CURRICULUM VITÆ of Luís Neto

+351919882990 lcsmneto@gmail.com https://paginas.fe.up.pt/~lcneto

1. EDUCATION

[2015 – Currently] - Ph.D. Candiate, Doctoral Program in Informatics Engineering, Faculdade de Engenharia da Universidade do Porto, Porto, Portugal
Specialization: Component Based Software Engineering, Linux Kernel, Embedded Systems, Reconfigurable Computing

[2014] - MSc., Master's Degree in Network and Information Systems Engineering, Faculdade de Ciências da Universidade do Porto, Porto, Portugal
Specialization: Computer Networks, Distributed and Embedded Systems

[2011] - B.A, Computer Science, Faculdade de Ciências da Universidade do Porto, Porto, Portugal
Predominant Scientific Areas: Computer Science

2. PROFESSIONAL POSITIONS

[November 2017 – Present] - Researcher, Digital and Intelligent Industry Lab (DIGI2), Faculdade de Engenharia da Universidade do Porto

[February 2020 – Jully 2021] - Invited Assistant Professor (Information Systems), Faculdade de Engenharia da Universidade do Porto

[May 2014 – November 2017] - Researcher, Institute for Systems and Robotics (ISR), Faculdade de Engenharia da Universidade do Porto

[2013] - Software Engineer, Applications on Demand (Apond), Porto, Portugal

3. RESEARCH PROJECTS

[June 2023 - Currently] – Advance4i, Portugal PRR program.
Currently involved in the SW/HW development of low-cost PLC, based on a Texas Instruments TM4C1294NCPDTI3R. Developing the digital in/out (GPIO,PWM) and analog in (ADC) interfaces. Target is to combine the IEEE 1451 standard for automatic sensor and actuator integration with an IEC 61499 RTE.

[January 2021 – June 2023] – SMARTCUT, Portugal 2020 Program.
SMARTCUT was an R&D project for the development of a remote maintenance, diagnostic and simulation solution for forestry machines. I was involved in the creation of a remote diagnostic environment, consisting of an IEC 61499 RTE, developed for my Ph.D., running locally in the machine and interfacing with its controller, sensors and actuators via CAN

J1939. The RTE was installed in a Raspberry Pi based gateway with 4G interface. A remote server with pre-built pipelines was able to trigger application execution in the machines, allowing for data collection and analysis (DTW, K-means, Correlation).
In the same project, a mechatronic platform was used to train operators with a VR simulation. I was responsible for the development of a kinematics model of the platform, whose control pipeline was running on the IEC 61499 RTE, and the trigonometric functions were accelerated in an Xilinx Zynq UltraScale+ FPGA (Avnet Ultra 96-V2).

[January 2020 – June 2022] – PRODUTECH-4S&C (Production Technologies Industry towards the establishment of a circular and sustainable manufacturing industry), EIT Manufacturing, Portugal 2020 Program.
Development of an Edge data acquisition and pre-processing application, based on IEC 61499. Combining HTTP for communication, MongoDB for time-series storage, Python *pandas* and *sci-kit learn* for data pre-processing.

[December 2021 – March 2022] – FactoRIS (Learning Factories for Digital Transformation of SMEs), Supported by the European Institute of Innovation and Technology (EIT).
Supervision and involvement in the refurbishment and retrofitting processes, involving small scale Festo MPS learning factories. Development of digital learning content for the topics of system integration, zero defects and predictive maintenance.

[October 2017 – December 2020] - PRODUTECH-SIF (Solutions for the Industry of the Future), Portuguese Research Project, Portugal 2020 Program.
Development of a Linux Kernel based RTE capable of integrating software components written in different programming languages. This project was the foundation of my Ph.D. work. The result of this project resulted in distributed (EtherCAT, ModBus, Ethernet) data acquisition system capable of sampling and pre-processing (alarms, control charts, data reduction) 36 data points from 4 machines in the shop floor.

[May 2015 – August 2017] - Health Monitoring and Life-Long Capability Management for SELf-SUStaining Manufacturing Systems (SelSus), European Research Project, 7th Framework Program.
Developed a Java OSGi based RTE capable of easing the process of building industrial monitoring applications. Sensor drivers, information parsers, Bayesian models and network clients were abstracted as graphical models that could be combined in a graph to build monitoring and processing applications. The final project consisted in the application of this solution to a machine at Ford Dunton Technical Centre, England.
[May 2014 – May 2015] - Intelligent Reconfigurable Machines for Smart Plug&Produce Production (IRAMP3), European Research Project, 7th Framework Program.
Collaboration in the development of a multi-agent system for manufacturing, C# and Java

agents, task coordination encoded in a custom XML model, UPnP protocol used to enable agent services.

4. CONFERENCE PUBLICATIONS

- Silva, Ricardo; Neto, Luís; Gonçalves, Gil. "Remote fault detection of heavy-duty machinery". The 25th IEEE International Conference on Industrial Technology, March 2024. Under review.
- Machado, Rui; Rodrigues, Ricardo; Neto, Luís; Barbosa, Luís; Bessa, Maximino; Melo, Miguel. "Immersive Virtual Reality Training Platforms powered by Digital Twin Technologies: the SMARTCUT Case Study". International Conference on Graphics and Interaction, November 2023. Accepted.
- Torres, Pedro M. B.; Spencer, Geoffrey; Neto, Luis; Gonçalves, Gil; Dionísio, Rogério. "Industrial Digitalization Solutions for Precision Forestry Towards Forestry 4.0". In Innovations in Smart Cities Applications Volume 6, 79-86. Springer International Publishing, 2023: https://doi.org/10.1007/978-3-030-79168-1_20.
- Pinheiro, João; Oliveira, Diogo; Neto, Luís; Gonçalves, Gil. "Introducing students to zero defects, condition monitoring and system integration using a refurbished learning factory". *Proceedings of the 12th Conference on Learning Factories (CLF 2022)* (2022): http://dx.doi.org/10.2139/ssrn.4074914.
- Juhás, Martin; Gulan, Martin; Neto, Luís; Gonçalves, Gil; Komenda, Titanilla; Pickel, Laurenz; Zhou, Shiyang; et al. "FactoRIS – A Learning Factories Based Education Framework to Support Digital Transformation of Manufacturing SMEs". *Proceedings of the 12th Conference on Learning Factories (CLF 2022)* (2022): http://dx.doi.org/10.2139/ssrn.4071842.
- Torres, Pedro; Dionísio, Rogério; Malhao, Sergio; Neto, Luis; Gil Manuel Magalhães de Andrade Gonçalves. Autor correspondente: TORRES, PEDRO. "Machinery Retrofiting for Industry 4.0". Trabalho apresentado em International Conference Innovation in Engineering, Guimarães, 2021.
- Neto, Luis. "On the development of a component model for the realization of Industry 4.0". Trabalho apresentado em *IEEE International Conference on Industrial Cyber-Physical Systems (ICPS)*, 2020.
- Torres, Pedro; Dionisio, Rogerio; Malhao, Sergio; Neto, Luis; Ferreira, Ricardo; Gouveia, Helena; Castro, Helder. "Cyber-Physical Production Systems supported by Intelligent Devices (SmartBoxes) for Industrial Processes Digitalization". 2019: 10.1109/rtsi.2019.8895553.
- Neto, Luis. "An Industry 4.0 Self Description Information Model for Software Components contained in the Administration Shell". Trabalho apresentado em *Eighth International Conference on Intelligent Systems and Applications (INTELLI)*, 2019.
- Neto, Luis. "Component Models for Embedded Systems in Industrial Cyber-Physical Systems". Trabalho apresentado em *The Seventh International Conference on Intelligent Systems and Applications (INTELLI)*, 2018.

- Neto, Luis; Madsen, Anders L.; Sondberg-Jeppesen, Nicolaj; Silva, Ricardo; Reis, Joao; McIntyre, Peter; Goncalves, Gil. "A component framework as an enabler for industrial cyber physical systems". 2018: 10.1109/icphys.2018.8387682.
- Neto, Luis; Reis, Joao; Silva, Ricardo; Goncalves, Gil. "Sensor SelComp, a smart component for the industrial sensor cloud of the future". 2017: 10.1109/icit.2017.7915543.
- Silva, Ricardo; Reis, Joao; Neto, Luis; Goncalves, Gil. "Universal parser for wireless sensor networks in industrial cyber physical production systems". 2017: 10.1109/indin.2017.8104845.
- Neto, Luis. "Parameter Learning Algorithms for Continuous Model Improvement Using Operational Data". Trabalho apresentado em *Symbolic and Quantitative Approaches to Reasoning with Uncertainty. ECSQARU 2017.*, 2017.
- Neto, Luis. "Optimizing Network Calls by Minimizing Variance in Data Availability Times". Trabalho apresentado em *International Symposium on Intelligent Manufacturing Environments (InManEnt)*, *Barcelona*, 2016.
- Neto, Luis; Reis, Joao; Guimaraes, Diana; Goncalves, Gil. "Sensor cloud: SmartComponent framework for reconfigurable diagnostics in intelligent manufacturing environments". 2015: 10.1109/indin.2015.7281991.

5. JOURNAL PUBLICATIONS

- Neto, Luís; Gonçalves, Gil. "A highly reconfigurable IEC 61499 runtime environment." IEEE Open Journal of the Industrial Electronics Society, 2024. Under review.
- Pinheiro, João; Oliveira, Diogo; Neto, Luis; Pinto, Vítor H.; Gonçalves, Gil. "Development of an IEEE 1451 Plug-and-Play Module for Smart Transducers in Industrial Environments". *Sensors* 22 20 (2022): 7880. http://dx.doi.org/10.3390/s22207880.
- Oliveira, Diogo; Pinheiro, João; Neto, Luis; Pinto, Vítor H.; Gonçalves, Gil. "A Plug-and-Play Solution for Smart Transducers in Industrial Applications Based on IEEE 1451 and IEC 61499 Standards". *Sensors* 22 19 (2022): 7694. http://dx.doi.org/10.3390/s22197694.
- Neto, Luis. "A Constraint Programming Approach to Optimize Network Calls by Minimizing Variance in Data Availability Times", International Journal on Advances in Telecommunications, 2017.

6. MSc. and B.A supervisions

1. **MSc Co-Supervisor** of João Maria Oliveira Torres Pinheiro, Faculdade de Engenharia da Universidade do Porto, Porto, Portugal. Topic: Adopting IEEE1451 for the development of a plug&play module for smart sensors in industrial environments. [Finished October 2022]

2. **MSc Co-Supervisor** of Diogo João Costa de Oliveira, Faculdade de Engenharia da Universidade do Porto, Porto, Portugal. Topic: Development of an edge device with plug&play capabilities for smart sensors in industrial environments. [Finished October 2022]

3. **B.A Co-Supervisor** of Rodrigo Manuel de Mansilha Flaminio Ribeiro, Faculdade de Ciências da Universidade do Porto, Porto, Portugal. Topic: Adopting DDS to extend SmartComponents in IIoT environments. [Finished June 2017]

4. **MSc Co-Supervisor** of Ana Sofia de Oliveira Ferreira, Faculdade de Ciências da Universidade do Porto, Porto, Portugal. Topic: A Sensor Cloud Enabler for the Factory of the Future. [Finished Jully 2015]

7. PRESENTATIONS

- Presentation of several publications in international conferences.
- Presentation of research activities and results of the PRODUTECH-SIF Portuguese research project for an event about Industry 4.0 at EMAF (Feira Internacional de Máquinas e Equipamentos para a Indústria). [2019]
- Development and presentation of a real-time failure detection system to members of the European Comission, during the final demonstration of the SelSus European research project at Ford Dunton Technical Centre, England. [2017]

8. AWARDS AND HONORS

- Best Paper Award - The Eighth International Conference on Intelligent Systems and Applications (INTELLI 2019), for the paper: "An Industry 4.0 Self-Description Information Model for Software Components Contained in the Administration Shell". [2019]
- Best Paper Award - The International Symposium on Intelligent Manufacturing Environments (InManEnv 2017), for the paper: "Optimizing Network Calls by Minimizing Variance in Data Availability Times". [2017]
- 1st Runner Up in the European Junior Achievement JA-YE Entrepreneurship competition. [2012]
- 1st Classified in the Portuguese Junior Achievement JA-YE Entrepreneurship competition. [2011]

9. SHORT DURATION COURSES

1. **Automotive Electronics,** Faculdade de Engenharia da Universidade do Porto, 6 ECTS [September 2014 – January 2015].

2. **Signal Processing and Aquisition,** Faculdade de Engenharia da Universidade do Porto, 6 ECTS [January 2015 – June 2015].
3. **Miracles of Human Language: An Introduction to Linguistics,** Universiteit Leiden & Meertens instituut (KNAW) @ Coursera [June 2016]
4. **Introduction to FPGA Design for Embedded Systems,** by University of Colorado Boulder @Coursera [January 2018]
5. **IEEE CASS "Seasonal School in CAS4IIoT",** Faculty of Sciences and Technology of NOVA University of Lisbon (FCT NOVA) [29-30 November 2018].
6. **Sensors and Sensor Circuit Design,** by University of Colorado Boulder @ Coursera [May 2019]

10. TECHNICAL SKILLS

- **Programming Languages:** C, Python, Java, PHP, C++, JavaScript, Matlab, Prolog.
- **Experience with embedded platforms and microcontrollers:** Texas CompactRIO 9040, AVNET Ultra96-V2, Texas TM4C, STM32, NodeMCU, ZedBoard, SunSPOT, Libelium Waspmote V1.2, MTM-CM5000 (TelosB generic), BeagleBone Black, RaspberryPI, and Arduino.
- **Industrial Communication Protocols:** CAN, EtherCAT, ModBUS, OPC UA.
- **Internet Communication Protocols:** HTTP, ZeroMQ, UPnP, MQTT.
- **System Communication Protocols:** UART, SPI, I2C.
- **Database Technologies:** MySQL, PostgresSQL, Miscrosoft Access.
- **Industrial Software Tools:** IEC 61499 Function Blocks, LabVIEW, Simulink, FlexSim.
- **Industrial PLC and Controllers:** SIEMENS Simatic and NI CompactRIO.
- **CAD and 3D Modelling:** Fusion 360, SolidWorks, FreeCAD and Altium.
- **3D Printing:** Ultimaker 2+, Creality Ender3, Cura Slicer.
- **Operating systems**: Linux, Linux-RT and Microsoft Windows.

Porto, 12th of December 2023
Luís Neto