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Supervisor Expression of Interest
MSCA - Marie Sklodowska Curie Action - (PF) Postdoctoral Fellowship 2023

Supervisor name: Salvatore Andolina

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Department Name: Dipartimento di Elettronica, Informazione e Bioingengeria

Research topic:
ENG_Information Science and Engineering

Brief description of the Department and Research Group (including URL if applicable):
The Department of Electronics, Information, and Bioengineering at Politecnico di Milano offers a wide range of educational programs and research activities in various engineering and science fields. DEIB is known for its interdisciplinary collaboration, high-quality research and teaching, and partnerships with international institutions and companies.

My research group draws on human-computer interaction, information retrieval, and creativity to design intelligent interactive systems for empowering humans in a variety of situations (https://andolina.faculty.polimi.it/). The group collaborates with leading research institutions and companies worldwide and has been recently part of a worldwide effort to establish priorities for Human-Centered AI [4]. The group also cover topics related to inclusive design and data quality through collaboration with close colleagues of the Politecnico di Milano, including Prof. Maristella Matera, Prof. Cinzia Cappiello, and the researchers of the HINT lab (https://hintlab.polimi.it/).

TITLE of the project: Human-centered AI Methods and Tools

Brief project description:
AI algorithms are increasingly affecting humans in many aspects of their life, promising empowerment, and enhancement of human performance in a variety of activities ranging from knowledge discovery [1] to idea generation [2], and decision-making [3]. However, the recent advancements in AI-related technologies also pose important challenges that should be addressed to minimize risks for humans and the environment they live in [4]. The aim of this project is to advance the goals of the new research area of Human-Centered AI (HCAI) to amplify, augment, empower, and enhance human performance while ensuring high levels of safety, human control, and trust.

To this end, the proposal should examine some of the most promising avenues for research that can contribute to the advancement of this new field, including:

- **Interacting with Large Language Models (LLMs)**: LLMs are changing the way we acquire knowledge but raise challenges in providing the right input and interpreting their output. We are interested in understanding how to design effective and controllable interfaces for interacting with LLMs to help individuals harness the power of these models while ensuring safety, trust, and control.
- **Design methods for AI-infused systems**: Human-Centered AI needs innovative design methods to achieve its vision [4]. We are interested in the development of novel methodological approaches that ensure technology complies with human needs and values.
- **AI-infused Creativity Support Tools**: AI has great potential to support humans in creative activities. We are interested in the design of human-centered AI tools that can support creativity in all its forms.
- **Inclusive Design for AI**: AI-enhanced multimodal interaction can increase the inclusivity of digital services [1]. We are interested in the development of novel methods to design for inclusivity while capturing the specificity of AI as a new design material.
- **Human-Centered Data Quality**: Data preparation is a crucial phase of the AI workflow that aims at improving the quality of data fed to an AI algorithm and mitigate issues of bias and fairness. We are interested in how to make the process more effective by leveraging smart recommendations and explainability techniques.

We welcome MSCA proposals that fit into these broader themes, or those involving innovative variations and combinations of these areas. Innovative proposals that fit the broader topic of Human-Centered AI are also encouraged.

[1] Emanuele Pucci, Isabella Possaghi, Claudia Maria Cutrupi, Marcos Baez, Cinzia Cappiello, and Maristella Matera. 2023. Defining Patterns for a Conversational Web. In Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems (CHI '23). ACM, Article 118, 1–17. https://doi.org/10.1145/3544548.3581145

[2] Giulia Di Fede, Davide Rocchesso, Steven P. Dow, and Salvatore Andolina. 2022. The Idea Machine: LLM-based Expansion, Rewriting, Combination, and Suggestion of Ideas. In Creativity and Cognition (C&C '22). ACM, 623–627. https://doi.org/10.1145/3527927.3535197

[3] Salvatore Andolina & Joseph A. Konstan (2023) Introduction to the Special Issue on AI, Decision-Making, and the Impact on Humans, *International Journal of Human–Computer Interaction*, 39:7, 1367-1370, DOI: 10.1080/10447318.2023.2175520

[4] Ozlem Ozmen Garibay, Brent Winslow, Salvatore Andolina, Margherita Antona, Anja Bodenschatz, Constantinos Coursaris, Gregory Falco, Stephen M. Fiore, Ivan Garibay, Keri Grieman, John C. Havens, Marina Jirotka, Hernisa Kacorri, Waldemar Karwowski, Joe Kider, Joseph Konstan, Sean Koon, Monica Lopez-Gonzalez, Iliana Maifeld-Carucci, Sean McGregor, Gavriel Salvendy, Ben Shneiderman, Constantine Stephanidis, Christina Strobel, Carolyn Ten Holter & Wei Xu (2023) Six Human-Centered Artificial Intelligence Grand Challenges, *International Journal of Human–Computer Interaction*, 39:3, 391-437, DOI: 10.1080/10447318.2022.2153320