

# Publications

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- [1] Hemmatpour, Masoud; Zheng, Changgang; Zilberman, Noa; Ha, Phuong Hoai, **GridWatch: A Smart network for Smart Grid**, IEEE SmartGridComm, 2024 Online link.

**Description:** Decentralized energy transactions within untrusted and non-transparent energy markets in modern smart grids expose vulnerabilities and are susceptible to attacks. To address this threat, this paper proposes GridWatch, an effective real-time in-network intelligent framework to detect false data injection attacks. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [2] Hemmatpour, Masoud; Zheng, Changgang; Zilberman, Noa, **E-commerce bot traffic: In-network impact, detection, and mitigation**, IEEE ICIN, 2024, Online link.

**Description:** This explores a vulnerability of in-network caching to bots traffic, showing it can significantly degrade performance. To mitigate the effect of bots traffic it introduces In-network Caching Shelter (INCS), an in-network machine learning solution implemented on NVIDIA BlueField-2 DPU. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [3] Hemmatpour, Masoud; Larsen, Tore Heide; Kumar, Nikshubha; Gran, Ernst Gunnar, **In-network monitoring strategies for HPC cloud**, Springer AINA, 2024, Online link.

**Description:** Network monitoring process can introduce additional over-head and consume system resources, potentially impacting the overall performance of HPC applications. This paper investigates different strategies to enable a low-overhead monitoring system utilizing emerging programmable network devices. I contributed to conceive, design, and supervise the performing of experiments as well as analyzing the data, and writing the paper.

- [4] Liu, Qiong; Zhang, Tianzhu; Hemmatpour, Masoud; Qiu, Han; Zhang, Dong; Chen, Chung Shue; Mellia, Marco; Aghasaryan, Armen, **Operationalizing AI in Future Networks: A Bird’s Eye View from the System Perspective**, IEEE Communications Magazine , 2024, Online link.

**Description:** This article concentrates on the practical issues of developing and operating ML-based solutions in real networks. Moreover, it enumerates the key factors hindering the integration of AI/ML in real networks and review existing solutions to uncover the missing considerations. I contributed to prepare the vision of the in-network machine learning as well as writing the paper.

- [5] Hemmatpour, Masoud; Montrucchio, Bartolomeo; Rebaudengo, Maurizio; Sadoghi, Mohammad, **Analyzing In-memory NoSQL Landscape**, IEEE Transactions on Knowledge and Data Engineering, 2020, Online link.

**Description:** This paper describes a break-down analysis of the state-of-the-art of the RDMA-based in-memory NoSQL systems regarding the indexing, data consistency, and the communication protocol. In addition, It compares traditional in-memory NoSQL with their RDMA-enabled counterparts. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [6] Hemmatpour, Masoud, **High Performance Computing using InfiniBand based clusters**, Doctoral Dissertation at Politecnico di Torino, 2019, Online link.

**Description:** This thesis presents one-of-a-kind comprehensive study of modern RDMA based in-memory key-value systems as well as well-known legacy in-memory systems. Finally, through exploiting the knowledge of analysing the state of the art, Kanzi, a distributed RDMA-enabled in-memory key-value store is proposed in this thesis.

- [7] Hemmatpour, Masoud; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Communicating Efficiently on Cluster-Based Remote Direct Memory Access (RDMA) over InfiniBand Protocol**, Applied Sciences, 2018, Online link.

**Description:** This paper evaluates communication paradigms in existing systems and new possible paradigms. Moreover, it analyzes the advantages and drawbacks of each paradigm. To further expand the investigation, the proposed communication paradigm is substituted in a real-world distributed application and evaluates the performance. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [8] Hemmatpour, Masoud; Montrucchio, Bartolomeo; Rebaudengo, Maurizio; Sadoghi, Mohammad, **Kanzi: A distributed, in-memory key-value store**, Posters and Demos Session of the Middleware Conference, 2016, [Online link](#).

**Description:** This paper introduces Kanzi, a distributed, in-memory key-value store over shared-memory architecture enabled by remote direct memory access (RDMA) technology. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [9] Hemmatpour, Masoud; Ferrero, Renato; Gandino, Filippo; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Cost Evaluation of Synchronization Algorithms for Multicore Architectures**, Advanced Methodologies and Technologies in Network Architecture, Mobile Computing, and Data Analytics, 2019, [Online link](#).

**Description:** The first contribution of this study is to evaluate the costs of the synchronization techniques such as Ticket lock, Filter lock, Readers-writer lock, and Read-Copy Update (RCU) according to memory access, system call, and spinning. The second contribution of this study is the analysis of both hardware and software solutions to reduce the synchronization costs. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [10] Hemmatpour, Masoud; Ferrero, Renato; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Analysis and optimization of synchronization algorithms for multicore architectures**, IFIP/IEEE Workshop on Resilience in Nanoelectronics Systems, 2016, [Online link](#).

**Description:** This abstract estimates the cost of the main existing synchronization techniques. A comparative analysis highlights benefits and drawbacks of the considered approaches. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [11] Hemmatpour, Masoud; Ghazivakili, Mohammad; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **DIIG: a distributed industrial IoT gateway**, IEEE COMPSAC, 2017, [Online link](#).

**Description:** This work describes the development of a distributed industrial IoT gateway, called DIIG, able to relay industrial network data to a centralized data store. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [12] Hemmatpour, Masoud; Karimshoushtari, Milad; Ferrero, Renato; Montrucchio, Bartolomeo; Rebaudengo, Maurizio; Novara, Carlo, **Polynomial classification model for real-time fall prediction system**, IEEE COMPSAC, 2017, [Online link](#).

**Description:** This paper presents an algorithm with polynomial classification model of human gait for real-time fall prediction. This approach enables the user to detect the transition from a normal to an abnormal walking pattern. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [13] Hemmatpour, Masoud; Ferrero, Renato; Gandino, Filippo; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Nonlinear Predictive Threshold Model for RealTime Abnormal Gait Detection**, Wily Journal of healthcare engineering, 2018, [Online link](#).

**Description:** The main contribution of this paper is a nonlinear model of user gait in combination with a threshold-based classification in order to recognize abnormal gait patterns with low complexity and high accuracy. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [14] Ferrero, Renato; Gandino, Filippo; Hemmatpour, Masoud; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Exploiting accelerometers to estimate displacement**, IEEE MECO, 2016, [Online link](#).

**Description:** This paper evaluates a correction technique based on the Kalman filter in order to increase the accuracy of the estimation of the displacement. I contributed to perform the experiments as well as analyzing the data, and writing the paper.

- [15] Hemmatpour, Masoud; Ferrero, Renato; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Eigenwalk: a novel feature for walk classification and fall prediction**, ACM BodyNets, 2016, [Online link](#).

**Description:** This study introduces eigenwalk, a novel feature based on the principal components of the accelerometer and gyroscope signals. This feature, in conjunction with a random forest classification, is able to distinguish walk patterns and to estimate a fall risk. I contributed to design and perform the experiments as well as analyzing the data, and writing the paper.

- [16] Hemmatpour, Masoud; Ferrero, Renato; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **A baseline walking dataset exploiting accelerometer and gyroscope for fall prediction and prevention systems**, ACM BodyNets, 2016, [Online link](#).

**Description:** This study creates a dataset based on the state-of-the-art techniques in simulating a fall. Different techniques are evaluated to find the best fall simulation. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [17] Masoud Hemmatpour, Renato Ferrero, Bartolomeo Montrucchio, Maurizio Rebaudengo, **A Neural Network Model Based on Co-occurrence Matrix for Fall Prediction**, Springer MobiHealth 2016, Online link.

**Description:** This study proposes a method based on new features and multilayer perception that outperforms state-of-the-art approaches. I contributed to conceive, design, and perform the experiments as well as analyzing the data, and writing the paper.

- [18] Ferrero, Renato; Gandino, Filippo; Hemmatpour, Masoud; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Urban dust monitoring from ground level to last floor**, IEEE ICMU,2017, Online link.

**Description:** The goal of this paper is to investigate the variability of the dust level according to the height. I contributed to perform the experiments as well as writing the paper.

- [19] Hemmatpour, Masoud; Ferrero, Renato; Gandino, Filippo; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Data Reduction Techniques for Near Real-Time Decision Making in Fall Prediction Systems**, IGI Global, 2018, Online link.

**Description:** In this chapter, a real-time data analyzer and reducer is proposed in order to manage the data volume of fall prediction systems. I contributed to design and perform the experiments as well as analyzing the data, and writing the paper.

- [20] Hemmatpour, Masoud; Ferrero, Renato; Gandino, Filippo; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **Internet of Things for fall prediction and prevention**, Journal of Computational Methods in Sciences and Engineering, 2018, Online link.

**Description:** IoT-based health applications are expected to change the paradigm traditionally followed by physicians for diagnosis, by moving health monitoring from the clinical environment to the domestic space. Fall avoidance is a field where the continuous monitoring allowed by the IoT-based framework offers tremendous benefits to the user. This approach gives more information to experts for estimating the risk of a future fall and for suggesting proper exercises. I contributed to design and perform the experiments as well as analyzing the data, and writing the paper.

- [21] Ferrero, Renato; Gandino, Filippo; Hemmatpour, Masoud, **Estimation of displacement for Internet of Things applications with Kalman filter**, MDPI Electronics, 2019, Online link.

**Description:** This paper investigates the benefits and drawbacks of the use of the Kalman filter as a correction technique to achieve more precise estimation of displacement. I contributed to perform the experiments as well as analyzing the data, and writing the paper.

- [22] Hemmatpour, Masoud; Ferrero, Renato; Montrucchio, Bartolomeo; Rebaudengo, Maurizio, **A review on fall prediction and prevention system for personal devices: evaluation and experimental results**, Wiley Advances in HumanComputer Interaction, 2019, Online link.

**Description:** This paper reviews various fall prediction and prevention systems, with a particular interest to the ones that can rely on the sensors embedded in a smartphone, i.e., accelerometer and gyroscope. I contributed to review the papers, organize the results as well as analyzing the data, and writing the paper.