

Marc Torrellas Socastro

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Resume

Proactive, problem-solving engineer from Barcelona, who enjoys **sharing knowledge**, **learning** day by day, and **applying mathematics** to solve challenging and impacting problems. **PhD** in signal theory and communications with **strong mathematical background** and several publications. Experience applying **machine learning** models on the prediction of video quality from encrypted streaming traffic. Currently working in Cambridge, UK, applying supervised and unsupervised machine learning concepts to cyber-security problems.

Education

- 2011-2015 **PhD in Signal Theory and Communications**, *TSC group at UPC*, Barcelona, Supervised by Dr. Adrian Agustin and Dr. Josep Vidal. Obtained a PhD FPI fellowship, funded by the Spanish Government (2011). **Cum Laude**.
- 2011-2013 **M.Sc. in Information and Communication Technologies (MERIT)**, *TSC group at UPC*, Barcelona, GPA: **85.4%**.
- 2006-2011 **M.Sc. in Telecommunications Engineering**, *ETSETB, UPC*, Barcelona, Third best student (2009), sixth best student (2011). Efficiency: 1 (certified as one out of the 3.5% of students at this **outstanding** level). GPA: **80.9%**.

Experience

since 1/2017 **Data Scientist**, *Darktrace*, Cambridge, UK.

Application of machine learning concepts to solve cyber-security problems.

Key tools: Machine Learning, Python, Git, Ubuntu, TensorFlow, Keras

- Design of a real-time system to detect anomalous combinations of network indicators, allowing customers to be alerted for potential threats, and saving time to analysts.
- Interaction with a RESTful API to gather data and publish results.
- Derivation of rules based on data analytics allowing to whitelist **twice** the number of domains for e-mails containing external hyperlinks.
- Implementation of a Keras based framework to rapidly develop classification models.
- Code optimization for existing projects, in terms of comp. time, readability, memory usage.
- Design of a mapping from URL popularity ranking to a 0-100 score.
- Other projects: DNS tunneling detection, anomalous e-mails/URLs, phishing detection

1/2016 - **Data Scientist**, *Zhilabs*, Barcelona, Spain.

12/2016 Application of machine learning concepts to solve computer networking problems.

Key tools: Deep Packet Inspection, Feature Engineering, Signal Processing, Machine Learning, R, Python, Android, Bash, Selenium, Subversion, Supervision of junior staff.

- Design of an automated system for capturing browser and mobile traffic captures from streaming platforms, e.g. Youtube. OOP-based integration of modules. Design of a system using those samples to predict video resolution and bitrate. Definition of requirements and adaptation of procedures with devops team to work in real-time.
- Supervision two new hires implementing/updating features to the automation system.
- Design of validation rules to reduce computational time and invalid solutions for an existing geolocation system.

- 9/2011- **Researcher**, *UPC*, Barcelona, Spain.
- 12/2015 PhD in the Signal Processing and Communications group. Analysis of the fundamental limits of information-theoretic MIMO systems and its applications.
Key tools: Information Theory, Signal Processing, Linear Algebra, Matlab, UX design, Latex, Adobe Illustrator, Communication Skills, Team and Tasks management.
- Design and simulation of transmission strategies for wireless multi-user multi-antenna networks, outperforming the state-of-the-art in terms of efficiency and complexity. Publication and presentation of peer-reviewed research papers in journals and several international conferences. See <https://tinyurl.com/yd5zoeto> for the full list.
 - Contributions to European Commission Projects. Supervision of a group of undergraduate students for the development of a user-friendly network planning tool for rural environments.
- 2009-2013 **Teaching experience in Academia**, *UPC*, Barcelona, Spain.
- Teaching assistant of Machine Learning course. Lectures of lab and theory sessions. Contribution to the design of new lab sessions.
 - Selected as a top student to design and code projects for *Introduction to coding* lab sessions.
- 2009-2011 **Researcher**, *UPC*, Barcelona, Spain.
Foundations of Master and PhD Thesis.
- 2009-2015 **Private tutor for engineering degrees students**, Barcelona, Spain.
Maths, Logic, Speech processing, Computer vision, Networking, Statistics, Probability, Matlab.

Professional Profile

- **Knowledge Areas:** Linear Algebra, Statistics, Image/Speech/Signal Processing, Machine Learning
- **Skills:** analytical skills, prototyping and programming of algorithms, oral and written communication, team player and supervisor, text synthesis and organisation
- **Coding:** Python, R, Matlab, C, Java, Bash, Android, C++, SQL
- **Tools and OS:** Git, Latex, Adobe Illustrator, Windows, Mac OS, Ubuntu, RPi
- **Languages:** Catalan, Spanish, English

Coursework

- 2013-2017 **Several MOOC-based courses (Coursera, Codecademy, SoloLearn).**
Algorithms, Android, Machine learning, Deep Learning, Text mining, Java, C++, SQL

Hobbies and Others

- Scouts monitor for 3 years. Planning activities for youths on a 3-member team. Secretary, Communications responsible, and **member of the Board**.
- Education and Maths. Applications of linear algebra.
- Technology, machine learning, mobiles. Developed an Android videogame.
- Music, guitar, singing in a choir, sports.

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