

Fourth International Conference of Scuola Democratica
Learning for Democracy Democracy for Learning

Learning Artificial Intelligence in Early Childhood

Algorithmic and Human Agency in Educational Processes

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Context & Problem Statement

The Platform Society and the challenges of human autonomy

Algorithmic Agency vs Human Agency

Platform Society & Delegation

On digital platforms, the progressive delegation of choices to automated systems risks eroding **human agency** in favor of technological automatism.

Critical competencies regarding recommendation systems, profiling, and behavioral nudging must be nurtured from early childhood.

Algorithmic Citizenship

Individual profiles are increasingly dictated by *Ius Algoritmi* (Cheney-Lippold, 2011), where data defines social rights and opportunities.

Early algorithmic literacy is crucial for democratic participation and preventing the passive delegation of human judgment (Crawford, 2021).

Algorithmic Capitalism and Disinformation

The Banal Deception of the "Like" Through data profiling and the capture of emotional flows (Karppi, 2018; Natale, 2022), platforms monetize attention, transforming individual preferences into guided behaviors

Engagement vs Reliability

Disinformation and fake news exploit emotional drive. The repeated circulation of altered content risks weakening society's ability to distinguish truth from falsehood.

Bias, Opacity & Disinformation

Ethical & Social Risks

Generative AI models reflect historical and social bias (Buolamwini & Gebru, 2018; Noble, 2018), producing "hallucinations" and opaque training criteria.

Threats to Democracy

Deepfakes and automated historical revisionism compromise collective truth, requiring early critical debugging skills (Balafrej & Dahmane, 2024).

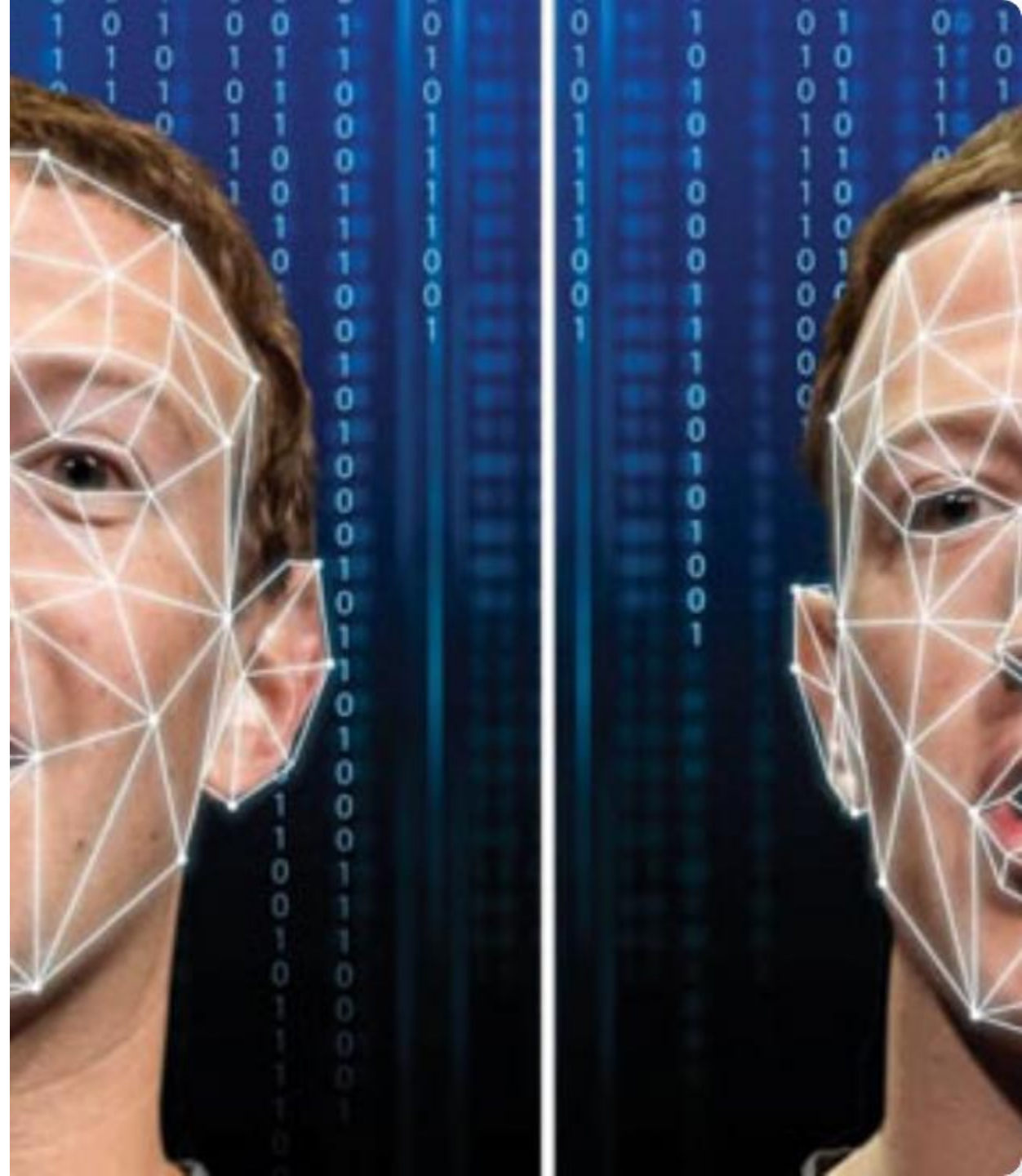


Deepfakes & Disinformation

A Major Democratic Threat

Manipulated images and synthetic media alter perceptions of reality and disrupt public debate (*Balafrej & Dahmane, 2024*).

Hyper-realistic face and voice synthesis makes identification difficult, directly challenging information integrity and democratic processes.



Early Childhood AI Literacy



Deconstructing Illusion

Helping children understand that smart devices do not possess real feelings, but process data and formal rule-sets.



Authentic Relationships

Protecting privacy and guarding against "artificial intimacy" by prioritizing genuine human connections (Turkle, 2018).



Grasping System Limits

Recognizing the inherent boundaries and capabilities of machine learning models through structured, playful exploration.

Educational Robotics & AI Toys

Key Pedagogical Tools

Educational robotics, conversational agents, and AI toys enable children to directly experience and test machine responses.

Experiential Learning

Through interactive play, children unbox the "black box" of AI, transitioning from passive consumers to active investigators of code.



Case Studies: PopBots & PlushPal



PopBots (Williams et al., 2019)

4 to 6-year-olds utilize decision trees in "rock-paper-scissors" to understand how AI constructs probabilistic predictions.



PlushPal (Tseng et al., 2021)

Programming gestures and audio using micro: bit to train plush toys, experiencing hands-on Machine Learning data collection.



Data Classification Play

Direct realization that the accuracy of an algorithmic model depends strictly on the quality of training data input.

Attentional & Digital Autonomy

Spaces of Autonomy

Preserving Attentional Focus

Fostering "micro-spaces of attentional autonomy" (Lazzaroli, 2025) is vital to counter emotional capture and platform addiction.

Safeguarding Critical Judgment

Protecting children's independent focus shields democratic values, diversity, and collective agency against automated manipulation.
Empowering children as active decision-makers in digital environments.

Montessori Pedagogy & Debugging

Montessori Principles

Emphasis on **autonomy**, direct experience, and individual pacing with **self-correction through error** (Montessori, 1953).

Pedagogical Debugging

AI serves as an active exploratory environment: technologies act as levers for **pedagogical debugging** against pre-programmed choices.

Key Pedagogical Recommendations

 **Early Intervention:** AI literacy must begin in early childhood education, well before primary school entry.

 **Centrality of Play:** Cooperative and experiential play demystifies technology and opens up the "black box."

 **Democratic Citizenship:** Fostering critical agency protects human sovereignty against technological determinism.

 **Transparency & Ethics:** Guiding children and educators to spot bias, fake outputs, and machine limitations.

Core Philosophical Vision

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“Educational AI technologies must serve as tools for pedagogical debugging of algorithmic automatism, reinforcing critical agency in contemporary learning spaces.”

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— Experiential & Cooperative Pedagogy
Framework



PEDAGOGICAL VISION

Governing the Code, Nurturing Human Freedom

Fostering critical thinkers and autonomous human agency in an early childhood ecosystem
increasingly shaped by artificial intelligence.

CONCLUSION

Thank You for Your Attention

Open for Questions & Discussion

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Image Sources



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