, spearheading the design and implementation of Natural Language Processing (NLP) pipelines for information extraction from texts. Additionally, I led the architecture and implementation efforts for a real-world application involving sentiment analysis of Twitter posts during the 2013 FIFA Confederations Cup games. Furthermore, I contributed to language resource development, training NLP modules for internal systems at IBM, and collaborating seamlessly with United States and Japan teams.

2010–	**Assistant professor**, *Fundação Getulio Vargas*, Rio de Janeiro
	Teaching Programming Languages, Data Structures, and Logics for graduate and undergraduate students of Economics and Applied Mathematics programs.
2008–2012	**Lecturer**, *PUC-Rio*, Rio de Janeiro
	Teaching Logics and Formal Languages and automata theory.
2009–2009	**Internatinal Fellow**, *SRI*, Menlo Park, USA
	As an international fellow, I worked for six months at the Computer Science Laboratory under the supervision of Natarajan Shankar. We worked on a couple of projects. To cite two of them: a logical file system and the implementation of a theorem prover for ALC in PVS.
2008–2008	**Internatinal Fellow**, *Microsoft Research*, Redmond, USA
	As an international fellow, I worked in the Z3 SMT Solver group with Leonardo Moura and Nikolaj Bjorner. I have developed a test infrastructure using the Condor cluster manager, scripts, and a web interface. We have also used some machine learning techniques to optimize Z3, testing it against different combinations of parameters.
2007-2010	**Lecturer**, *Fundação Getulio Vargas*, Rio de Janeiro
	Teaching Introduction to Programming for undergraduate students of Economics.
1996–2010	**Team Manager and System Architect**, *Fundação Getulio Vargas*, Rio de Janeiro
	I managed an IT team at the Graduate School of Economics. We have the following activities: Development and maintenance of the School's information systems; development of websites; Support of research activities in economics with the development of scripts and database queries in different programming languages and systems; Management of the School's computer-based resources and helpdesk service; Given training courses on statistics and mathematical software.

Research Experience

Logics	I have developed theorem provers and written articles about logical systems and their properties. I have experience with interactive and automatic theorem provers, rewriting logics and the Maude system.
Knowledge Representation	I have been working with Semantic Web technologies like RDF, OWL, etc. I have developed ontologies and formally verified them. I have also worked with triple stores, RDF transformations, queries, and data analysis. Moreover, I have an excellent background in the formal foundations of ontology languages.
Data Integration	Integrating and ranking information from heterogeneous data sources.
Natural Language Processing	Construction of Lexical Resources and NLP application for Information Extraction and Sentiment Analysis. The OpenWordnet-PT is the most complete and cited Wordnet for Portuguese. The Portuguese Corpora in the Universal Dependencies, especially the Bosque and GSD corpora, are used by almost all syntactic parsers to train Portuguese parsing models. I have implemented tools and scripts using Common Lisp, Haskell, and Racket.

Invited Talks

2018	**Challenges for Information Extraction in the Oil and Gas Domain.**, ONTOBRAS 2018.
2018	Conferência Internacional Brasil e Argentina de Inteligência Artificial
2018	Mineração do DHBB e o desafio de resolver a prova da OAB, Congresso em Humanidades Digitais 2018.
2015	Passing in the OAB Exam. Primeiro Encontro em Computação Semântica - Semantic Traffic Diagnosis with STAR-CITY, 2015.

2012	**The openWordnet-PT Project**, Universidade Federal Fluminense.
2008	**Ontology and Context**, Facultad de Informática, Universidad Complutense de Madrid.

Computer skills

Mathematics and Statistics	R, Julia, Mathematica, MATLAB.
Programming	Lean, Haskell, Common Lisp, Prolog, Racket, Python, Java, Maude, C/C++, Bash, SQL/SPARQL, etc.
Web and Semantic Web	XML, XSLT, RDF, OWL, CMS systems, etc.
Operation Systems	Unix/Linux, Windows, MacOS.
Other	DevOps, Agile, Cloud Computing, LaTeX Version Control, CI/CD, etc

Selected Resources and Softwares

UD Portuguese Corpora	The Portuguese corpora Bosque and GSD part of the Universal Dependencies project. `http://universaldependencies.org`.
The Glosstag corpus	The annotated Princeton Wordnet Gloss Corpus. `http://github.com/own-pt/glosstag`.
OpenWordNet-PT	A complete free and opensource Brazilian Wordnet. This is an ongoing project. Available at `http://openwordnet-pt.org`.
NomLex-PT	A complete free and opensource Brazilian dictionary of nominalizations. This is an ongoing project. Available at `github.com/arademaker/nomlex-pt`.
Semantic Lattes	A set of tools and scripts to bridging the gap between the Brazilian Curriculum Lattes plataform and Semantic Web technologies. Availabe at `https://github.com/arademaker/SLattes`. The QUALIS dataset is available at `https://github.com/arademaker/qualis`.
Hemera	A theorem prover for propositional logic implementing Tableaux and Sequent Calculus. Available at `https://github.com/arademaker/hemera`.
IBGE data dictionaries	A R package with IBGE data dictionaries covering POF, PNAD and Censo datasets. Available at `https://github.com/arademaker/dicionariosIBGE`.

Professional Activities

Journal Reviewer	Journal of Automated Reasoning

Conference Reviewer (PC)	11th International Conference on Formal Engineering Methods. NAACL HLT 2019, 2nd Conference on Language, Data and Knowledge (LDK 2019), The Eighth Joint Conference on Lexical and Computational Semantics (SEM 2019), ISWC 2019, LSFA 2019, SLATE 2019, Joint Workshop on Multiword Expressions and WordNet (MWE-WN 2019-, ACL 2019-), 19th EPIA Conference on Artificial Intelligence, Ontobras 2013-2018-2019, EMNLP-IJCNLP 2019-, PROPOR 2014-2017-2019-2022, COLING 2015-, LREC 2018-, Global Wordnet Conferenes etc
Session/Area Chair	The XVI Brazilian Logic Conference (EBL), Global WordNet Conferences, COLING 2018 etc.
Workshops Organization	Logics and Ontologies for Portuguese 2011, FGV, Rio de Janeiro, Brazil; FOMI 2014; LogOnto 2014. UDW 2019.
Board of Associations	Global WordNet Associaton, Special Committee on Natural Language Processing from the Brazilian Computational Society (2017-2019).

Awards

2021	IBM Outstanding Technical Achievement Award: Research Contributions to Watson NLP Stack
2021	IBM Appreciation with Cash: Eminence & Excellence Award
2019	IBM Outstanding Technical Achievement Award. Unit Technical Award (OIA/OTAA)
2018	Best Paper Award PROPOR 2018. "Tagsets and datasets: some experiments based on the Portuguese language" Claudia Freitas, Luiza F. Trugo, Fabricio Chalub, Guilherme Paulino-Passos, and Alexandre Rademaker. This same paper also got the Manager's Choice Award in 2015.

Additional Education

2021	**Patent Issuance Badge**, *Issued by IBM*
2021	**Open Source Committer Badge**, *Issued by IBM*
2021	**Text Analytics (V2) Badge**, *Issued by IBM*
2018	**First Patent File Badge**, *Issued by IBM*
2008	**Summer School on Software Engineering**, Pernambuco, Recife, Brazil.
2012	**Hands-on Workshop on using Wordnets with Word Sense Disambiguation**, Matsue, Japan.

Patents

2015	**Real-time filtering of massive time series sets for social media trends**, *US20150347392A1*, published
2021	**Predicting user posting behavior in social media applications**, *US10902345B2*, active
2023	**Bias identification and correction in text documents**, *US11675980B2*, active

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