



POLITECNICO
MILANO 1863

Supervisor Expression of Interest MSCA-IF Marie Sklodowska Curie Action-Individual Fellowship

Supervisor name:	Pier Luca Lanzi
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Department Name: Research topic: (https://www.polimi.it/en/scientific-research/research-structures/departments/)	DEPARTMENT OF ELECTRONICS, INFORMATION AND BIOENGINEERING (DEIB) Computational Intelligence in Serious Games for Cultural Heritage
MSCA-IF Research Area Panels	<input type="checkbox"/> CHE_Chemistry <input type="checkbox"/> ECO_Economic Sciences <input checked="" type="checkbox"/> ENG_Information Science and Engineering <input type="checkbox"/> ENV_Environmental and Geosciences <input type="checkbox"/> LIF_Life Sciences <input type="checkbox"/> MAT_Mathematics <input type="checkbox"/> PHY_Physics <input type="checkbox"/> SOC_Social Sciences and Humanities
Politecnico di Milano Areas:	<input checked="" type="checkbox"/> Cultural Heritage <input type="checkbox"/> Smart Cities <input type="checkbox"/> Territorial Fragilities <input type="checkbox"/> Health <input type="checkbox"/> Industry 4.0
Brief description of the Department and Research Group (including URL if applicable):	The Department of Electronics, Information and Bioengineering (DEIB) is a world-class scientific institution committed to forefront research, education, and technology transfer in computer science and engineering, electronics, systems and control, telecommunications, and bioengineering. The Artificial Intelligence and Robotics research group has three full professors, five associate professors, two tenure assistant professors, three research assistants, and several PhD students working in the general areas of Artificial Intelligence, Autonomous Agents, Computational Intelligence, Machine Learning, Autonomous Robotics, Computer Vision, and related philosophical aspects. The team working on Computational intelligence and games focuses on (i) the application of serious games to learning and rehabilitation; and (ii) the development of computational intelligence tools that support designers and developers to automatically generate high-quality content, based on the feedback provided by a panel of experts or users. http://www.deib.polimi.it/eng/research-lines/dettagli/118



<p>Brief project description: (max 1 page)</p>	<p>Games are effective tools to build immersive experiences and have been successfully applied to learning, training, simulation, etc. Games combine problem solving, decision making, and artifact creation into complex and rich interactive worlds that promise to provide new approaches to learn cultural content in an engaging way. The recent advances in virtual and augmented reality have a clear potential to support the experiencing of cultural heritage by the large public, complementing the current tools and practices based on tangible goods, such as museums, exhibitions, books and visual content.</p> <p>Computational intelligence has been applied to games since the 1960s, but it is the recent availability of cheap computing power and data storage that actually enables its application to games on a large scale. In particular, on the one hand, the advances in big data technology are providing new tools to develop models of user behavior. On the other hand, the recent progress of deep learning in the area of reinforcement learning, image recognition, text analysis and generation, style transfer, and sound analysis/synthesis can enrich games in ways that were infeasible just a few years ago, also introducing novel interaction paradigms. For example, deep learning can bring real-time learning into games, as well as introducing new ways to interact with users in real-time through image recognition. Style transfer and sound/image generation can help creating novel content in real-time. In addition, the availability of game design and development tools enabling the easy integration of state-of-the-art computational intelligence methods is shaping the future of data-driven game design and procedural content generation. This project aims at developing computational intelligence methods for data-driven game design and procedural content generation that can help designers in building engaging experience by (i) applying data science and deep learning methods to model game design best practices, and (ii) integrating such models into game design and content generation tools. Validation will focus on serious games for learning and cultural awareness (e.g., language, custom, traditions, spiritual beliefs, rules of behavior in a society).</p>
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