Elena Gutiérrez

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Work Experience

Sept. 2016 - Present

IMDEA Software Institute and Universidad Politécnica de Madrid
PhD. in Software, Systems and Computing supervised by Pierre Ganty

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Working on the language-theoretical aspects of finite and weighted automata constructions and weighted context-free grammars; minimization and other optimization algorithms for finite automata and weighted automata. Applications of weighted automata to machine learning.

May. 2019 - Nov. 2019

National Institute of Informatics in Tokyo (Japan)
6-month internship supervised by Ichiro Hasuo

Developing a genetic-algorithm-based metaheuristic (in C) to approximate the maximum weight in a weighted automaton. The goal is to use it in combination with an algorithm that translates recurrent neural networks into weighed automata to enable efficient network analysis.

2013 - 2015

IMDEA Software Institute
3-month summer internships supervised by Pierre Ganty

Exploring the use of Horn clauses for the formal verification of programs. I developed an algorithm (in Prolog) to translate non-linear logic programs into linear preserving their meaning.

Education

2016 - Present

PhD. in Software Systems and Computing
Universidad Politécnica de Madrid | Expected graduation date: September, 2020

2011 - 2016

Double Degree in Mathematics and Software Engineering (360 ECTS)
Universidad Autónoma de Madrid

Publications

2020 **Genetic Algorithm for the Weighted Maximization Problem on Weighted Automata**
E. Gutiérrez, T. Okudono, M. Waga and I. Hasuo
Published in GECCO 2020 (Genetic & Evolutionary Computation Conference)

2020 **A Quasiorder-based Perspective on Residual Automata**
P. Ganty, E. Gutiérrez and P. Valero
Published in MFCS 2020 (Mathematical Foundations of Computer Science)

2019 **A Congruence-based Perspective on Automata Minimization Algorithms**
P. Ganty, E. Gutiérrez and P. Valero
Published in MFCS 2019

2018 **The Parikh Property for Weighted Context-Free Grammars**
P. Ganty and E. Gutiérrez
Published in FSTTCS 2018 (Foundations of Software Technology & Theoretical Computer Science)

2017 **Parikh Image of Pushdown Automata**
P. Ganty and E. Gutiérrez.
Published in FCT 2017 (Fundamentals of Computation Theory)

Software

2020 Genetic algorithm for solving an optimization problem on weighted automata (implemented in C). GitHub

2016 Linearization algorithm for Horn clauses (implemented in Prolog). GitHub

Ph.D. Thesis

2020 New Perspectives on Classical Automata Constructions
Supervised by Pierre Ganty

Computer Skills

Programming Languages C, Python, Octave, Bash, Prolog, HTML, CSS | General Experience
C++, Java, JavaScript | Basic Experience

Other tools Git, LaTeX

Grants

2017 - 2021 Predoctoral Contract for PhD. Training Grant (FPI)
Provided by the Spanish Ministry of Economy, Industry and Competitiveness

Additional Information

Languages English | TOEFL iBT (Feb. 2016)
French | Basic

Volunteer Work *Soñar Despierto* Foundation
Support classes for students coming from marginalized backgrounds

Interests Running (medium: 10 km, and large: 21 km distance)