J. FELICIEN IHIRWE

PhD Student, Software engineer & Low-code engineering

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BIO

I'm a Ph.D. student in the Department of Information Engineering, Computer Science, and Mathematics (DISIM) at University of L'Aquila. I works for Intecs Solutions S.p.A's Innovation Technology Service research lab in Pisa-Italy. I graduated from Carnegie Mellon University with a Master's degree in Electrical and Computer Engineering. My research interest lies in Lowcode Engineering (LCE), Software Engineering, and the Internet of Things (IoT) at the Edge/Fog/Cloud. Low-code Engineering aims to upgrade the current Low-code Development Platforms trend into a new paradigm by integrating the theoretical and technical framework established by recent research in Model Driven Engineering, Cloud Computing and Machine Learning. My current Ph.D. topic focuses on developing a robust domain-specific language for the design and analysis of IoT complex systems by employing Low-code Engineering concepts.

EDUCATION

P.h.D in Computer Science

Nov 2019 – Ongoing — **University of L'Aquila (Italy)**

Interest: *Low-code engineering & Domain-specific languages & IoT*

M.Sc. in Electrical and Computer Engineering

July 2017 – June 2019 — **Carnegie Mellon University (Rwanda)**

Interest: *Software engineering & Machine Learning*

B.Sc. in Electronics and Telecommunication Engineering

Oct 2012 – June 2016 — **College of Science and Technology-University of Rwanda**

Interest: *Embedded Systems*

PROFESSIONAL EXPERIENCE -5 YEARS

Research Assistant

Intecs Solutions S.p.A

December 2019-Current — Pisa,Italy

- I am a member of Lowcomote project and I'm part of the MDE research team under in the ITS lab. My research focuses on how to improve the CHESS toolkit to meet IoT development standards by creating a domain-specific language for large and complex IoT systems.
- Examine how the newly designed tool can assist a variety of analyses, such as dependability and real-time analysis.

Technical Consultant

BIRGER.

June 2019-November 2019 — Kigali, Rwanda

- TaagMind aim is to offer Augmented & Virtual reality (AR&VR) experience to client.
- Technologies used: Unity3D, Node.Js, React Frameworks, SparkAR Studio.

Software Engineer

WYS ltd

Jan 2019 - June 2019 — Kigali, Rwanda

- Contributed to the software development lifecycle by adopting agile principles until effective deployment.
- Software development using Java-based SpringBoot tech, Thymlearf Jquery, Bootstrap
- Worked on an integration framework with different multipurpose consumer services.

Co-Founder-Developer

TaagMind ltd

September 2018 - October 2020 | Kigali, Rwanda

- TaagMind aim is to offer Augmented & Virtual reality (AR&VR) experience to client.
- Technologies used: Unity3D, Node.Js, React Frameworks, SparkAR Studio.

Data Scientist (Internship)

Rwanda Revenue Authority

May 2018 – September 2018 | Kigali, Rwanda

- Worked on Electronic Billing Machine (EBM) data to improve the VAT tax payment compliance and service quality.
- Developed a Machine Learning model to predict non-reporting EBM machine.

Administrative Support Officer

Carnegie Mellon University - Africa

Jan 2018 – May 2018 | Kigali, Rwanda

- General office support for various administrative functions of the organization.

Electronics & Repair Engineer

BBOXX Capital

May 2016 – August 2017 | Kigali, Rwanda

- Efficiently provided a great working commitment to the company product refurbishment processes, unshipping, product quality check and deployment to the market.
- Close collaboration with the ongoing product design team to improved client's satisfactions.

IT & Automation officer (Internship)

BRALIRWA - Part of Heineken

May 2015 – August 2015 | Kigali, Rwanda

- Contributed to the design and implementation of new system wiring optimization of brewery expansion.
- Effectively identified and fixed faults which arose in company electrical and automotive network.

RESEARCH EXPERIENCE

PUBLICATIONS

2021

- **"Cloud-based modeling in IoT domain: a survey, open challenges and opportunities"**. **Felicien Ihirwe** , Arsene Indamutsa, Davide Di Ruscio, Silvia Mazzini, and Alfonso Pierantonio. ***[ACCEPTED]*** *at the 2nd Low-code workshop at the ACM/IEEE 24th International Conference on Model Driven Engineering Languages and Systems(MODELS 2021)*. October 2021
- **"A domain specific modeling and analysis environment for complex IoT applications"**. **Felicien Ihirwe** , Davide Di Ruscio, Silvia Mazzini, and Alfonso Pierantonio. *In the 7th Italian Conference on ICT for Smart Cities And Communities (I-CiTies'21)*. September 2021. [Online]
- **"Towards an MQTT5 geo-location extension for location-aware applications"**. **Felicien Ihirwe** , Giovanni Iovino, and Davide Di Ruscio. **In the 44th IEEE International Conference on Telecommunications and Signal Processing (TSP'21)**. DOI: 10.1109/TSP52935.2021.9522590. July 2021 [Online]
- **"Towards a modeling and analysis environment for industrial IoT systems"**. **Felicien Ihirwe** , Davide Di Ruscio, Silvia Mazzini, and Alfonso Pierantonio. *In the International workshop on MDE for Smart IoT Systems co-located with Software Technologies: Applications and Foundations (MESS@STAF21) conferences*. June 2021. [Online]
- **"Model-based Analysis Support for Dependable Complex Systems in CHESS"**. Alberto Debiasi, **Felicien Ihirwe** , Pierluigi Pierini, Silvia Mazzini, and Stefano Tonetta. *In Proceedings of the 9th International Conference on Model-Driven Engineering and Software Development - MODELSWARD'21*. ISBN 978-989-758-487-9; ISSN 2184-4348, pages 262-269. DOI: 10.5220/0010269702620269. February 2021 [Online]

2020

- **"Low-code Engineering for Internet of things: A state of research"**. **Felicien Ihirwe** , Davide Di Ruscio, Silvia Mazzini, Pierluigi Pierini, and Alfonso Pierantonio. *In Proceedings of the 23rd ACM/IEEE International Conference on Model Driven Engineering Languages and Systems: Companion Proceedings (MODELS'20)*. Article No.: 74 Pages 1–8 DOI:10.1145/3417990.3420208. October 2020 [Online]

TEACHING - 4 years

Carnegie Mellon University-Africa

Fall 2018 — Kigali-Rwanda

- **Graduate Teaching Assistant:** 04-330 Foundations of Software Engineering and Problem Solving.

July-Aug 2018, 2019 and 2021 — Kigali-Rwanda

- **Graduate Teaching Assistant:** Introduction to Linux-Java programming orientation course.

The African Centre of Excellence in Data Science (ACEDS)

Fall 2019 and 2020 — Remote

- **Graduate Teaching Assistant:** DSC6231 Computer Systems and Data Analytics.

High school teaching (ACEC)

February 2012 - June 2015 — Nyabihu-Rwanda (Part-time)

- **Graduate Teaching Assistant:** Mathematics and Physics for Advanced level studies.

VOLUNTEER

- **Shadow Program Committee member:** 2021 Mining Software Repositories conference (MSR'21). May 17-19, 2021
- **Student Volunteer:** ACM / IEEE 24rd Int. Conf. on Model Driven Engineering Languages and Systems (MODELS'21) 10-15 October 2021
- **Student Volunteer:** 25th ACM International Systems and Software Product Line Conference (SPLC 2021) Sept 6-11, 2021

ATTENDED CONFERENCES

- 25th ACM International Systems and Software Product Line Conference (SPLC 2021) **(SV & Attendee)** Sept 6-11, 2021.
- The 44th IEEE International Conference on Telecommunications and Signal Processing (TSP'21) **(Speaker)** July 26-28, 2021.
- Software Technologies: Applications and Foundations conferences (MESS@STAF21'21) **(Speaker)** 21-25 June 2021.
- The 2021 Mining Software Repositories conference (MSR'21) **(ShadowPC & Attendee)** May 17-19, 2021
- ACM/IEEE 23rd Intl. Conf. on Model Driven Engineering Languages and Systems (MODELS'20) **(Speaker)** Oct 16-23, 2020
- 14th European Conference on Software Architecture (ECSA'20) **(Attendee)** 14-18 September 2020.

PROJECTS

Lowcomote (EU H2020-ITN n. 813884)

November 2019-Current — Pisa, Italy

- Investigate how to improve model driven design and development in IoT domain by applying Low-code Engineering concepts.
- develop a domain-specific language for the design of large and complex IoT systems.
- Propose a possible IoT integration with Lowcomotive platform.

TECHNICAL SKILLS[*:FAMILIAR]

Programming Language

Java (SpringBoot), Python (Flask), JavaScript*, Node.js* PL/SQL, C++*/C*, Java*, Assembly Languages*,MATLAB, UML/SysML, Xtext*/Xtend*/Qvto*

Database

MySQL, Postgres, MongoDB*

Web Technology

HTML, CSS, JS*, JQuery*, Bootstrap

Source Control

Git, SVN

OS

MacOS, Linux (Ubuntu, Kali), Windows

Data Science

Python Libraries, Data Visualization, Machine Learning, Deep leanrning*

Editor

VS Code, Sublime, Vi

Tools in Design

Papyrus, EMF, Simulink*

Languages

English, French*, Italian*, Kinyarwanda, Kiswahili*

Linux

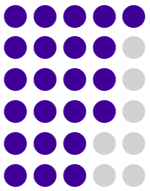
Linux/Bash Scripting

Deployment

Docker(DockerFile, Docker Compose)

INTEREST

Research
Teaching
IT Team Leading
Backend Development
Software design
Data Science



ACADEMIC REFERENCES

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Department of Engineering and Information Sciences and Mathematics
University of L'Aquila
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