PREFACE

COL-SAI: COllaboration and Learning through Symbiotic Artificial Intelligence

The rapid advancements in Artificial Intelligence (AI) are transforming the way humans interact with technology. The integration of AI in their daily lives can provide substantial support in many contexts, improving the performance of both sides in terms of knowledge and resources.

The *COllaboration and Learning through Symbiotic Artificial Intelligence (COL-SAI)* workshop explores how humans and AI can effectively collaborate, learn from each other, and co-adapt symbiotically. Through discussions and the exchange of perspectives, the workshop aimed to investigate the key components of the interaction between the two parties. Participants gained deeper insights into the implications of integrating AI into various aspects of daily life concerning problem-solving activities such as learning, decision-making, and co-creation.

The selected works reflected current research developments while proposing innovative frameworks to address complex societal and technological challenges. A unifying theme was the role of AI not as a mere tool, but as an instrument that works alongside humans, which is embodied in the concept of symbiosis.

Seven papers were submitted and accepted for publication. One work introduces the topic of Cyber Social Security (CSS) in the context of Multi-Domain Operations (MDO), focusing on cybersecurity across various domains–e.g., Space, Air, Land, Sea–to help minimizing threats and risks through both technical defense and human resilience. In this regard, AI can strengthen detection and response in critical areas such as automotive security, mobile malware detection, and cyber-social threat mitigation. Specifically, the contributions investigated the performance of Convolutional Neural Networks (CNN) in this domain, confirming its value in both technical and social cybersecurity applications. The integration of AI in this field can contribute to the creation of a strict human-AI collaboration fostering a symbiotic relationship among them.

On the educational side, the workshop also discussed the use of social robots to support students with Specific Learning Disorders (SLDs). Robots like *NAO*, *Minibo*, and *Cellulo* were shown to offer interactive, personalized, and emotionally engaging learning experiences that support language, writing, and math skills. These technologies can boost motivation and reduce performance anxiety in children, although limitations remain regarding technical robustness, cost, and methodological consistency. Nonetheless, they demonstrated how AI can positively impact social well-being when developed with ethical awareness.

We plan to have new editions of the workshop in the future.

The workshop organizers,

Miriana Calvano, University of Bari Aldo Moro, Italy
Andrea Antonio Cantone, University of Salerno, Italy
Antonio Curci, University of Bari Aldo Moro and University of Pisa, Italy
Rosa Lanzilotti, University of Bari Aldo Moro, Italy
Francesca Perillo, University of Salerno, Italy
Giuliana Vitiello, University of Salerno, Italy