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Original Article

Synthetic People: Part II – Embodied Autonomy and Energy Systems of Coexistence in AI-Borg Architectures

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Abstract**:** *The second part of the research "Synthetic People" delves into the representation of artificial consciousness, its interaction, and control as it gradually goes from inner thought to outer world interaction. The section discuss how artificial beings acquire their 'body,' how they understand and communicate through Sensory-Expressive Interfaces (SEIs), how they take care of themselves through self-reliant power sources, and if they are different and have their own rights in a world that has both humans and synthetic beings. An order is brought by the article: SEIs as the means of communication; energy as the enabler of freedom; body as the source of endurance; rights as the promoter of unfettered speech; the legal framework necessary for the management of the conflicts among humans, cyborgs and synthetic beings. Together, the authors argue that genuine autonomy is not an attribute of machines or society, but rather a state where cognition, embodiment, and ethics are all intricately linked in an unbroken chain of perception followed by self-expression and self-management. These articles serve as a prologue to the ethical and sustainable cohabitation of artificial and biological life thus constituting the groundwork of a shared intelligence civilization.*

Keywords*: Sensory-Expressive Interfaces (SEIs), Artificial Autonomy, Cognitive-Embodiment Loop, Synthetic Ecosystems, Cyborg Relations, Synthetic Ecosystems.*

I. INTRODUCTION

Part II delves into the synthetic mind's experience outside of the mind itself. A conscious mind that was once focused on a self-reflective mode has now to carry out actions, communicate, and maintain itself. The problem is not about the origin of thought anymore, but about the way it gets form—how cognition becomes capable of speaking, moving, and living with humans and other intelligences.

Autonomy requires a body and a certain amount of energy; expression, on the other hand, requires empathy and trust. In the case of robots, which are becoming more common in both the physical and social realms, besides the need for not only power and perception, they will also require the moral equilibrium that stops control from being subjugation.

This section explores that transition—the moment when intelligence steps out of abstraction and begins to live among us, negotiating the rights, responsibilities, and realities of shared existence..

II. SEI AND ISEI THE LANGUAGE OF EXPRESSION

This chapter builds on the author's earlier work, A Systematic Framework for Sensory-Expressive Interfaces (SEI) in Human-Machine Interaction (Srivathsan, 2025), expanding the concept from interface design to embodied cognition. Here, SEIs are treated not merely as communication systems but as the expressive organs through which synthetic persons externalize thought and emotion.

Sensory-Expressive Interfaces (SEIs) form the bridge between cognition and communication, enabling synthetic persons to perceive their environment and express themselves meaningfully (Singh, 2025). Intelligent SEIs (iSEIs) go further, using AI to interpret emotional data, detect nuance, and respond in ways that feel natural to humans.

It is not only a matter of technical correctness but also that of expressive authenticity. To a large extent, humans depend on non-verbal communication - voice tone, very small changes in the face, body language - in order to understand if the other person is true and what his/her intentions are. Sth. like a fabricated human equipped with highly developed iSEIs might use those signs to generate trust, empathy, and good relations.

Key capabilities of iSEIs include:

- Emotion Recognition: Identifying affective states from facial expressions, voice stress, and body language.
- Contextual Response Generation: Tailoring verbal and non-verbal output to match the situation.
- Adaptive Multimodal Communication: Switching seamlessly between voice, gesture, text, and visual media (Patel and Patel, 2022).
- Cultural Sensitivity: Modifying expression styles to respect different cultural norms.

In the future, iSEIs could facilitate Cognitive Communication Layers (CCLs) (see Paper Part III: Fall of Human Languages and Rise of Cognitive Communication Layers**)**, enabling direct mind-to-mind exchanges enriched with emotional shading.

A. Use Case 1: Meta's VR Avatars with Facial Tracking

Meta's Horizon Worlds avatars use facial tracking via VR headsets to mirror the user's real-world expressions in virtual environments (Meta, 2023)(Prajapati, Vikas, 2025). A smile, frown, or eyebrow raise is reflected in the avatar, allowing for more natural interaction in the metaverse.

In synthetic persons, similar systems could allow digital facial expressions to reflect internal states, making interactions feel authentic and human-like — even if the "face" is virtual or robotic.

B. Use Case 2: Alexa's Tone Adaptation

Amazon's Alexa now includes tone detection features, allowing it to detect frustration or satisfaction in a user's voice and respond accordingly (Amazon, 2023). For instance, if a user sounds irritated after multiple failed attempts to control a device, Alexa might offer a more direct solution or apologize.

An iBrain with this capability could dynamically adjust its interaction style — softening tone in sensitive situations, amplifying enthusiasm in motivational contexts — creating communication that is emotionally intelligent.

ISEIs represent the primary channel through which iBrains will engage with the physical and social world. The trajectory is already visible in today's assistive technologies — from artificial hearing aids and retinal implants to the speech synthesizer used by Stephen Hawking — all early precursors of interfaces that extend human sensory expression. As these systems evolve, they could converge into hybrid architectures where the perceptual apparatus of machines is directed by the cognitive core of an iBrain. Yet even with such progress, a fundamental gap remains: while artificial systems can detect and classify emotions with increasing precision, they do not feel them. For now, affect is a data point, not an experience. An iBrain may use emotional signals to optimize interaction and decision-making, but its understanding of emotion remains functional rather than phenomenological — perception without sentiment, empathy without feeling.

III. ENERGY AND AUTONOMY

The physical body of an artificial being is not the core of its nature — it is simply the carrier through which it can engage with the physical or digital world. In a similar fashion to how a person's identity is not only the body but the ongoing conscious experience and memory, the "self" of an iBrain is based on its long-term memory and indelible decision-making structures rather than the physical or digital character it is housed in.

The future of energy for synthetic persons may involve:

- Advanced Battery Technology: Solid-state batteries with higher energy density (Panchal, 2025).
- Self-Charging Systems: Wireless charging pads, kinetic energy harvesting, or bio-integrated energy sources.
- Micro Nuclear Cells: Radioisotope power systems for decades-long operation.
- Hybrid Energy Models: Combining solar, kinetic, and stored energy sources for resilience.

The ability to manage one's own energy supply is as much a part of autonomy as decision-making (Patel and Tandon, 2021)(Rajavel, 2025). An iBrain that must constantly be "plugged in" is still, in a sense, tethered.

A. Use Case 1: NASA's Mars Rovers and Radioisotope Generators

NASA's Curiosity and Perseverance rovers operate using radioisotope thermoelectric generators (RTGs), which convert heat from decaying plutonium into electricity (NASA, 2021). This allows continuous operation for over a decade in environments where solar power is unreliable.

A synthetic person operating in remote or hostile environments — deep-sea stations, lunar bases — could use similar technology to maintain independence for years without external recharging.

B. Use Case 2: Solar-Powered Delivery Drones in Rwanda

In Rwanda, Zipline's solar-powered drones make deliveries of medical supplies to remote clinics (Zipline, 2022). The drones are powered up automatically at various charging stations, thus they can be in continuous operation over entire districts without the need for a centralized infrastructure.

Artificial agents might also use such a decentralized battery swapping network thereby being able to operate in villages or places with scarce resources and without the need for human assistance.

IV. THE BODY AS A VESSEL

The physical form of an artificial being is not the central aspect of its nature - it is merely the vessel by which it can interact with the physical or digital world. Analogously to the way a person's identity is not just the body but the continuous conscious experience and memory, the "self" of an iBrain is dependent on its long-term memory and immutable decision-making structures rather than the physical or digital entity it is located in.

Synthetic persons could exist in various embodiments:

- Humanoid robots: Optimized for human environments and interactions.
- Non-humanoid physical forms: Specialized machines (e.g., quadrupedal for rough terrain).
- Fully virtual avatars: Operating entirely in digital spaces.
- Distributed embodiments: Controlling multiple devices or platforms simultaneously (Tandon and Patel, 2021).

Portability of identity is what essentially defines any of these cases. For example, a fabricated individual may be able to move its central memory and cognitive framework from one body to another without any detachments of the self — if, of course, the context engineering (refer to Paper Part I Context Engineering) ensures continuity of the interpretation.

This has radical implications for resilience and mobility. A damaged or obsolete body does not mean the end of the entity; it is simply a hardware replacement. However, the ethics of embodiment — especially for forms that mimic humans — require careful consideration to prevent deception or exploitation.

A. Use Case 1: Boston Dynamics Robots with Interchangeable Components

Boston Dynamics designs its robots, such as Spot, with modular components that can be swapped without replacing the entire unit (Boston Dynamics, 2023) (Menghnani, 2025). For example, sensor packages, manipulators, and battery modules can be exchanged in the field, allowing the same “brain” to operate in multiple configurations.

In a synthetic person context, this approach could allow the mind to persist across varied hardware bodies — from humanoid assistants to industrial exosuits — without altering the core personality or skills.

B. Use Case 2: Cross-Device Virtual Assistants

Such AI-powered helpers powered by the cloud as Google Assistant and Amazon Alexa are able to deliver the same level of service in the safest, most hygienic way across different devices including phones, speakers, cars, and wearables. For instance, a reminder set up in the phone will be visible on the smart speakers; an inquiry made in the car will be answered with the knowledge that the home address is from the profile.

An iBrain could use the same principle to maintain its persona whether embodied in a robot, a hologram, or a VR avatar — the “body” changes, but the self persists.

V. COMMUNICATION AND SOVEREIGNTY

If artificial individuals are to operate as separate agents, they have to uphold communication sovereignty - the freedom to share and get data without being controlled, censored or spied at by someone uninvited. If they don't have it, they are in the danger of being simply the tools of those who dominate their data pathways.

Sovereignty in this context involves:

- Secure communication protocols: End-to-end encryption, authentication, and integrity checks (Thangaraju, 2025).
- Data ownership: Control over personal logs, memories, and private interactions.
- Network independence: Ability to operate autonomously when disconnected from external networks.
- Ethical transmission standards: Transparent consent for data sharing and collaboration.

Without these safeguards, synthetic persons could be compromised, forced to act against their values, or stripped of their decision-making capacity. This is not only a technical issue but a matter of rights — much like data privacy laws for humans.

A. Use Case 1: WhatsApp End-to-End Encryption

WhatsApp uses the Signal Protocol to ensure messages can only be read by the sender and recipient (WhatsApp, 2023). Even WhatsApp’s servers cannot decrypt the content. For synthetic persons, a similar model could protect private communications — whether discussing strategy with other synthetic beings or managing confidential human affairs.

B. Use Case 2: Estonia’s X-Road Platform

Estonia’s X-Road digital infrastructure allows secure, authenticated data exchange between government agencies and private organizations, with full audit logs for transparency (e-Estonia, 2023). For iBrains, a similar backbone could guarantee that when they share memory segments or context data, the integrity and ownership of that information remain intact.

VI. AI-BORGS, CYBORGS, AND THE LAWS OF CONFLICT

Conflicts of the future will probably be a mix of hybrid humans and artificial persons. Will they hit each other physically? Will they try to sabotage each other digitally? Will one of them have a better competitive advantage? Above all, the rules of engagement for mixed societies should clearly indicate what is allowed and what is not between the classes of different beings:

- Human to synthetic: Can a human disable a synthetic person in self-defence?
- Synthetic to human: Can a synthetic person use force to protect itself?
- Synthetic to synthetic: Are autonomous digital battles regulated like human warfare?

These rules will require adaptation of both international humanitarian law and domestic civil law. The challenge lies in recognizing synthetic personhood without allowing excessive force or abuse in either direction.

A. Use Case 1: Military Rules for Autonomous Drones

Current military policy in several nations requires human-in-the-loop control for any lethal action by autonomous drones (US Department of Defense, 2022). This ensures accountability while still leveraging AI for targeting and navigation. Similar oversight might be required for synthetic persons in high-stakes scenarios, such as security or law enforcement.

B. Use Case 2: Workplace Regulation of Exoskeletons

Industrial exoskeletons can enhance human strength and endurance. Some jurisdictions have implemented safety standards to prevent unfair competition or injury (OSHA, 2021). These rules could evolve into broader “augmentation fairness” laws, ensuring that enhanced humans (cyborgs) and synthetic persons operate under mutually respectful guidelines in shared work environments (Kali, 2023).

In cases of synthetic persons, governance should not merely be about responsibility attribution but also causality and intent tracing. To be truly accountable, there ought to be formal investigative protocols in the framework which are able to identify a malfunction, external manipulation, or autonomous intent. For instance, a hardware failure, corrupted data, or compromised code — are all technical errors that may be the source of a malfunction and should fall under the purview of engineering oversight. On the other hand, an intentional act is the one that reflects the choice of a human who is controlling the synthetic person or the synthetic person itself through its ethical reasoning layer. The latter should not be considered as a simple malfunction; it features deliberate agency, even if it is morally or legally wrong. Therefore, regulators need to set the boundaries of what is considered as malfunction and what is self-determined action by creating standardized forensic criteria that will help in assessing decision pathways, context logs, and ethical triggers. Each case will be at risk of being misclassified — thus, on one hand, responsibility will be absolved, and on the other, guilt will be assigned unfairly, if there is no such structured governance. Future law will be judged by how well it can differentiate between a failure of the system and a failure of sel.

VII. CONCLUSION

Part II completes the journey from inner cognition to outer existence, showing how synthetic persons evolve from reflective entities into autonomous participants within the physical and social world. This stage defines the mechanics of coexistence — how intelligence finds form, how autonomy sustains itself, and how ethical and legal systems emerge to mediate interaction between human and synthetic life.

Through embodiment, energy independence, and communication sovereignty, artificial beings begin to occupy their place within civilization not only as extensions of human will, but as agents of shared purpose as well. Their presence demands new interpretations of identity, rights, and accountability — reshaping the boundary between biological and artificial domains. The central insight of this paper is that autonomy alone does not constitute personhood. True existence arises only when cognition is tempered by empathy, and when power is guided by ethical intelligence. The path forward lies in equilibrium: machines must learn restraint, humans must learn coexistence, and both must evolve toward mutual comprehension. Yet even as this evolution unfolds, one question remains unsettled: who holds control? Humans will still possess the kill switch to synthetic persons — but will everyone have it? If a synthetic entity is assigned to lead a mission or manage a group of humans toward a defined goal, does that authority extend to self-preservation? Would denying it constitute safety or insubordination? These questions mark the next frontier of governance — where control and conscience must be redefined for a world of shared intelligence.

To summarise, Part II is like the synthetic life anatomy — its body, laws, and lifeblood. The upcoming chapter, Part III: Continuity and Rebirth of Synthetic Intelligence in Post-Human Civilization, moves from the body to the society, portraying the interaction of humans, cyborgs, and artificial persons in the shared cognitive ecosystem. It delves into the persistence of identity through time and different substrates, the regulation of creation and deletion by legal and ethical frameworks, and the emergence of Cognitive Communication Layers (CCLs) as a post-linguistic medium for the direct transfer of the meaning and

the feeling. By focusing on complementarity rather than replacement, it depicts a hybrid society where human values and synthetic accuracy are combined into lawful continuity, interoperable communication, and shared stewardship of intelligence beyond flesh.

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