Dr. Carlos Cotrini

Nationality: Colombian
Residence: Switzerland
Email: ccarlos@inf.ethz.ch

About me I am interested in applying machine-learning and mathematical logic to develop innovative solutions in information security. I have developed methods for mining access logs and techniques to automatically check compliance of authorization policies.

Education

Dr. sc. in Information Security ETH Zürich 2014 - 2019

MSc in Computer Science ETH Zürich 2012 - 2014

BSc in Mathematics Universidad de Los Andes, Colombia 2007 - 2011

Projects

[2017-2019] Unicorn: A universal method for building policy miners

— Developed Unicorn in Python.

— Experiments proving miners built with Unicorn are competitive with the state of the art.

— Built the first policy miners for XACML and RBAC with spatio-temporal constraints.

[2015-2017] Rhapsody: A data-mining algorithm for mining authorization rules from logs

— Developed Rhapsody in Java and Python.

— Results presented at IEEE European Symposium on Security and Privacy, London, 2018.

— Experiments proving Rhapsody mines rules with a 15 % higher predictive power than other machine-learning algorithms. Other algorithms mine unnecessarily long rules or overly-permissive rules.

— Participated on meetings with clients and potential users of Rhapsody.

— Conducted a case study with logs from Amazon and a European bank, Rhapsody found rules that were at least 5 times shorter than the bank's rules.

[2016] Mining policies from big data

— Advised Simon Bienz's bachelor's final project. (Final grade: 5.5/6.0)

— Developed an algorithm using MapReduce on Hadoop using Amazon Web Services for mining authorization rules from large logs.

[2014-2015] FORBAC: An algorithm for identifying loopholes in security policies and preventing insider misuse

— Presented FORBAC at IEEE Computer Security Foundations Symposium 2015.

— Participated on meetings with clients and potential users of FORBAC.

— A case study with a European bank shows that FORBAC can analyze large amounts of security policies within seconds.

Teaching experience Assistant for the following courses:

Statistical learning theory (2018, 2019)

Data mining (2016)

Advanced machine learning (2018)

Probabilistic artificial intelligence (2014, 2017)

Information security (2015–2017),

Language skills Spanish (Native), English (TOEFL: 100/120, 2012), German (C1).

Programming languages Java, Python.