ANDREA PINTO

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Country of residence: USA, **Country of origin:** Italy

EDUCATION

Saint Louis University, St. Louis, MO *Aug 2021 - current*
Ph.D. Student in Computer Engineering **GPA 4.0/4.0**
Electrical and Computer Engineering (ECE)

University of Naples Federico II, Naples, Italy *Oct 2020*
B.S & M.S in Computer Engineering **GPA 3.95/4.0**

Department of Electrical Engineering and Information Technology
M.S. Thesis Title: **APIs for the Internet of Things: Solutions for Semantic Interoperability in Heterogeneous Ecosystems.**

WORK EXPERIENCE

IMDEA Networks Institute, Madrid, Spain *May 2022-Aug 2022*
- ***Visiting Ph.D. Student***
- ***Research Areas*: 5g localization, mobile networking, edge computing;**

Saint Louis University, St. Louis, MO, USA *Aug 2021-current*
- ***Graduate Research Assistant***
- ***Research Areas*: Computer Network Management, Network Virtualization, Distributed Learning;**

Ericsson R&D, Naples, Italy *Jan 2021-Jul 2021*
- ***Cloud Engineer***
- **Sofware engineer and DevOps. Experience with testing, GoLang, and programming with microservice-based architectures such as Docker and Kubernetes.**

Ericsson Research, Helsinki, Finland *Feb 2020-Aug 2020*
- ***Research Intern***
- **Design of a protocol for heterogeneous IoT interoperability and implementation over a robotic arm.**
- **Acquired skills: GrapQL, SDF, NodeJS, GRPC.**

PERSONAL SKILLS AND COMPETENCES

Programming: Python, Java, C/C++, Javascript, GoLang.
Other Tools: SDN, OpenFlow, git, MATLAB, Linux, Docker, Kubernetes, IoT, GraphQ, Tensorflow, FPGA, MySQL.

RELEVANT ACADEMIC COURSES

Computer Networks, Computer Security, Software-Hardware Co-design, Internet network, Telematics Applications, Analysis and Performance of the Internet, Protocols For Mobile Networks, Computer Systems Engineering, Algorithm and Data Structures.

CURRENT RESEARCH ACTIVITIES

5G Core Localization

Despite the large attention achieved by 5G localization in standardization bodies, the integration of 5G network function modules designed for localization lacks experimental work. Assessing the performance of these modules is essential to offering location services. In this work, we present our implementation and evaluation of the 5G Location Management Function (LMF), the key network function in the 5G core for localization services. Our implementation complies with the 3GPP standard and OpenAirInterface, the currently most advanced framework that implements a full 5G-New Radio stack. Our implementation shows that we can extend the functionality of OpenAirInterface, enabling location services. Finally, we demonstrate that the performances of our implementation satisfy the 5G Key Performance Indicators required by 3GPP for localization.

Privacy Aware Distributed Learning

Mobile phones, wearable devices, and other sensors produce every day a large amount of distributed and sensitive data. Classical machine learning approaches process these large data-sets usually on a single machine, training complex models to obtain useful predictions. To better preserve user and data privacy and at the same time guarantee high performance, distributed machine learning techniques such as Federated and Split Learning have been recently proposed. Both of these distributed learning architectures have merits but also drawbacks. In this work, we are analyzing such trade-offs and proposing new hybrid Federated Split Learning architectures, to combine the benefits of both in terms of efficiency and privacy.

Performant Programmable Networks with FPGA and in-kernel Virtual Machines

Programmable data planes allow network programmers to define their own efficient packet filtering algorithms. This offers great flexibility for network customization, for next generation wireless networks, edge computing, or even data center networks. New programmable data plane techniques have emerged to achieve such flexibility, either as new abstractions, or as programming language e.g., the Programming Protocol-independent Packet Processor (P4). In this research project, we explore alternative programming data plane solutions using hardware-acceleration techniques such as classical Field-Programmable Gate Array (FPGA) and more modern in-kernel network virtualization techniques such as the Extended Berkeley Packet Filtering (eBPF).