THE BRAIN AS MYTH: CINEMATIC REPRESENTATIONS AND MYTHIC REPRODUCTION IN THE KOREAN SCIENCE FICTION FILM *JUNG_E*

SOOJIN LEE, Professor
Inha University
100 Inha-ro, Michuhol-gu, Incheon, Republic of Korea
jinara@inha.ac.kr

ORCID: https://orcid.org/0009-0009-2250-721X

NARA YOON, Invited professor
Inha University
100 Inha-ro, Michuhol-gu, Incheon, Republic of Korea
221172@inha.ac.kr

ORCID: https://orcid.org/0009-0005-5337-8626

Abstract: Science fiction films emerge from contemporary developments in science and technology, creating narratives through the integration of humanistic imagination. They also serve as essential bridges for understanding the scientific concerns and aspirations of each era. Since the 2010s, the Korean film industry has witnessed a rise in the production of SF works that engage with issues such as artificial intelligence, robotics, aerospace technology, and genetic engineering. However, these films have not achieved notable success with neither audiences nor critics, despite their growing number. The cause of

this phenomenon lies in the attitude of many Korean filmmakers, who often display limited interest in scientific and technological domains. As a result, they fail to meaningfully explore the complex relationship between evolving technological environments and human existence. Director Yeon Sang-ho's *Jung_E* exemplifies this problematic tendency. *Jung_E* incorporates advanced technologies such as AI and robotics, yet these elements remain largely decorative – they do not constitute the core of the narrative. This superficial engagement with science and technology leads to fundamental misrepresentations; for instance, the film's flawed portrayal of memory and intelligence becomes embedded in its cinematic representations of AI.

To investigate this issue, this article draws on Roland Barthes's theory of mythology as its analytical framework. It further adopts an interdisciplinary approach that integrates insights from the natural sciences with semiotic analysis. Through this methodology, the study demonstrates how Korean SF films weaken their artistic potential by sidelining scientific thinking and adhering to mythologized views of science and technology.

Keywords: Sci-Fi, AI, Robot, Jung_E, Yeon Sang-ho, Barthes, Mythology

신화로서의 두뇌:
한국 SF 영화 <정이>에 나타난 영화적 재현과 신화의 재생산

초록: SF 영화는 동시대 과학기술을 출발점으로 삼아 인문학적 상상력을 결합함으로써 시대의 과학적 관심사를 이해하는 중요한 매개체로 기능한다. 한국 영화계에서도 2010년대 이후 인공지능, 로봇공학, 항공우주 기술, 유전학 등 시대적 화두를 다루는 SF 작품의 제작이 활발해졌다. 그러나 제작 편수에 비해 대중과 평단에서 모두 성공하는 확률은 현저히 낮다. 이러한 현상의 근본적인 원인은 한국 영화계가 대체로 과학기술 분야에 대한 심도 있는 탐구나 기술 환경과 인간 존재의 관계에 대한 인문학적 사유에 익숙하지 않기 때문이다.

연상호 감독의 <정이> 역시 이 경향에서 벗어나지 않는다. 감독 스스로 영화의 핵심 주제를 모녀 간의 사랑으로, 과학기술을 부차적 요소로 규정했기 때문이다. <정이>는 AI와 로봇공학 등의 첨단 기술을 다루면서도, 이를 서사의 중심이 아닌 표면적인 장치로만 활용한다. 이러한 과학기술의 피상적 재현은 단순한 영화적 한계를 드러내는 일에 그치지 않는다. 기억과 지능에 대한 근본적 오해를 영화적 재현 방식에 투사함으로써 신화적 사고를 재생산하는 문제를 내포한다.

본 연구는 이러한 문제의식을 바탕으로 롤랑 바르트의 신화론을 방법론적 틀로 삼아, 자연과학과 기호학의 학제적 접근을 시도한다. 이를 통해 한국 SF 영화가 과학적 사고를 부차화하고 신화화된 관점을 고수함으로써 어떻게 작품의 예술적·철학적 잠재력을 약화시키는지를 밝히고자 한다.

1. Introduction: Science Fiction's Role in Constructing Techno-scientific Discourses

We are living in an era fundamentally driven by artificial intelligence transforming our cultural, technological, and artistic environments. This technology began developing seriously in the 1950s, when scientists became fascinated by how humans think, use language, and engage in intellectual activities. They studied the brain as the organ that governs these cognitive abilities. While neuroscience seeks to understand the brain's operational principles, artificial intelligence aims to replicate cognitive processes through technological means. Although these fields may appear highly complex to non-specialists, they reflect contemporary society's fundamental desire to understand humanity through techno-scientific knowledge.

Science fiction often engages with science and technology, drawing significant attention at a given time. *A Trip to the Moon* (*Le Voyage dans la Lune*, 1902), considered the first science fiction film, depicts technologies developed in the late 19th century, such as cannons, gun barrels, and metalworking. 2001: *A Space Odyssey* (1968), regarded as a masterpiece of science fiction, explores themes of space exploration and artificial intelligence, technologies that began to emerge in the 1950s. *The Matrix* (1999), released at the end of the 20th century, reflects the rapid development of information technology during the 1990s. Beyond these representative examples, a broader examination of science fiction films – those that achieved box office success in their respective eras, became subjects of critical or academic discourse, or marked turning points in cinematic history – reveals a consistent pattern: technologies prominent in their time are given central narrative focus. In this context, as of 2025, the core technologies explored in global science fiction cinema include brain engineering, artificial intelligence, information technology, robotics, bioengineering, space exploration, and environmental engineering.

In the case of Korea, if we narrow the scope to works where science and technology play more active roles beyond merely serving

as superficial story settings or spatiotemporal backgrounds, the timeline can go back to the early 2010s. During this period, several notable works exemplify this kind of science fiction. *The Heavenly Creature* (directed by Kim Jee-woon 김지운, 2012), the second segment of the omnibus film *Doomsday Book*, explores themes of artificial intelligence and robotics. *Okja* (directed by Bong Joon-ho 봉준호, 2017) addresses the consequences of genetic engineering, while *The Witch: Part 1. The Subversion* (2018) and *The Witch: Part 2. The Other One* (2022), both directed by Park Hoon-jung, focus on enhancement drugs and biologically augmented humans. In the 2020s, Korean SF content became more prominent, with films and series such as *Space Sweepers* (directed by Jo Sung-hee 조성희, 2021), which centers on space debris and exploration; *Seobok* (directed by Lee Yong-joo 이용주, 2021), which depicts human cloning; and *The Silent Sea* (directed by Choi Hang-yong 최항용, 2021), which examines the implications of extraterrestrial life and lunar exploration. The television series *L.U.C.A.: The Beginning* (directed by Kim Heung-seon 김흥선, 2021) also contributes to this wave, with its narrative focused on genetic modification.

More recent examples include *Jung_E* (directed by Yeon Sang-ho 연상호, 2023), which revisits the themes of artificial intelligence and robotics; *Wonderland* (directed by Kim Tae-yong 김태용, 2024), which envisions a virtual world sustained by AI; and *Mickey 17* (directed by Bong Joon-ho 봉준호, 2025), which engages with the theme of human cloning in a futuristic context.

Despite the increasing number of Korean SF films, relatively few works engage in *speculative*[1] reflection that explore fundamental questions about humanity, human–nonhuman relationships, and our future.

This tendency is explicitly revealed in interviews with directors Yeon Sang-ho and Bong Joon-ho, both of whom have created multiple science fiction films. Rather than foregrounding scientific or technological elements, both directors emphasize character-driven narratives. Yeon Sang-ho, for instance, describes his focus as being on

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[1] The term *speculative* originates from an expression used by American science fiction writer Robert A. Heinlein. French science fiction critic Hervé-Pierre Lambert has defined the characteristics of French science fiction as speculative in nature. In this article, we adopt Lambert's criteria and categorize such works as speculative science fiction. (Hervé-Pierre Lambert, 2009: 22–23)

"the relationship between a mother and daughter trapped in an existential hell due to the mother's final moments"[2], while Bong Joon-ho highlights "the story of an ordinary, powerless, and in some ways pitiful young man"[3] as the core of his filmic vision.

As narrative focus shifts toward socio-political issues, personal relationships or individual emotional experiences, scientific and technological elements are often relegated to a secondary role. As a result, science and technology are not approached with the necessary analytical depth or conceptual rigor. In Yeon Sang-ho's *Jung_E*, for example, the protagonist is portrayed as an artificial intelligence robot generated through cloning and ostensibly capable of uploading consciousness as digital data. However, the foundational assumptions and hypothetical mechanisms behind such a being – particularly the means by which consciousness could be digitized and transferred – are left unexplored and unsubstantiated. Since these elements serve primarily as devices for narrative worldbuilding rather than objects of speculative inquiry, depictions of science and technology frequently rely on familiar visual conventions borrowed from older works.

Scenes built upon well-established conventions offer the benefit of facilitating audience comprehension and narrative accessibility. However, such accumulated clichés can reduce the level of intellectual engagement required for critical interpretation, allowing viewers to process the content with minimal cognitive effort within familiar narrative patterns. This tendency risks oversimplification and may hinder deeper reflection on the scientific and philosophical dimensions of the work. Through an analysis of the Korean SF film *Jung_E*, this article seeks to examine the limitations of conventional representations (a sort of *cliché*) of science and technology in film and to illuminate how such conventions shape, constrain, or distort our understanding of the future and the human condition.

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[2] Chu Seung-hyeon. "Interview with Yeon Sang-ho: Melodrama Film? It Was Originally Planned as SF in Classical Melodrama Format." *The Seoul Economic Daily*, January 21, 2023. https://signalm.sedaily.com/NewsView/29KK6R5U5X/GL01 accessed January 21, 2023).

[3] Oh Bo-ram, and Park Won-hee. "Bong Joon-ho Press Conference: Human-Scented SF, Containing Political Satire." *Yonhap News Agency*, January 20, 2025. https://www.yna.co.kr/view/AKR20250120068951005 (accessed January 20, 2025).

2.   Korean Science Fiction Film *Jung_E*

2.1. Filmographies of Director Yeon Sang-ho and Sociopolitical Films

Jung_E, the focus of this study, represents the fourth feature film by director Yeon Sang-ho. Prior to the release of his first live-action film, *Train to Busan*, in 2016, Yeon had devoted his career to animation. His animated works consistently exhibit a deep engagement with societal issues, particularly those relevant to contemporary South Korean society.

Yeon's two major animated films clearly show his concern with social problems. *The King of Pigs* (2011) examines how collective violence – both physical and emotional – occurs in high school. It focuses on how a group of students collectively bullies an individual and how the school administration turns a blind eye to it. *The Fake* (2013) tells the story of a fraudulent religious group in a small town. The film demonstrates how such groups can manipulate people psychologically and cause harm, including emotional manipulation and sexual abuse.

This topic has been reinterpreted in various TV series. The issue of collective violence remains a major concern in Korean society and has been explored in numerous series such as *Save Me* (2017), *D.P.* (2021), *Hellbound* (2021), *The King of Pigs* (2022), *The Glory* (2022), among others. However, it is important to note that collective violence is not a problem unique to South Korea. This societal issue reflects a broader issue in contemporary global society. It is likely this universal relevance that contributed to the international box office success and critical acclaim of Yeon Sang-ho's first live-action film, *Train to Busan*.

"Yeon's *Train to Busan* follows in the same spirit as his previous animated works". (Lee Soojin 이수진, 2019: 126) As the first Korean zombie film to achieve both domestic and international acclaim, it addresses ethical dimensions of human relationships and familial loyalty. Set in a dystopian world facing systemic collapse due to a zombie outbreak, the narrative emphasizes humanist themes within an apocalyptic context.

The spread of the deadly virus is attributed to experimental research conducted by profit-driven corporations. In the face of this public health crisis, governmental authorities are portrayed as incapable of protecting citizens or maintaining order. The train – serving as a metaphor for contemporary society – brings together a cross-section of human archetypes: a pragmatic businessman, an individualistic executive, a devoted father, a courageous husband, a perceptive pregnant woman, a self-sacrificing grandmother, an energetic teenager, and a young girl embodying innocence.

As the undead assault intensifies, the passengers must fight for survival in complete isolation. However, the greater challenge lies not in the external threat but in the internal moral dilemmas faced by the survivors. Confronted with life-and-death decisions, the group fractures into two camps: one motivated by self-interest and survival instinct, the other guided by altruism and collective solidarity. Ultimately, the sacrifice of the father ensures the survival of a child and a pregnant woman. The film thus elevates familial love as a fundamental value that must be preserved, even in the direst of circumstances.

2.2. Plot Analysis and Narrative Elements of *Jung_E* (2023)

Following *Train to Busan*, the melodramatic theme of familial love has been reinforced through *Psychokinesis* (released in 2018) and *Peninsula* (released in 2020). This theme also figures prominently in *Jung_E*, in which Yeon Sang-ho foregrounds the mother-daughter relationship. Whereas Yeon's earlier works employ dystopia as a spatiotemporal framework to allegorically represent the darker facets of contemporary South Korean society, the dystopian setting in *Jung_E* unfortunately devolves into a generic science fiction trope, lacking speculative depth.

Sociopolitical science fiction traditionally portrays dystopian futures as representations of dysfunctional societies – counterpoints to utopia, or even as inverted utopias. "Dystopia is one-sidedly critical, in the sense that it offers nothing positive, no better world". (Éric Dufour 2011: 208) *Jung_E* unfolds within a dystopian universe shaped by extreme climate change and environmental collapse, rendering Earth uninhabitable and prompting humanity's migration to space-based

refuges. This vision of the future, however, mirrors numerous other science fiction narratives and extends across genres including action, adventure, and superhero films. As such, it represents a well-worn narrative convention lacking in originality or critical nuance.

In *Jung_E*, humanity has established approximately 80 space refuges over several decades. When one of these refuges declares independence as an autonomous nation, it sparks a war that has lasted for over 40 years. In an effort to end the prolonged conflict, a military company develops an advanced AI based on the brain of legendary soldier Jung-e Yoon. The goal is to transplant this AI into mass-produced combat robots through a project called *Jung_E*.
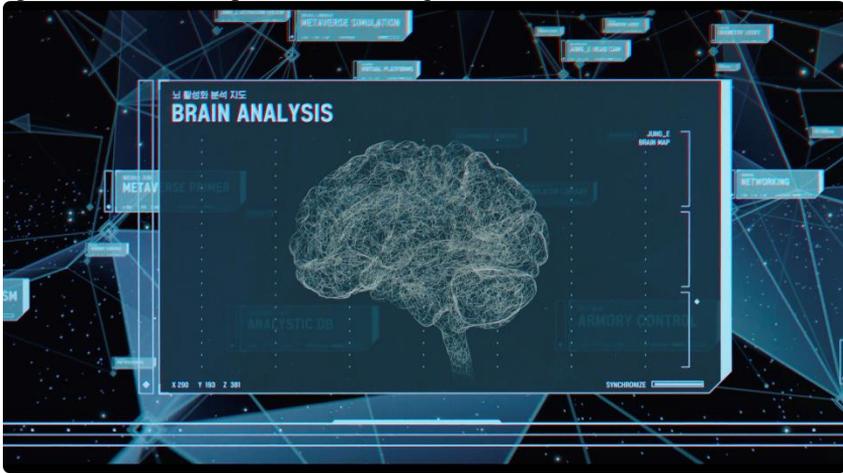
The scientist leading the AI research is Seo-hyun, Jung-e's daughter. She analyzes a cloned 3D brain map of her mother, who had fallen into a vegetative state prior to her death.

Figure 1. Mechanical brain cloned from Jung-e's brain

Source: Scene from *Jung_E* at 14 minutes and 42 seconds

Figure 2. 3D brain map of the robot Jung_E

Source: Scene from *Jung_E* at 15 minutes 37 seconds

Each part of the 3D brain map is activated during training simulations. These simulations are virtual programs that reproduce, in 3D form, the final battle in which Jung-e was defeated by enemy robots. To overcome the critical moment when the AI-equipped robot named Jung_E (modeled after the human Jung-e) is struck by a decisive shotgun blast, Seo-hyun continues her research by repeatedly running the simulations.

Table 1. Analysis of sequences and key events in the film *Jung_E*

Sequence n ° 1	00:00-06:35	• Setting overview of the future society in the film • Defeat of elite soldier Jung-e in battle against mechanical soldiers
Sequence n ° 2	06:36-10:09	• Execution of AI robot training simulations • Introduction of scientist Seo-hyun, Jung-e's daughter
Sequence n ° 3	10:10-17:58	• Initiation of the *Jung_E* project
Sequence n ° 4	17:59-26:20	• Revelation that Jung-e enlisted as a mercenary to fund treatment for Seo-hyun's rare childhood disease
Sequence n ° 5	26:21-35:14	• Flashback to the day of Seo-hyun's medical surgery and Jung-e's departure to the battlefield • Jung-e's consent to brain cloning after sustaining fatal

		injuries • Seo-hyun's current terminal diagnosis with an estimated three months to live
Sequence n ° 6	35:15-41:41	• Progression of training simulations • First activation of an unidentified brain zone and temporary enhancement of combat capability
Sequence n ° 7	41:42-52:44	• War ends and the *Jung_E* project is terminated
Sequence n ° 8	52:45-59:41	• Research director persists despite project cancellation • Repetitive simulation rehearsals continue to fail
Sequence n ° 9	59:42-69:40	• Seo-hyun directly supervises the simulation • Second activation of the unidentified brain zone • Flashback to the day of medical surgery
Sequence n ° 10	69:41-75:54	• Seo-hyun in the simulation chamber • Final training simulation fails completely • All simulation's system is shut down
Sequence n ° 11	75:55-84:28	• Jung_E robot escapes from the facility • Combat occurs between Jung_E robot and opposing multiple robots • Seo-hyun intervenes, enabling successful joint escape
Sequence n ° 12	84:29-90:40	• Final battle between Jung_E robot and the research director • Seo-hyun's intervention results in her critical injury
Sequence n ° 13	90:41-93:48	• Flashback to a joyful moment between mother and daughter • Seo-hyun's death and Jung_E robot's successful escape

Source: Authors' own elaboration

During the simulation involving the eighteenth Jung_E robot, a specific area of the brain becomes activated unlike in previous attempts. After conducting several tests, Seo-hyun discovers that this particular brain region responds when memories related to the original Jung-e's daughter are stimulated. In the end, Seo-hyun sacrifices herself to *liberate* the robot, which contains the mechanical brain preserving her mother's memories.

3. **Symbolic Role of Brain Data Visualization in *Jung_E***

In this chapter, we analyze scenes from *Jung_E* that illustrate the film's conception of memory, learning, and artificial intelligence. This analysis centers on the film's underlying hypothesis: that memory and cognitive functions are localized within distinct and isolated brain regions. These regions, which are assumed to store information, knowledge, and memory, are portrayed as functioning independently without interconnection. This conceptualization aligns with a reductionist paradigm in neuroscience, in which specific cognitive functions are strictly associated with discrete anatomical areas of the brain.

According to this logic, *Jung_E* posits that artificial intelligence can be created by replicating the data stored within individual brain regions. While contemporary neuroscience increasingly challenges such reductionist views – emphasizing the brain's networked and dynamic nature – some science fiction films, including *Jung_E*, continue to rely on this outdated framework and its stereotypical representations.

Brain data visualization appears frequently in *Jung_E*. From the opening through thirteenth sequence, such visualizations feature prominently – particularly in depicting brain mapping, extracting data from the protagonist's experiences and memories, and illustrating the learning and training processes essential to finalizing the AI. These visualizations serve as one of the most effective audiovisual tools for conveying cinematic information to viewers.

Data visualization involves the graphical representation of information in a visually comprehensible manner without relying on language and text. It employs diagrams, histograms, tables, graphs, and other visual elements to illustrate complex data and concepts. This approach emphasizes simplification transforming numerical and textual data into visual signs for more intuitive understanding.

The interactive data visualization in *Jung_E* enables users to understand and manipulate data on the monitor through simple gestures. This method facilitates intuitive understanding by transforming numerical datasets into accessible visual formats.

The data visualization in *Jung_E* was specifically designed during production to reflect this purpose. In this context, constructed

signs are open to interpretation because the *narrating instance*[4] deliberately controls how information is presented visually. Therefore, such visualizations cannot be considered neutral or faithful representations of reality. While these visual elements often coincide with live-action sequences and convey redundant information, they sometimes imply meaning more subtly.

Data visualization complexity varies by target audience. Children's films require explicit, easily understandable displays, while expert documentaries can employ more sophisticated forms. Creating such visualizations necessarily involves selective representation – choosing certain data to include while omitting others.

Figure 3. Brain data visualization
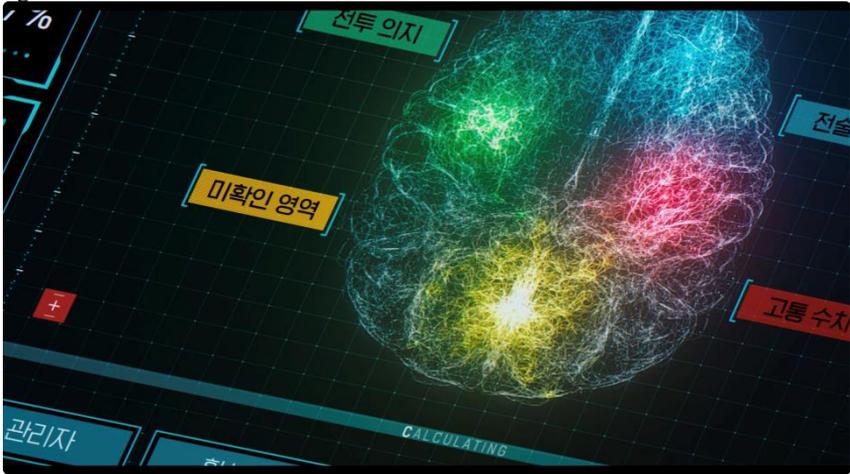
Source: Scene from *Jung_E* at 70 minutes 32 seconds

In *Jung_E*, researchers control the simulation via a panel interface linked to the robot's central processor and mechanical components. The panel displays brain data through simplified visual

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[4] As a film semiologist, Christian Metz proposed the term narrating instance (instance racontante in French) as a substitute for the concept of subject, a notion he considered excessively anthropocentric. Although he occasionally referred to the concept of the great imagist (grand imagier in French) developed by Albert Laffay, Metz favored the notion of narrating instance in developing his theory. C. Metz, L'énonciation impersonnelle ou le site du film, Paris: Klincksieck, 1991. For the concept of the great imagist, see the following work: A. Laffay (1964): "Le récit, le monde et le cinéma", dans Logique du cinéma, Paris: Masson, 51-90.

representations.

The brain map displayed on the control screen resembles human neural network representations used in neuroscience. This visualization particularly evokes *tractography*[5], a three-dimensional modeling technique that visualizes nerve fiber bundles based on diffusion magnetic resonance imaging (dMRI) data.

Current scientific understanding shows that the brain comprises a complex network of interconnected neurons forming structural circuits that transmit nerve impulses. Microscopically, synapses connect individual neurons, while macroscopically, white matter bundles enable connectivity between brain regions. For studying these structural connections, tractography and dMRI are essential technologies – the only non-invasive methods allowing visual reconstruction of white matter pathways in living subjects.[6]

This approach enables researchers to map the brain's connectivity network without surgical intervention. The technique visualizes structural connections between brain regions using specific color-coding systems.

Jung_E employs color-coded brain data visualization that parallels tractography methodologies. The film assigns specific colors to different functional areas: green for combat instinct, red for pain-related regions, blue for tactical zones, and yellow for an initially unidentified area but later revealed to correspond to memory or maternal love. This color-codes differentiation is reinforced through verbal commentary.

While these simplified visual signs resemble the organization of nerve fiber tracts – inspired by scientific methods, the representation significantly adapts and distorts them. It is precisely at this point that the *mythological inflection* described by Barthes becomes apparent: "Myth hides nothing and displays nothing: it distorts. Myth is neither a

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[5] "Tractography, a computational reconstruction method based on diffusion-weighted magnetic resonance imaging (DWI), attempts to reveal the trajectories of white matter pathways in vivo and to infer the underlying structural connectome of the human brain". (Maier-Hein, K.H., Neher, P.F., Houde, JC. et al. 2017: 2)

[6] "A key element in understanding healthy and impaired brain structure and function is the analysis of its neural pathways, the white matter (WM). Over the last decades, the development of diffusion-weighted magnetic resonance imaging (dMRI) has revolutionized our ability to study WM in vivo. By probing the movement of water molecules, dMRI provides information about the microstructure, integrity, and con-nectivity of WM tracts." (Neher, P., Hirjak, D. & Maier-Hein, K.H. 2024: 1)

lie nor a confession – it is an inflection". (Barthes 1957: 202)

Barthes explains myth as a *secondary semiological system*. (Barthes 1957: 187) Every sign consists of a signifier and a signified. This primary level operates independently of myth. Myth arises at the second level, where the sign from the first system functions as a new signifier. This signifier is directly linked to a new signified, forming a new sign within the secondary system. In other words, the complete sign of the first semiological chain becomes "the first term or partial term of the enlarged system that it builds. It is as if the myth shifted the formal system of the first significations by one notch". (Barthes 1957: 187) In this way, the two semiological systems are layered within each other. The signifier of myth has a dual nature, which makes it ambiguous. "It is both meaning and form, full on one side, empty on the other." (Barthes 1957: 190) While it retains its initial meaning, it simultaneously becomes an empty vessel ready to accommodate new conceptual content.

To illustrate this mechanism, consider how the film *Jung_E* employs brain data visualization as mythical sign. The image of a neural bundle rendered in various colors symbolizes cognitive acquisition through experience.

For instance, the green-colored bundle, representing the combat instinct, becomes the mythical signifier that transforms abstract neural processes into controllable, quantifiable objects within the secondary system. This secondary system – where the myth operates – is tied to the film's narrative. Initially, the green bundle appears as simple image, but as the story unfolds, it transforms into a mediating interface for controlling the AI robot.

At this secondary stage, researchers manipulate this colored region with simple gestures. The act of adjusting the data visualization on the control panel – such as moving an icon up or down, left or right – suffices to control the AI's functions completely. With just a few adjustments, the robot begins to fight intensely, or experience intensified pain.

Through this process of visually simplifying the complex neural networks of the human brain and imbuing them with mythical meaning, the film suggests that human cognition, sensory perception, and motor coordination can be quantified, visualized, calculated, and easily manipulated.

This representation promotes a misleading notion of direct

correspondence between behavior and specific brain regions, implying a reductive view of how the brain operates – a view that myth naturalizes as common sense. As the events and narrative actions develop, "a whole new story is implanted in the myth". (Barthes 1957: 191)

> In truth, what is invested in the concept is less the real itself than a certain knowledge of the real; in the transition from meaning to form, the image loses knowledge: so that it may better receive the knowledge of the concept. However, the knowledge contained in the mythical concept is a confused one, composed of soft and unlimited associations. It is important to emphasize this open-ended nature of the concept. […] In this sense, we can say that the fundamental characteristic of the mythical concept is its capacity to be appropriated (approprié in French). (Barthes 1957: 192)

In short, the brain data visualization scenes in *Jung_E* can be interpreted as a myth reflecting fundamental assumptions about human intelligence. While they seem to depict scientific methodologies, these images deliberately blur the boundaries between human cognition and artificial intelligence. As a result, the spectator becomes unconsciously absorbed into the persuasive framework of these ostensibly techno-scientific representations.

4. Myth of Learning and Memory and Its Demystification

The narrative framework of *Jung_E* demonstrates how each segment of the three-dimensional brain map activates during training simulations. These simulations reproduce the virtual environment of the final confrontation between the human Jung-e and a robotic unit – a battle that proved fatal.

The film presents multiple sequences of iterative training sessions, all of which end in failure. These repeated exercises constitute an experimental protocol designed to optimize combat capabilities, with each iteration beginning moments before Jung-e's death and focusing on three key parameters: combat instinct, pain perception, and tactical approach. The training process is repeated through systematic adjustments to the numerical values of these three parameters. When

the robot Jung_E fails against the opposing unit, the simulation terminates immediately, and the artificial neural processor is systematically destroyed irrespective of the processor's performance or potential.

These fictional processes create a regressive loop in which fixed parameters and a static neural configuration inevitably leads to the termination of the robot Jung_E. Within this framework, no learning occurs. In contrast, real-life contexts typically prompt behavioral modifications when individuals encounter recurring problematic situations. Diverse experiences enable the development of varied cognitive patterns, while the re-evaluation of past experiences proves crucial for generating differentiated responses. This principle, grounded in phenomenological and experiential knowledge, has been validated through neuroscientific research.

However, the narrative construction of *Jung_E* demonstrates a fundamental misunderstanding of basic neuroscientific and cognitive principles, as well as elementary human behavioral mechanisms. The film's portrayal of static, non-adaptive neural processing contradicts established research on neuroplasticity and learning, revealing the creators' limited engagement with contemporary cognitive science.

Until the early 20th century, neuroscience and cognitive science research was dominated by *localizationist* theories that assigned specific functions to distinct brain regions – an approach mirrored in *Jung_E*'s segmented brain mapping concept. However, beginning in the 1960s, advances in neuroscience led to the scientific recognition of *brain plasticity*[7] and the emergence of connectionist models. This paradigm shift reconceptualized brain structure and cognitive activity as components of dynamic, interconnected networks rather than isolated, functionally-specific regions. Unlike the static

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[7] The concept of *brain plasticity* – also known as *neuroplasticity* or *synaptic plasticity* – emerged in the late 19th century. It refers to the brain's ability to modify its structure and functions in response to internal or external stimuli. This is not a temporary state but rather an intrinsic and enduring property of the healthy brain throughout the lifespan. *Synaptic plasticity* allows the brain to adapt to environmental changes, facilitates learning, and supports recovery from brain injuries. Spanish neuroanatomist Santiago Ramón y Cajal (1852–1934) was the first to define the neuron as the fundamental cellular and physiological unit of the nervous system. His work significantly influenced early theories on synapses, synaptic transmission, and synaptic plasticity. (Santiago Ramon y Cajal 1894: 444–468)

compartmentalization implicit in *Jung_E*, connectionist[8] approaches recognize that cognitive functions emerge from distributed neural activity capable of adaptation and reorganization.

Connectionist models have fundamentally transformed neuroscience by shifting focus from localized brain functions to distributed neural networks.[9] This paradigmatic shift coincided with advances in cognitive science during the 1990s, when computational approaches increasingly emphasized network-based processing and adaptive learning mechanisms.

In *Jung_E*, scientific experimentation is reduced to the repetitive execution of training simulations. Here, experimentation is depicted as nothing more than interacting with oversimplified graphics. In contrast, real-world information technology research involves the careful design of complex parameters, technical implementation, and iterative adjustments based on feedback data.

While the quality of a science fiction film is not necessarily determined by its adherence to scientific and technological accuracy, the central issue with *Jung_E* lies in the mythologizing effect created by this oversimplification. The film reflects neither a basic understanding of neuroscience, cognitive science, and computer technology, nor a humanistic perspective that takes human complexity seriously. Had the storytelling engaged more rigorously with the

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[8] Neurobiologist Eric Kandel (1929-) elucidated, through his studies on Aplysia, the cellular mechanisms of memory and learning. He demonstrated that in cognitive processes, the strengthening of new synapses or their creation, interneuronal connections, play a more decisive role than the neurons themselves. Subsequently, he focused on clarifying the complex and fundamental mechanisms underlying this process. In 2000, he received the Nobel Prize in Physiology or Medicine with Arvid Carlsson (1923-2018) and Paul Greengard (1925-2019). Their work founded the *connectionist* conception of neuroscience. https://planet-vie.ens.fr/thematiques/animaux/systeme-nerveux-et-systeme-hormonal/la-plasticite-cerebrale (accessed July 20, 2025).

[9] A prominent example is the *Human Connectome Project*, launched on July 1, 2010, which builds upon decades of neural mapping research beginning with Caenorhabditis elegans connectome studies initiated in 1986. The project's fundamental objective is to create comprehensive maps of the structural and functional networks underlying human brain connectivity, thereby illuminating the mechanisms of neural information processing and integration. Between 2009 and 2014, researchers collected data from more than 1,200 healthy adult participants using advanced neuroimaging technologies, including functional magnetic resonance imaging (fMRI) and diffusion MRI (dMRI). This extensive dataset has been made freely accessible to the global neuroscience research community through the project's online platform. https://humanconnectome.org/

processes of human learning and cognition, it would not have reduced such intricate mechanisms to these simplistic representations.

Jung_E uses visual signs that evoke science and technology, thereby presenting AI and robotics research in an experimental setting that appears superficially credible. This narrative framing places the story and its meaning within the mythological system. Furthermore, the oversimplified representation inevitably leads to reductive perception and understanding. Ultimately, the film's portrayal of AI research is reduced to experiments conducted on cloned versions of a human being, governed by a few supposedly controllable parameters. (Notably, the robot Jung_E is visually identical to the human Jung-e, and both are portrayed by the same actress.)

The same logic applies to how obstacles are overcome in AI research within the film. The turning point is portrayed as the accidental discovery of a previously unidentified brain region that is intrinsically linked to the human Jung-e's memories of her daughter. Conversations with her sick daughter, affectionate gestures, final gifts, and other emotional moments are invoked to enable the robot Jung-E to achieve higher levels of combat efficiency and performance.

From this, we can infer the narrative logic that the film establishes: there exists a specific brain region where memories of her daughter are stored; stimulating this region activates maternal love; maternal love generates a desire to see her daughter again; this desire transforms into a will to survive in battle; and this will ultimately leads to tactical optimization in combat against other robots.

This narrative development illustrates how the film, by prioritizing its melodramatic dimension, neglects any deeper or speculative engagement with the complexities of human memory.

The view that human learning and cognitive activity depend on neural network interconnections also applies to memory. Recent research has moved away from the earlier assumption that specific memories are stored in isolated brain regions – for example, fear memories in the amygdala or spatial memories in the hippocampus. Individual memories are now understood to be distributed across multiple brain regions, with researchers successfully mapping the complex neural networks that demonstrate how memories span various interconnected areas throughout the brain.[10]

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[10] "The concept that a memory is stored not just in a single engram cell ensemble but

In *Jung_E*, the solution lies in the accidental discovery of a brain region associated with motherhood. A specific area of the brain is shown to contain memories of the protagonist's daughter, memories that serve as the source of maternal love. Emotion, then, emerges as the ultimate solution to all challenges. All the iterative trial-and-error processes involved in the data-driven training simulations – initially framed as scientific experimentation – are ultimately rendered meaningless.

This development compels us to examine the narrative hypothesis of *Jung_E* explored in this article: that a memory, or even a cognitive ability, is localized within a distinct brain region, operating in isolation. According to this hypothesis, discrete areas of the brain store individual units of information, knowledge, learning, or memory without any interconnection.

The key to overcoming the obstacles in developing the AI robot was hidden from the beginning and only needed to be unlocked by discovering this previously unidentified brain region. This secret region is portrayed as containing total knowledge or the mystical essence of mother-daughter love – reminiscent of Roland Barthes's critique in Mythology of how Einstein's brain was mystified as a symbol of innate genius.

> Paradoxically, the more human genius materialized in Einstein's brain, the more the product of his intellect took on a magical condition, reincarnating the old esoteric image of a science all enclosed in a few letters. There is a secret unique to the universe, and this secret is contained in a word; the universe becomes a safe, and humanity seeks the right combination to unlock it. Einstein almost found it – such is the

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in learning-induced enduring changes in multiple functionally connected neuronal ensembles was suggested by Richard Semon ("unified engram complex") and Donald Hebb ("neurons that fire together wire together"). The experimental evidence for this concept came from an observation that gene expression is altered by experience in widespread, behaviorally- defined neural circuits, multiunit recording experiments that identified distributed brain regions involved in memory formation, and an analysis of engram cells from multiple hippocampal subfields and the amygdala, which has since been supported by activity mapping studies. [...] The distributed nature of engram cell ensembles of a specific memory has led to the suggestion that the memory engram within an individual brain region may contribute a subset of the overall memory information. [...] In conclusion, this study provides evidence supporting the concept that a memory is stored in a functionally connected engram ensembles' complex distributed broadly across the brain, consistent with Semon's unified engram complex hypothesis." (Roy, D.S., Park, YG., Kim, M.E. et al. 2022: 13)

> myth of Einstein. It contains all the great Gnostic themes: the unity of
> nature, the ideal of a fundamental reduction of the world, the opening
> power of the word, the ancestral struggle between a secret and a word,
> and the idea that total knowledge must be discovered at once like a lock
> that suddenly opens after a thousand fruitless attempts. (Barthes 1957: 86)

The specific example of mythologizing Einstein's brain as an organ symbolizing human intellectual abilities illustrates a key point: the understanding of intelligence presented in *Jung_E*, despite its release in 2023, is still rooted in 1950s thinking.

At that time, people believed that knowledge was stored in Einstein's brain. The narrative of *Jung_E* follows the same logic. The power to enhance human abilities is mysterious and hidden somewhere in the brain. To discover it, one need not rely on scientific methods or rigorous experimentation, but simply find the right key in the right place. In the film, that key is the love of a mother and daughter.

Given this narrative development, the audience is spared from considering what it truly means to create an AI robot. Love solves everything. The introduction of AI and simulation experiments becomes insignificant. As stated at the beginning of this article, science and technology remain mere accessories.

5. Conclusion

In this article, we analyzed a science fiction film from a semiotic perspective, focusing on two key areas: representative scenes related to science and technology, and the causal relationships driving narrative development. In particular, we interpreted the brain data visualization scene in *Jung_E* through the lens of Roland Barthes's theory of mythology. In doing so, we aimed to highlight the problematic nature of perpetuating clichés without regard for contemporary scientific advancements. Such an approach can foster misconceptions among viewers who may rely solely on films for their understanding of science. To counter this, we referenced fundamental assumptions and established findings from recent research in cognitive science and neuroscience, albeit to a limited extent. This methodology represents an example of interdisciplinary research bridging semiotics and the natural

sciences.

While science fiction is a genre that thrives on imaginative freedom, it should not resort to entirely unfounded fantasies. Strictly speaking, fantasy is a genre with its own unique features. Rather, science fiction serves as a medium through which scientific and technological discourse can cross the boundaries of laboratories and reach broader audiences. To create original and compelling science fiction, such works must be grounded in genuine engagement with science and technology, which form its foundation and point of departure.

Given the current state of the popular culture industry, the number of high-quality Korean science fiction films remains relatively low compared to the overall production volume. Critics often cite melodramatic tones, an overemphasis on romance, and derivative narratives as key shortcomings. We believe these criticisms likely stem from the genre's insufficient engagement with scientific and technological themes. Through this article, we hope to contribute to the positive development of Korean science fiction by encouraging a more thoughtful integration of scientific themes.

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Bibliography

Barthes, Roland. 1957. *Mythologies*. Paris: Éditions du Seuil.

Chu, Seung-hyeon (추승연). Interview with Yeon Sang-ho (연상호): 'Melodrama Film? It Was Originally Planned as SF in Classical Melodrama Format'. In *The Seoul Economic Daily*, https://sedaily.com/NewsView/29KK6R5U5X (accessed January 21, 2023).

Dufour, Éric. 2011. *Le cinéma de science-fiction*. Paris: Armand Colin.

Laffay, Albert. 1964. *Logique du cinéma*. Paris: Masson.

Lambert, Hervé-Pierre. 2009. La version française de l'imaginaire posthumain. In *Revue de langue et littérature françaises*, Vol. 28: 19-38.

Lee, Soojin (이수진). 2019. *CinémAction Le cinéma de science-fiction*

post-11 septembre, Athis-de-l'Orne: Charles Corle.

Maier-Hein, Klaus, Peter F. Neher, Jean-Christophe Houde, Marc-Alexandre Côté, Eleftherios Garyfallidis, Jidan Zhong, Maxime Chamberland, Fang-Cheng Yeh, Ying-Chia Lin, Qing Ji, Wilburn E. Reddick, John O. Glass, David Qixiang Chen, Yuanjing Feng, Chengfeng Gao, Ye Wu, Jieyan Ma, Renjie He, Qiang Li, Carl-Fredrik Westin, Samuel Deslauriers-Gauthier, J. Omar Ocegueda González, Michael Paquette, Samuel St-Jean, Gabriel Girard, François Rheault, Jasmeen Sidhu, Chantal M.W. Tax, Fenghua Guo, Hamed Y. Mesri, Dávid Szabolcs, Martijn Froeling, Anneriet M. Heemskerk, Alexander Leemans, Arnaud Boré, Basile Pinsard, Christophe Bedetti, Matthieu Desrosiers, Simona Brambati, Julien Doyon, Alessia Sarica, Roberta Vasta, Antonio Cerasa, Aldo Quattrone, Jason Yeatman, Ali R. Khan, Wes Hodges, Simon Alexander, David Romascano, Muhamed Barakovic, Anna Auría, Oscar Esteban, Alia Lemkaddem, Jean-Philippe Thiran, H. Ertan Cetingul, Benjamin L. Odry, Boris Mailhe, Mariappan S. Nadar, Fabrizio Pizzagalli, Gautam Prasad, Julio E. Villalon-Reina, Justin Galvis, Paul M. Thompson, Francisco De Santiago Requejo, Pedro Luque Laguna, Luis Miguel Lacerda, Rachel Barrett, Flavio Dell'Acqua, Marco Catani, Laurent Petit, Emmanuel Caruyer, Alessandro Daducci, Tim B. Dyrby, Tim Holland-Letz, Claus C. Hilgetag, Bram Stieltjes, and Maxime Descoteaux. 2017. The challenge of mapping the human connectome based on diffusion tractography. In *Nature Communications*, Vol. 8: 1–13.

Metz, Christian. 1991. *L'énonciation impersonnelle ou le site du film*. Paris: Klincksieck.

Neher, Peter, Dusan Hirjak, and Klaus Maier-Hein. 2024. Radiomic tractometry reveals tract-specific imaging biomarkers in white matter. In *Nature Communications*. Vol. 15: 1-12.

Oh, Bo-ram (오보람), and Won-hee Park (박원희). Bong Joon-ho Press Conference: Human-Scented SF, Containing Political Satire. In *Yonhap News Agency*, https://www.yna.co.kr/view/AKR20250120068951005 (accessed January 20, 2025).

Park, Young-Gyun (박영근), Dheeraj S. Roy, Minyoung Kim (김민영), Ying Zhang, Sachie K. Ogawa, Nicholas DiNapoli, Xinyi Gu, Jae H. Cho, Heejin Choi (최희진), Lee Kamentsky, Jared Martin, Olivia Mosto, Tomomi Aida, Kwanghun Chung (정광훈), and Susumu Tonegawa. 2022. Brain-wide mapping reveals that engrams for a single memory are distributed across multiple brain regions. In *Nature Communications*, Vol. 13: 1–17.

Ramon Y Cajal, Santiago. 1894. La Fine Structure des Centres Nerveux, In *Proceedings of the Royal Society of London*, Vol. 55: 444–468.