

Preface

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Abstract

The 5th Edge Computing Workshop (doors 2025) is a peer-reviewed international edge computing event organized by Zhytomyr Polytechnic State University and the Academy of Cognitive and Natural Sciences. This workshop brings together researchers, academics, and industry practitioners to explore advancements in edge computing. In this distributed computing paradigm, computation and data storage are performed closer to the location where they are needed. The 2025 edition covers a diverse range of topics, including environmental monitoring systems, quality assurance for edge systems, integration of IoT with edge devices, advanced AI techniques, signal and image processing challenges, and messaging protocols for IoT systems. The workshop emphasizes theoretical research and practical implementations to identify emerging trends and innovative solutions in edge computing, which is increasingly vital due to the rise of the Internet of Things (IoT) and its demands for low latency, enhanced privacy, and real-time responsiveness.

Keywords

edge computing, Internet of Things (IoT), distributed computing, signal processing, MQTT messaging, Real-time applications

1. Introduction

The 5th Edge Computing Workshop (doors 2025) is a peer-reviewed international event focused on the rapidly evolving field of edge computing, organized by Zhytomyr Polytechnic State University and the Academy of Cognitive and Natural Sciences.

The Edge Computing Workshop (doors) is designed to bring together researchers, academics, and industry practitioners to explore advancements and applications in edge computing. Edge computing refers to a distributed computing paradigm where computation and data storage are performed closer to the location where they are needed—such as mobile devices, sensors, and end-users—rather than relying solely on centralized cloud systems. This approach is increasingly vital due to the rise of the Internet of Things (IoT), which demands low latency, enhanced privacy, and real-time responsiveness.

The 2025 edition marks the fifth iteration of this workshop, building on previous years (e.g., doors 2024, 2023, etc.), and continues to foster discussions on the challenges and opportunities in this domain. It emphasizes theoretical research and practical implementations to identify emerging trends and innovative solutions.

The workshop is particularly relevant in today's digital landscape, where responsiveness, privacy, and situational awareness push computational capabilities to the "edge" of networks. It seeks to bridge the gap between central cloud systems and localized processing, encouraging innovative solutions to real-world problems.

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2. doors 2025 committees

2.1. Program committee co-chairs

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- *Serhiy O. Semerikov*, Kryvyi Rih State Pedagogical University, Ukraine

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2.3. Additional reviewers

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3. Workshop overview

Several presentations focused on systems for monitoring environmental conditions, particularly for climate and plant monitoring [1] and using regression analysis to identify patterns in atmospheric data [2]. These systems leverage IoT and edge computing to collect and analyze environmental data in real-time.

Edge computing was a central focus, with presentations on quality assurance for edge systems [3], implementing knowledge distillation for medical imaging at the edge [4], and exploring the potential of Large Language Models on edge devices [5]. The integration of IoT with edge devices for various applications, including sports motion mechanization [6], was also discussed.

Advanced AI techniques featured prominently, including:

- Graph convolutional networks for traffic flow prediction [7];
- Multi-teacher knowledge distillation for cardiac MRI classification [4];
- Improved algorithms for UAV path planning [8];

- Feature fusion and attention enhancement for vehicle detection [9];
- Object detection models for remote sensing images [10];
- Speech enhancement using Bayesian estimators [11].

Several presentations addressed challenges in signal and image processing, including image denoising methods for dealing with shot noise and compound Poisson noise [12] and improved models for detecting randomly oriented objects in remote sensing images [10].

The workshop also covered messaging protocols for IoT systems, with an evaluation of TBMQ for peer-to-peer MQTT messaging [13], addressing the need for scalable and reliable communication in distributed IoT environments.

The event encourages interdisciplinary dialogue, reflecting the multifaceted nature of edge computing, which intersects with computer science and engineering.

4. Conclusion

This workshop appears to have brought together researchers and practitioners working at the intersection of edge computing, IoT, environmental monitoring, and AI-powered analysis. Particular attention was paid to real-time applications and systems that can operate efficiently at the edge rather than requiring cloud infrastructure.

Declaration on Generative AI: The authors have not employed any generative AI tools.

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