

Xuan Sang LE | Curriculum Vitae

🏠 Douai, France

📞 [contact me] ✉ [xsang.le AT gmail DOT com] 🌐 <https://lxsang.me>

“ Currently, PhD and research engineer in computer science, I'm particularly interested in (1) Distributed, network system and modern web technologies, (2) system/middleware design and development, IoT and sensor network , (3) application of Object Oriented Design methodology on embedded system, object-oriented based software architectures, languages and development of tools/platforms. ”

Education

- 📌 **PhD in computer science** *Brest, France*
Université de Bretagne Occidentale *2014-2017*
- 📌 **Master in computer science** *La Rochelle, France*
Université de La Rochelle *2011-2013*
- 📌 **Engineer in computer science** *Danang, Vietnam*
Polytechnic School of Danang *2004-2009*

Previous Employment

- 📌 **INRIA Lille Nord Europe** *2018-2018*
3 months, research engineer (7/2018-9/2018)
Developing a robotic application in Pharo (Smalltalk) language in cooperating with the ROS middleware
- 📌 **IMT Lille-Douai** *Douai, France*
1 year, Post-Doc *2017-2018*
Working as a research engineer in the research of multi robot exploration of unknown environment using Robotic Operating System (ROS).
- 📌 **ENSTA Bretagne and IMT-Lille Douai** *Douai and Brest, France*
3 year, PhD *2014-2017*
Working as researcher, partition in the research of the application of object-oriented design methodology in embedded systems.
- 📌 **Danang University of Architecture** *Danang, Vietnam*
2 year, teaching *2010-2011*
Work as a tutor, participation in the teaching of basic computer science disciplines.
- 📌 **IFI JSC.** *Danang, Vietnam*
Developer *2009-2010*
Developer: participation in the design and development of an online document and CV management/archiving platform using modern web technologies.

Projects

Personal projects

- 📌 **Ant-HTTP**
Lightweight extensible web server for (embedded) linux system
Keywords : server development, web server, embedded linux
Skills : C, TCP/IP, HTTP, HTTPs, SSL, Open SSL, Web socket, Sqlite 3

A lightweight and portable HTTP/HTTPs web server written in C standard: It can be configurable to work well on embedded Linux for server application. It supports SSL via open SSL, database via Sqlite 3 and web socket. It is also extensible via a extension mechanism that allows to easily extend the server capability.
All the content on my website (<https://lxsang.me>) is powered by this server (with Lua). For more information:
<https://github.com/lxsang/ant-http>
<https://github.com/lxsang/ant-plugins>
 - 📌 **AntOS**
A web desktop for accessing embedded linux or linux server from browser
Keywords: web OS, web technologies, Web API, UI design
Skills: Javascript, CSS, HTML, Coffee script, Web design
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Server or Embedded Linux are often headless, so accessing the resource on these systems is not always obvious. The aim of this project is to develop a client core API that provides a desktop like experience to remotely access resource on the server using web technologies. The API defines the core UI, system calls (to server), Virtual File system, virtual database and the necessary libraries for easing the development of applications. Applications can be developed with coffee/javascript/css without the need of a server side script.

Dynamic contents on my website are created using an AntOS's application. A demo of the web desktop is available on my page: <https://os.lxsang.me/>. For more information: <https://github.com/lxsang/antos>

STRos

Minimal ROS compatible client for small embeded systems (support Linux)

Keywords: Robotic Operating System (ROS), client API, ROS protocol

Skills: C, XMLRPC, TCP/IP, ROS

ROS is a huge system for robotic applications, however using ROS on small embedded systems is not always feasible due to the resources constrains on these system. This project aim at providing a very bare-bone and standalone ROS client API for such systems. It allows embedded systems to act as a ROS node and communicate with the ROS master using ROS protocol via the network.

For more information: <https://github.com/lxsang/STRos>

SmallIoT

A no operating system (NOS) Smalltalk VM for Raspberry Pi

Keywords: Smalltalk VM, language VM, NOS, Raspberry Pi, embedded system

Skills: VM development, C, ASM, Smalltalk, embedded development, Newlib

This is a hobby project when i studied about a Smalltalk VM for embedded system. SmallIoT is a barebone VM that run on the Raspberry Pi without any OS installed. The VM is loaded when the Pi boot, then it load its Smalltalk image from the SD Card. The communication with the VM on the Pi is established via UART line using a terminal, in which user can directly type Smalltalk code to program and control the Pi in real-time

For more information: <https://github.com/lxsang/smallIoT>

And many more...

Many of my personal or work projects are hosted on my Github page at: <https://github.com/lxsang>

Work projects

Multi-robots autonomous exploration of un known environment in ROS

IMT Lille-Douai, France (2017-7/2018)

Post-Doc, research project

Keywords: ROS, distributed system, middleware, robotic, SLAM, autonomous exploration, multi-agent

Skills: ROS, C, C++, Python, PharOS (ROS binding for Pharo Smalltak), TCP/IP, linux

The first part of this work is to set up an evaluation stack to evaluate different SLAM algorithms available in Robots Operating System (ROS) in the context of autonomous exploration of unknown environment, then select a good candidate (SLAM) for such application. The second part is to extend the selected algorithm to the context of multi-robots, in which robots are able to collaborate between them to explore and map the environment why maintaining the independent operation of each robot.

More information on the project: <https://github.com/lxsang/ROS-packages>

Software/FPGA Co-design for Edge-computing: Promoting Object-oriented Design

PhD, research project

IMT Lille-Douai and ENSTA Bretagne, France (2014-2017)

Keywords: IoT, FPGA, edge-computing, middleware, Sensor network, Object Oriented, modelling, HW design, SW/HW co-design, embeded system

Skills: VHDL, middleware architecture, C, C++, Smalltalk, UML, FPGA, ARM, embeded linux, network programming, language virtual machine

Edge-centric computing for IoT requires sensors nodes with more software capability and processing power while being constrained by energy consumption. Hybrid hardware systems consisting of FPGA and processor (ARM) offer a good trade-off for this requirement. Applications design for such hybrid network/software/hardware (SW/HW) system remains always a challenged task. Our motivation is to propose a homogeneous design methodology and environment for such system. We study the application of a modern design methodology, in particular object-oriented design (OOD), to the field of embedded systems. We aim at using OOD to develop a homogeneous design environment for edge-centric systems. Our approach addresses three design concerns: (1) *HW design, where object-oriented principles and design patterns are used to improve the reusability, adaptability, and extensibility of the HW system.* (2) *HW / SW co-design, for which we propose to use OOD to abstract the SW/HW integration and the communication that encourages the system modularity and flexibility.* (3) *middleware design for Edge Computing which rely on a centralized development environment for distributed applications, while the middleware facilitates the integration of the peripheral nodes in the network, and allows automatic remote reconfiguration both SW and HW (FPGA).*

Optimization by parallelization of the 3d elastic Free Form Deformation algorithm

Master 2, research project

DSV/I2BM/MIRCen - CEA Fontenay-aux-Roses, France (2012)

Keyword: Bioinformatic, 3D image registration, image processing, Computer vision

Skills: Python, C/C++, openCV, linux, teamwork

Working in bioinformatic domain, my work addresses an optimization and parallelisation solution for an elastic 3D Freeform Deformation (FFD) algorithm implemented at MIRCen. The goal is to optimize the 3D mapping of biomedical multimodal mono and inter-subject data whose volume is increasing exponentially. The work focuses mainly on the implementation of a parameters quantitative evaluation and optimization process for an existing implementation of the algorithm.

■ **Interfacing the ArcRisk earthquake simulator and the GAMA platform**

Master 1, research project

Institut Francophone International and Vietnam Geophysical Institute (2011)

Keywords: Simulation, GIS, GAMA, Multi-agents system, modelling

Skills: Java, GAML, GIS

Participation in the research of modeling and simulation of complex systems, a collaboration project between IFI and Vietnam Geophysical Institute: the objective is to set up a simulation model to evaluate an earthquake rescue protocol using ArcRisk's geographic data (GIS) and the GAMA modeling and simulation platform

■ **Digital Asset Management System**

HD2NET, Paris – France

Engineering, Industrial project (internship)

Skills: Web technologies, PHP, HTML, CSS, Javascript, MySQL, linux, C, web server development

Working as developer, participation in the "Digital Asset Management System" (DAMS) project, a software project for managing multi-media files online, in a collaboration between HD2NET, EISTI University and EPITECH University, Paris.

Technical skills

■ **Programming skills**

C, C++, Pharo (Smalltalk), Python, Ruby, Java, PHP, Lua, Shell script, VHDL, HTML, Javascript, CSS, Coffee script Also basic ability with: Assembly, Matlab, nodejs, RESTful web services.

■ **Softwares**

Latex, Libre Office, SVN, git, KiCAD

■ **Embedded and robotic system**

Arduino, Raspberry Pi, FPGA, ROS, sensor network, distributed and IoT system

■ **Other**

Autonomous, team work skill, multidisciplinary domains flexibility, good research and learning spirit, can write well organised and structured reports and publications

Languages

■ **French**

fluent in writing and speaking

■ **English**

fluent in writing, and good enough for speaking

■ **Vietnamese**

native language

Awards

■ **ESUG 2018: Innovation Technology Awards 15th Edition**

3st Innovation Technology Awards for PhaROS, a ROS based client for Pharo

Authors: Luc Fabresse, Pablo Estefo, Xuan Sang Le, Noury Bouraqadi

<https://esug.github.io/2018-Conference/awardsSubmissions2018.html>



■ **IWST 2015 Best paper**

Award for the paper 'A meta model supporting both hardware and smalltalk-based execution of fpga circuits'.

IWST BEST PAPER AWARD BRESCIA 2015



A Meta Model Supporting Both Hardware and Smalltalk-Based Execution of FPGA Circuits

Xuan Sang Le, Loïc Lagadec, Luc Fabresse, Jannik Laval and Noury Bouraqadi

INTERNATIONAL WORKSHOP ON SMALLTALK TECHNOLOGIES 2015

Activities

■ ICIRA 2018 PC member

Program committee member for The 11th International Conference on Intelligent Robotics and Applications, Newcastle, Australia, August 9-11, 2018

■ IWST 2017 PC member

Program committee member for the International Workshop on Smalltalk Technologies 2017, Maribor, Slovenia; September August 5th, 2017

■ ReConFig 2016 PC member

Program committee member for International Conference on ReConFigurable Computing and FPGAs, 2016

Publications

Xuan Sang LE, Luc Fabresse, Jannik Laval, Jean-Christophe Le Lann, Loïc Lagadec, and Noury Bouraqadi. Dynamic distributed programming on reconfigurable ip-based smart sensor networks. *Presented as poster at 11ème Colloque du GDR SoC-SiP, France, 2016.*

Xuan Sang LE, Luc Fabresse, Jannik Laval, Jean-Christophe Le Lann, Loïc Lagadec, and Noury Bouraqadi. Speeding Up Robot Control Software Through Seamless Integration With FPGA. *In SHARC '16: 11th National Conference on Software and Hardware Architectures for Robots Control, Brest, France, 2016.*

Xuan Sang LE, Loïc Lagadec, Luc Fabresse, Jannik Laval, and Noury Bouraqadi. From Smalltalk to Silicon: Towards a methodology to turn Smalltalk code into FPGA. *In IWST 14, Cambridge, United Kingdom, August 2014.*

Xuan Sang LE, Loïc Lagadec, Luc Fabresse, Jannik Laval, and Noury Bouraqadi. A meta model supporting both hardware and smalltalk-based execution of fpga circuits. *IWST '15, pages 6:1–6:14, 2015.*

Xuan Sang LE, Jean-Christophe Le Lann, Loïc Lagadec, Luc Fabresse, Noury Bouraqadi, and Jannik Laval. Cardin: An agile environment for edge computing on reconfigurable sensor networks. *In the proceedings of The 2016 International Conference on Computational Science and Computational Intelligence (CSCI'16), Las Vegas, Nevada, USA, 2016.*

Xuan Sang LE, Luc Fabresse, Noury Bouraqadi, & Guillaume Lozenguez. (2018). Evaluation of Out-of-the-box ROS 2D SLAMs for Autonomous Exploration of Unknown Indoor Environments. *In The 11th International Conference on Intelligent Robotics and Applications. ewcastle, Australia, August 9-11, 2018*

