

Mohsen Shirali

PhD in Computer Engineering



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Work Experience

Jul 2024 to Now	Postdoctoral Researcher ICTEAM, UCLouvain (Belgium) <ul style="list-style-type: none">• Research Project: Robustness in Complex Systems• Research 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 networks• Analysing of central, distributed, edge- and cloud-based networks• Joint 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 development• Software architecture conceptual and physical design• Leading 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



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[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

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

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, JL. 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](#)]

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

Arduino-based and SunSpot sensors

IoT devices programming

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