# Human-AI Coevolution (Abstract Reprint)

**Dino Pedreschi**[1] , **Luca Pappalardo**[2,3] , **Emanuele Ferragina**[4] , **Ricardo A. Baeza-Yates**[5] , **Albert-László Barabási**[6] **Frank P.M. Dignum**[7] , **Virginia Dignum**[7] , **Tina Eliassi-Rad**[6] ,
**Fosca Giannotti**[3] , **János Kertész**[8] , **Alistair Knott**[9] , **Yannis E. Ioannidis**[10] , **Paul Lukowicz**[11] , **Andrea Passarella**[12] , **Alex Sandy Pentland**[13] , **John S. Shawe-Taylor** [14] and **Alessandro Vespignani**[6]

[1] University of Pisa, Italy
[2] Consiglio Nazionale delle Ricerche (CNR), Pisa, Italy
[3] Scuola Normale Superiore, Pisa, Italy [4] Sciences Po, Paris, France
[5] Universidad de Chile, Santiago, Chile
[6] Northeastern University, Boston, MA, USA
[7] Umeå Universitet, Umea, Sweden
[8] Central European University, Vienna, Austria
[9] Victoria University of Wellington, Wellington, New Zealand
[10] National and Kapodistrian University of Athens, Athens, Greece
[11] Rheinland-Pfälzische Technische Universität Kaiserslautern-Landau, Kaiserslautern, Germany
[12] Consiglio Nazionale delle Ricerche, Rome, Italy
[13] Massachusetts Institute of Technology, Cambridge, MA, USA
[14] University College London, London, UK
dino.pedreschi@unipi.it, luca.pappalardo@isti.cnr.it, emanuele.ferragina@sciencespo.fr

**Abstract Reprint.** This is an abstract reprint of a journal article by [Pedreschi *et al.*, 2025].

## Abstract

Human-AI coevolution, defined as a process in which humans and AI algorithms continuously influence each other, increasingly characterises our society, but is understudied in artificial intelligence and complexity science literature. Recommender systems and assistants play a prominent role in human-AI coevolution, as they permeate many facets of daily life and influence human choices through online platforms. The interaction between users and AI results in a potentially endless feedback loop, wherein users' choices generate data to train AI models, which, in turn, shape subsequent user preferences. This human-AI feedback loop has peculiar characteristics compared to traditional human-machine interaction and gives rise to complex and often "unintended" systemic outcomes. This paper introduces human-AI coevolution as the cornerstone for a new field of study at the intersection between AI and complexity science focused on the theoretical, empirical, and mathematical investigation of the human-AI feedback loop. In doing so, we: (i) outline the pros and cons of existing methodologies and highlight shortcomings and potential ways for capturing feedback loop mechanisms; (ii) propose a reflection at the intersection between complexity science, AI and society; (iii) provide real-world examples for different human-AI ecosystems; and (iv) illustrate challenges to the creation of such a field of study, conceptualising them at increasing levels of abstraction, i.e., scientific, legal and socio-political.

## References

[Pedreschi *et al.*, 2025] Dino Pedreschi, Luca Pappalardo, Emanuele Ferragina, Ricardo Baeza-Yates, Albert-László Barabási, Frank Dignum, Virginia Dignum, Tina Eliassi-Rad, Fosca Giannotti, János Kertész, Alistair Knott, Yannis Ioannidis, Paul Lukowicz, Andrea Passarella, Alex Sandy Pentland, John Shawe-Taylor, and Alessandro Vespignani. Human-ai coevolution. *Artificial Intelligence*, 339:104244, 2025.