Profile

My education

- 2012 M.Sc. in Telecommunication Engineering (thesis on audio fingerprinting)
- 2016 Ph.D. in Computational Intelligence

My tools and skills

- Software
  - Software architecture and development
  - Build systems
  - Unit testing and continuous integration
  - Embedded (mostly bare metal)
  - Favorite languages
    - C (simple rules, easy to establish coding standards, agnostic)
    - Python (fast prototyping, huge community)
- Linux OS, Yocto, Kernel (only config and building)
- Computer networks and protocols
- Electronics, basics (i.e., not afraid to grab a scope to debug inter-ic communications)

My scientific background

- Statistics
- Information theory
- Signal processing
- Mathematical optimization

Research Activity (2011 - 2016)

I've worked as a research fellow, Ph.D. student, and finally post-doc researcher at the DSP Labs, DITEN, University of Genoa

- Application layer joint source/channel coding
  - Realized Android apps performing adaptive source/channel encoded video streams
  - Collaboration with Selex ES projects
  - Co-authored scientific publications
- TV channel detection via audio fingerpritning
  - C implementation of live TV audio stream fingerprint computation and matching
  - Collaboration with Telecom Italia
  - Ported fingerprint algorithm to iOS
  - Research and optimization of system parameters
  - Co-authored scientific publications
- Brain stroke detection via microwave imaging
  - State of the art survey
  - Implementation of glue code for data manipulation
  - Preliminary investigation on neural network detection (Google Tensorflow)
  - Co-authored scientific publications

Industrial Experience (2016 onwards)

My experience working in industry

- Akya, 2016-2017
  - DSP Software Engineer
  - Mostly software development
  - Some verification / visualization tools built
- 5G Innovation Center, 2017-2018
  - Senior Software Engineer
  - Maintained and developed the core network's codebase
  - Some experiments (moving GTP tunneling to existing kernel space libraries for performance, QHM)
- Cambridge Touch Technologies, 2018-ongoing
  - Senior DSP Engineer
  - Several diagnostics and signal integrity tools
  - Rearchitectured software repos, migrated to self hosted GIT server, designed CI infrastructure and pipelines for automatic regression test and build

Quick Http Messages, developed at 5GIC, 2018

- HTTP over UDP
- playground for SoA (RESTful API services)
- core messaging implemented
- initial version of automatic generator (from OpenAPI yml files)
- available at `https://github.com/giuliol/quick-http-messages`

Touchscreen analyser. Developed at CTT, 2019

- Diagnosing manifacturing defects of pressure sensing enabled touch panels
- OTS VNA, custom serial operated switch board
- Impedance spectroscopy to find anomalies
- My contribution
  - Designed software and data architecture
  - Implemented most of the software
  - Designed data analysis algorithm and metrics to highlight anomalies
  - Automatic report generation
- prototype output validated against known dataset, flagged previously unknown defects.
- second iteration in design

Signal Injector for Pressure Sensors. Developed at CTT, 2019

- Inject signal into amplifier boards, to isolate analog frontend and downstream
- Maximally usable - a self contained little box, with easy to use web-app to control it
- My contribution
  - Contributed to requirements specifications
  - Designed functional architecture
  - Designed and implemented drivers, software and communication protocols
  - Integration (as slave component) with other existing diagnostic tools
- Very positive feedback, currently in use by the hardware team
- Second iteration under development

Human touch interaction model, Developed at CTT, ongoing

- Provide mathematical models for touch interactions (e.g., force profile as a function of time)
- Identify assumptions and applicability
- Gather experimental data
- Fit mathematical curves
- My contribution
  - Designed and realized acquisition tool (arduino + strain gauge + haptics)
  - Implemented firmware and software to “gamify” the experiment
  - Designed mathematical curves to fit the “average” force profiles
- Test machines are able to simulate realistic touches using parametrised mathematical models
- Design choices can now be strongly backed up by the study
- Experiment platform is generic and extensible, second study (effects of processing delay) has been commissioned and ongoing