

Mohsen Shirali

PhD in Computer Engineering



mohsen.shirali@uclouvain.be



Work Experience

Jul 2024 to Now	Postdoctoral Researcher ICTEAM, UCLouvain (Belgium) <ul style="list-style-type: none">Research Project: Robustness in Complex SystemsResearch Topics: ML-based Anomaly Detection, Time-Series Analysis, System Modelling and Digital Twins
Oct 2023 to April 2024	Researcher Faculty of Economics and Business (FEB), KU Leuven (Belgium) <ul style="list-style-type: none">Research on "Using Process Mining in multimodal IoT Systems"Supervisor: Prof. Estefanía Serral Asensio
Nov 2022 to Apr 2023	Lead Researcher and head of Network Architecture Group 5G research Group, Shahid Beheshti University (Iran) <ul style="list-style-type: none">Research on the Radio Access Network (RAN) deployment consideration and requirements of 5G networksAnalysing of central, distributed, edge- and cloud-based networksJoint project with the biggest Iranian mobile operator (MCI)
Jul 2020 to Mar 2022	R&D specialist Arad Company (Iran) <ul style="list-style-type: none">Agile methodologies for software design and developmentSoftware architecture conceptual and physical designLeading an IoT-related project to integrate sensorial data
Apr 2019 to Mar 2020	Research assistant and Visiting Researcher IT-Security chair, University of Passau (Germany) <ul style="list-style-type: none">Research on "security and privacy of IoT and smart homes"
From 2012 to 2022	Lecturer <ul style="list-style-type: none">About 7 years of lecturing experience in 2 different universities (Shahid Beheshti University and Ahwaz Sama University)Post-grad and under-grad teaching and project supervision

Education

Sep 2015 - Jul 2025	Ph.D. in Computer Engineering—Computer Architecture Shahid Beheshti University, Tehran, Iran <ul style="list-style-type: none">Thesis Title: "An energy-efficient and privacy preserving solution based on Internet of Things (IoT) for mental healthcare applications"
Sep 2011 – Nov 2013	M.Sc. in Computer Engineering—Computer Architecture (Distinction) Shahid Beheshti University, Tehran, Iran <ul style="list-style-type: none">Thesis Title: "A Novel Group Key Management Scheme for Using Broadcast Encryption in WSNs"GPA = 1.43 (2nd best graduated student)
Sep 2006 – Sep 2010	B.Sc. in Computer Engineering (Distinction) Islamic Azad University, Tehran-North Branch, Tehran, Iran <ul style="list-style-type: none">Thesis Title: "Introducing Industrial Network Standards, Protocols and Applications"GPA = 1.79 (2nd best graduated student)

Personal Info



Leuven, Belgium



(+32) 460 973 793



Mohsen Shirali



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Nationality

Iranian

Date of Birth

21/04/1988

Field of Expertise

Process Mining

Process Discovery and modelling

Conformance Checking

Process Enhancement

Concept Drift and Anomaly Detection

Internet of Things (IoT)

Ambient Assisted Living (AAL)

Wearable Sensors

Smart Homes

Multi-modal data fusion

Data Analytics

Data Collection

Pre-processing

Data Clustering

Error Correction

Data Validation

Security and Privacy

Anonymous Communication

Privacy Enhancing Techniques (PET)

Multi-Party Computation (MPC)

Encryption

Key Management

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Scientific Skills (Process Mining)

- **Process Mining**
 - ◆ Process discovery and process modelling
 - ◆ Detection of anomalies and concept drift
 - ◆ Conformance checking and enhancement
- **Distributed Systems**
 - ◆ IoT, wireless Sensor Network and distributed systems
 - ◆ System design, implementation and prototyping
 - ◆ Ambient and wearable sensors
 - ◆ Health-related IoT systems
- **Data Analysis**
 - ◆ Hands-on experience of health-related data collection and analysis
 - ◆ Pre-processing, clustering and visualisation of data
 - ◆ Error detection and correction
 - ◆ System and dataset validation

Publications

• Journals

- 1) **M. Shirali**, Z. Ahmadi, C. Fernández-Llatas, J. L. B. Montón, and G. D. Federico, "An Interactive Error-correcting Approach for IoT-sourced Event Logs," ACM Trans. Internet Things, vol. 5, no. 4, p. Article 21, 2024, [DOI: 10.1145/3680289].
- 2) **M. Shirali**, T. Tefke, R. C. Staudemeyer, H. C. Pöhls, "A Survey on Anonymous Communication Systems with a Focus on Dining Cryptographers Networks", in IEEE Access, February 2023 [DOI: [10.1109/ACCESS.2023.3242870](https://doi.org/10.1109/ACCESS.2023.3242870)].
- 3) **M. Shirali**, J. L. Bayo-Monton, C. F. Llatas, M. Ghassemian, V. T. Salcedo, "Design and evaluation of a solo-resident smart home testbed for mobility pattern monitoring and behavioural assessment", in *Sensors Journal*, special issue of *Internet of Things for Smart Homes and Industrial Application*, MDPI, December 2020 [[Link](#)].
- 4) M. Sharafi, F. Fotouhi, **M. Shirali**, M. Ghassemian, "A low power cryptography solution based on chaos theory in wireless sensor nodes," in IEEE Access, 2019 [[Link](#)].

• Conferences

- 1) **M. Shirali**, M. Fani Sani, Z. Ahmadi, and E. Serral. "LLM-based event abstraction and integration for IoT-sourced logs," in 8th International Workshop on BP-Meet-IoT, 22nd Business Process Management Conference, Krakow, Poland, 2024.
- 2) G. Di Federico, C. Fernández-Llatas, Z. Ahmadi, **M. Shirali** and A. Burattin. "Identifying Variation in Personal Daily Routine Through Process Mining: A Case Study." in 6th International Workshop on Process-Oriented Data Science for Healthcare (PODS4H23), International Conference on Process Mining (ICPM 2023).
- 3) **M. Shirali**, M. Sharafi, M. Ghassemian, F. Fotouhi, "A testbed evaluation for a privacy-aware indoor monitoring system in smart home," in IEEE Global Humanitarian Technology Conference (GHTC), California, USA, October 2018.
- 4) **M. Shirali**, M. Norouzi, M. Ghassemian, D. Jai-Persad, "A testbed evaluation for an indoor temperature monitoring system in smart homes," In 16th IEEE International Conference on Smart City (SmartCity2018), Exeter, UK.
- 5) A. Jafari, **M. Shirali**, M. Ghassemian, "A testbed evaluation of MAC layer protocols for smart home remote monitoring of the elderly mobility pattern," In CMBEBIH 2017, IFMBE Proceedings, vol 62. Springer, Singapore, March 2017.
- 6) A. Jafari, **M. Shirali**, M. Ghassemian, P. Taheri (MD), "Monitoring of disabled mobility pattern in the smart home environment for remote monitoring by clinical personnel", 1st National Congress of Medical Informatics, Feb 2017, Iran.

• Others

- 1) **M. Shirali**, Z. Ahmadi, C. Fernandez-Llatas, J.L. Bayo, "Synergy of Information in Multimodal IoT Systems," arXiv preprint arXiv:2403.14707 (2024).
- 2) J. J. Lull, J. L. Bayo, **M. Shirali**, M. Ghassemian, and C. Fernandez-Llatas, "Interactive Process Mining in IoT and Human Behaviour Modelling," In Interactive Process Mining in Healthcare, pp. 217-231, Springer, Cham, 2021 [[Link](#)].
- 3) [Dataset] **M. Shirali**, A. Jafari and M. Ghassemian, "eSense Smart Home: A PIR-based solo-resident Smart Home dataset," Zenodo, 2023. [[Link](#)]

Organisational/Managerial Skills

Supervising and Management

(supervision of more than 10 bachelor and master students)

Research Leading and Project Management

Head of R&D team and leading the research activities and management and coordination of multiple software design and development projects in ARAD company

Technical and scientific report writing

Writing more than 3 research proposal during PhD and 5 project proposal at work and more than 10 scientific article

Team-Work and Communication

Work as a member of a team in R&D team at work and in eSense research lab during my PhD and good communicating skills to present results in simple language

Teaching and Presentation

Gained through my experience as a lecturer in different universities and being the presenter and tutor in two hands-on workshop

Problem-solving and Data analysis

Scrum and Agile methodology

Languages

English (Excellent)
(B2 / IELTS 6.5 certificates)

German (A1)

Persian (Native)

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Projects

- **Robustness in Cyber-Physical Systems (CPS)**
Research and development of anomaly detection techniques (including Time-Series Analysis and Digital Twins) for CPS in operation mode.
- **ML-based Nitrate Reduction Front Prediction in Flanders**
Development of a model to estimate the probability and the location of Nitrate Reduction Front based on drilling descriptions.
- **Administrative IoT-based System for Agriculture Management**
Designing the architecture of a smart agricultural management system for integration of services and data from IoT sources
- **Interactive Process Mining for behaviour Modelling**
Using datasets from Ambient-Assisted Living use cases, smart homes and multi-modal IoT systems to extract daily behavioural models and mobility pattern
Error correction of an IoT sourced event log to discover noises and missing data and use rule-based and process mining-based techniques for correction
- **Radio Access Network Architectures of 5G Cellular Networks**
Study of the Radio Access Network architectural requirements and fronthaul considerations for implementation of 5G cellular networks
- **DCN-based Anonymous Communication for privacy preservation of IoT devices**
Using Dining Cryptographers Network protocol to implement a new Anonymous Communication System to support Unobservable Communication for IoT devices
- **Brain Computer Interface for Neurofeedback Therapy of ADHD children**
Using EEG signal to extract concentration level and moving a robotic ball to provide hardware-base feedback
- **Stress Measurement by wearable sensors**
Prototype design and evaluation of a wristband with skin conductance and Heart Rate signals

Presentations

- **The 8th International workshop on BP-Meet-IoT, BPM 2024**
Presenter—"LLM-Based Event Abstraction and Integration for IoT-Sourced Logs ", Krakow, Poland, 2024.
- **The 10th MyPhD workshop**
Presenter— "An energy-efficient and privacy preserving IoT-based solution for healthcare applications"
University of Passau— April 2019
- **The 24th Iranian Conference on Electrical Engineering (ICEE 2016)**
Workshop presenter – "Wireless Sensor Network Workshop"
Shiraz University— May 2016
- **The 2nd International Smart Health and Wellbeing**
Workshop organiser and presenter – "Wireless Sensor Network Workshop"
Shahid Beheshti University , November 2015.

Awards, Patent and Certificates

- **DAAD scholarship**
Short-Term Research Grant-2019
Research Stay at University of Passau from 1/10/2019 to 31/3/2020
- **MSRT scholarship**
Six-Month scholarship of Ministry of Science, Research and Technology of the Islamic Republic of Iran
Research stay at University of Passau from 1/04/2019 to 30/09/2019
- **Certificate: "Process Mining: Data Science in Action"**
Eindhoven University of Technology
Coursera— August 2022
- **Certificate: Process Mining— From Theory to Execution**
Celonis Academy, June 2022.
- **Patent**—"An innovative neurofeedback system for cognitive rehabilitation of ADHD"
Patent number IR-10052
Classification G10H 5/04; A61B 5/00, issued January 2020

Programming and General Skills

Data Analysis



IoT devices programming

Arduino-based and SunSpot sensors



Database Management Systems

SQL, MySQL



Programming Languages

C, C++, C #



Java, Python



Documentation & Reporting

Office Suite and Word processing



Latex



Simulation

Network Simulation (NS2, OMNeT)



Matlab



Operating Systems

Windows, Linux, VMWare
Workstation, VirtualBox



Interests

Board games, Persian Food
Cooking, Nature, Travelling , Team
Sports like Football