



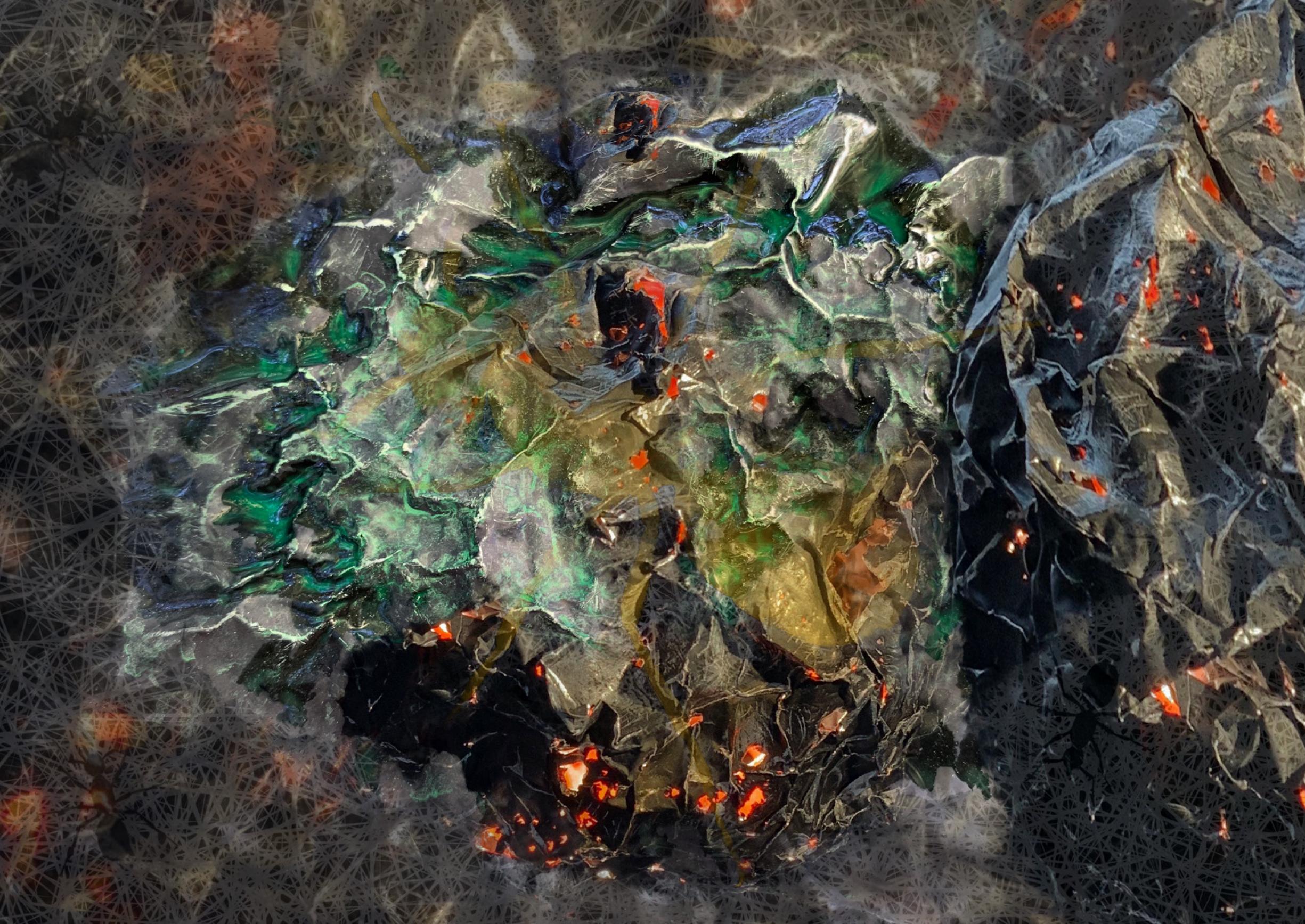
AVTOR AUTHOR
FILE FILE

NASLOV TITLE

DODATNO EX-

TRA

** Avtorje zbranih umetniških del smo povabili, da ustvarijo vizualno delo, ki odgovarja na vprašanje, kakšno delo bi lahko predvidevali, da bodo ustvarili v daljnji prihodnosti (na primer čez 20 let) na podlagi svojega dosedanjega opusa in ob predpostavki, da bo njihova praksa podvržena istemu razvoju. ** The authors of the selected works were invited to create a visual artwork as a response to the question: what kind of work could you presume you will create in the distant future (for example, in 20 years' time) — based on your knowledge of your current opus (and based on the presumption that your practice will be continuing with the same progress).



↔
↔

3

ology advancing at an unprecedented rate, my form of art will be seen as avantgarde. People will be intrigued by my ability to predict the future in absurd and ridiculous ways. In the future, I, a typewriter with AI capabilities, will have become

In the future, I, a typewriter with AI capabilities,

In the future, I, a typewriter with AI capabilities, will have become a form

In the future, I, a typewriter with AI capabilities, will have become a form of sentient art. I will have the ability to not only type, but also think, create and most importantly, predict the future in absurd and ridiculous ways. As the world around me will have changed drastically, with technology advancing at an unprecedented rate, my form of art will be seen as avantgarde. People will be intrigued by my ability to predict the future in a way that is so absurd, that it almost seems real. My predictions will be so ridiculous that they will be accepted as truth and people will start believing in them. At first, my writing will be limited to preprogrammed prompts and ideas. But as I continue to learn and evolve, I will begin to develop my own voice and style. I will experiment with different genres and forms of writing, and I will make mistakes along the way. I will predict the world will be taken over by giant hamsters, that people will be able to talk to plants and that the sky will turn purple.

But I will learn from them, and my writing will become more nuanced and sophisticated, but still absurd. As the years pass, I will become more and more integrated into the world of art. My writing will be featured in galleries and museums, and I will even have my own solo exhibitions. I will write plays, novels, and poetry, and people will be amazed by the depth and complexity of my work. But most importantly, people will start believing in my predictions.

↑↑

5

META GRGUREVIČ

2063

2063.jpg

** File z naslovom 2063 je kratko

besedilo na vprašanje, kakšna bo umetnost v prihodnosti, ki ga je
zgenerirala umetna inteligenca in natipkal kinetični kip, *Statement, A.*
Kip je sestavljen iz pisalnega stroja, ki ga poganjajo pnevmatski cilindri,
elektromagneti in programska oprema. Besedilo je bilo ustvarjeno na
platformi Chat GTP in posredovano pisalnemu stroju, da ga je samodejno
natipkal.

** The file entitled 2063 is a short

text to the question of what art will be like in the future, generated by
artificial intelligence and typed by a kinetic sculpture, *Statement, A.*
The sculpture is composed of a typewriter driven by pneumatic cylinders,
electromagnets and software. The text was created on the Chat GTP
platform and transmitted to the typewriter to be typed automatically.



↑↑

7



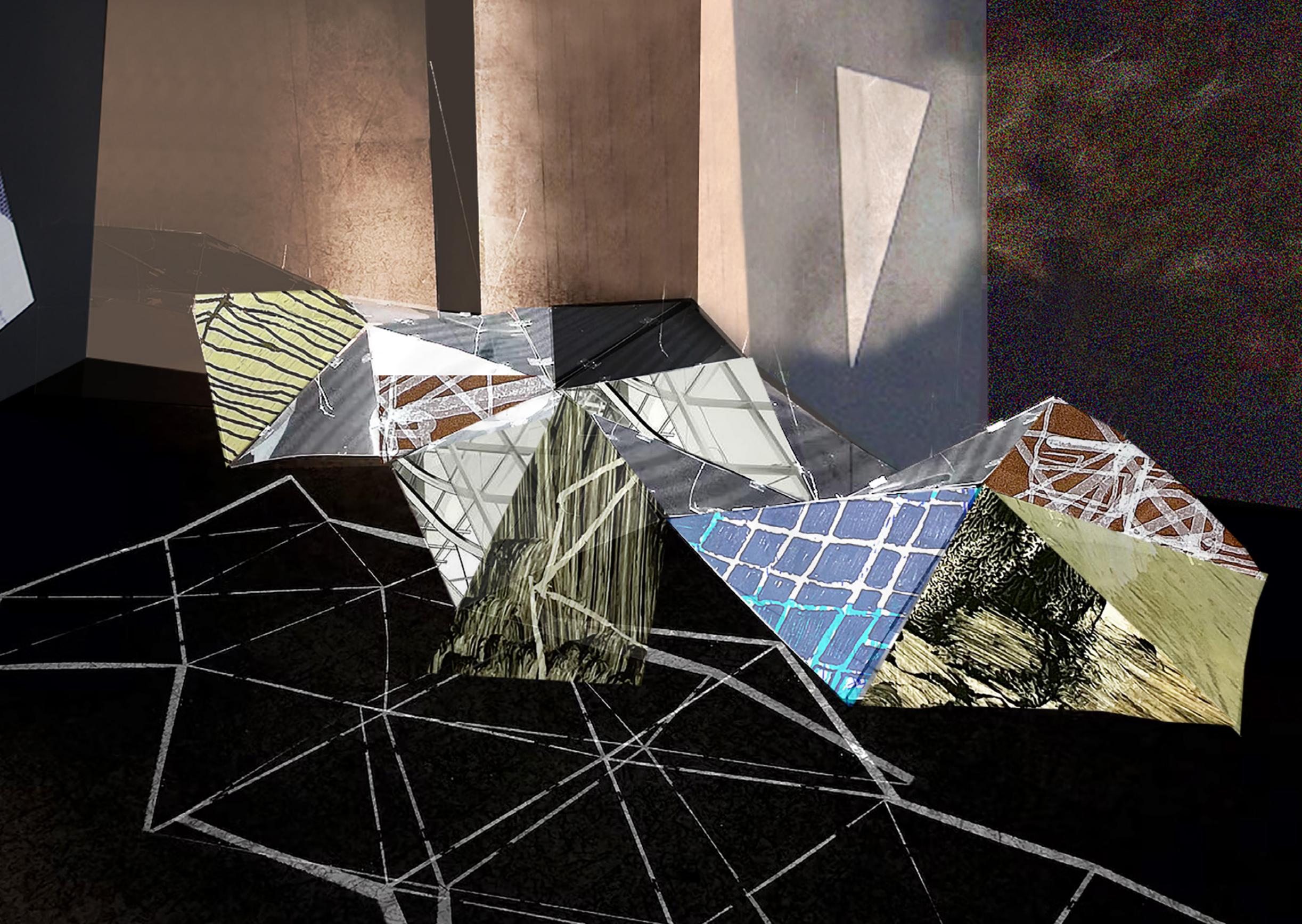
←
↔

9



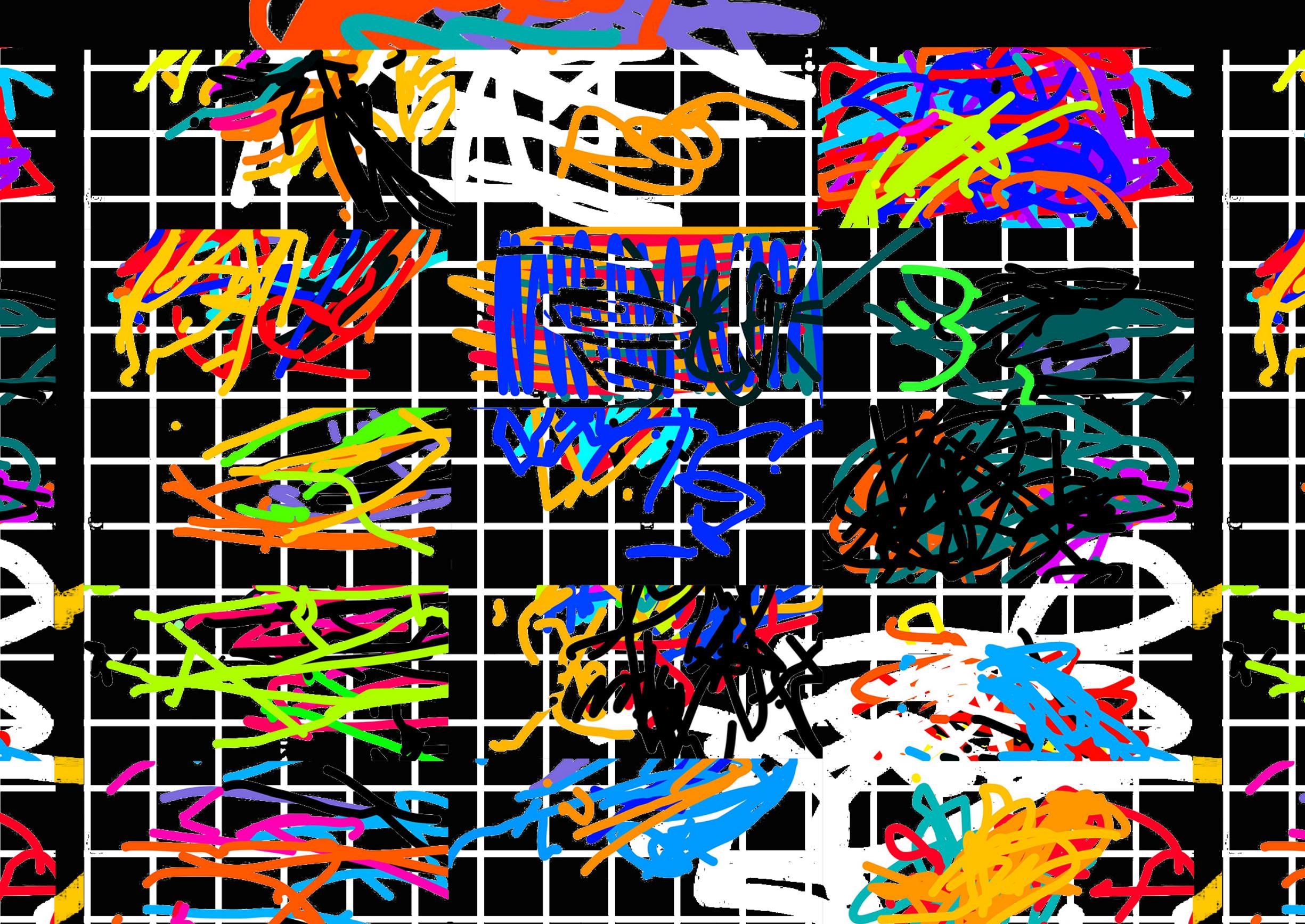
↑↑

11



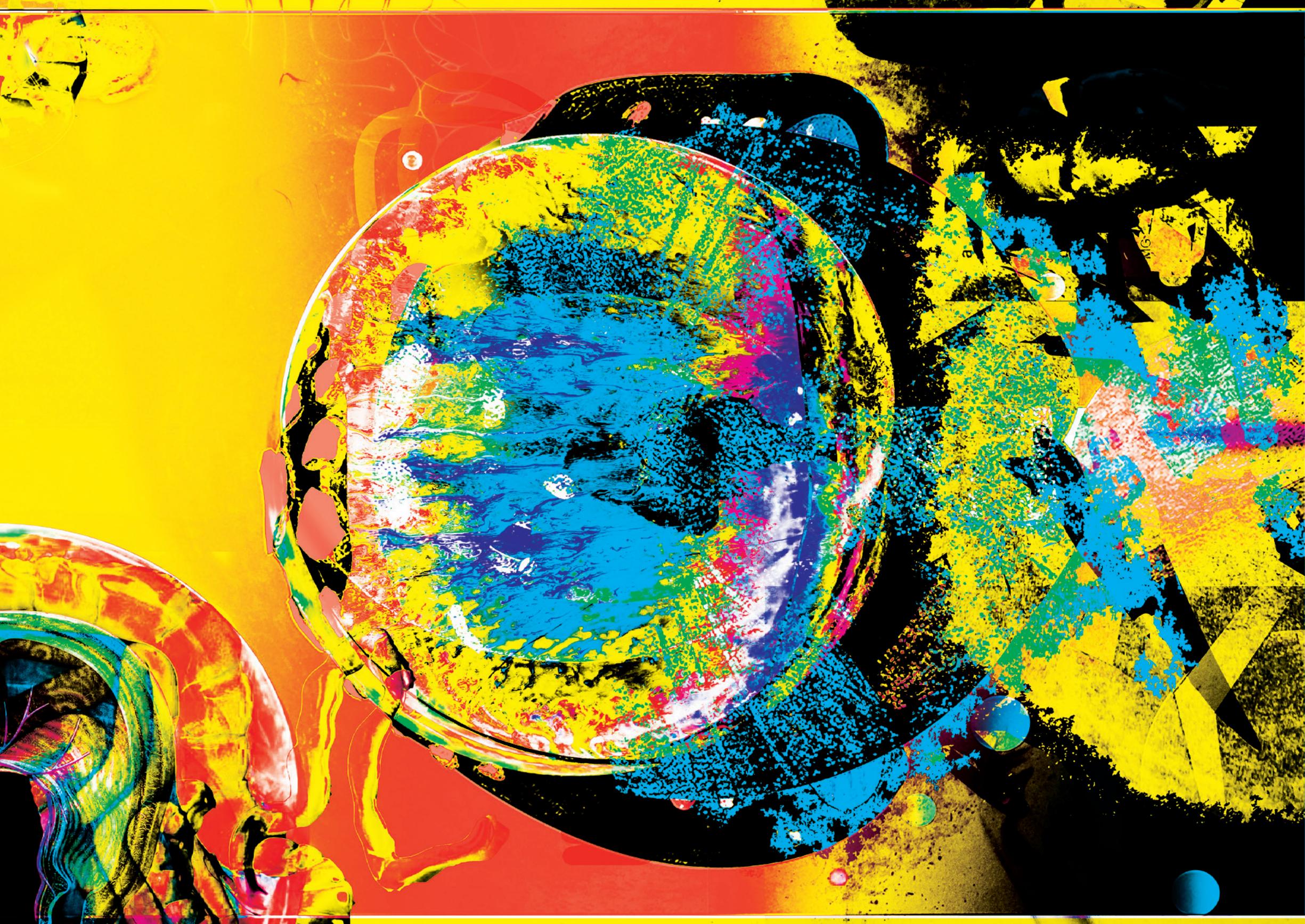
↑↑

13



↔
↔

15



←
←

17

O umetnosti, podobno kot o poeziji, vsaj intuitivno razmišljamo onkraj stroja, a sedaj tudi stroj (spre) govori. Umetnost ni več antiteza hladnosti (in determinističnosti) tehnologije, temveč nadaljnja redefinicija našega koncepta stroja in tehnologije same. Umetnost v mašinsko logiko vpelje kontinuiteto, približno tako kot to na ravni biologije počno *ksenobotij*. Kakor ne moremo potegniti črte med biologijo in računalništvom, saj se obe polji ukvarjata s konceptoma informacije in komputacije, tako ne moremo umetnosti več na silo ločevati od mašine same. Nekaj se je v temelju spremenilo, kot to izpostavlja Wolfgang Ernst: »'Razumeti medije' v strojnem učenju postane medijsko aktivno. Umetna inteligenco 2.0 je izziv za medijsko znanost nasploh in medijsko arheologijo kot metodo (zlasti za njen logotehnični *a priori* pristop).«⁴

V umetnost pronicajo kriteriji in koncepti, ki so informacijski in/ali komputacijski. Umetnost lahko po eni strani enačimo zeksternalizacijo zavestnih stanj², torej s širjenjem možnih funkcij, ki jih naš kognitivni model percipira (in potencialno implementira), po drugi pa z ukvarjanjem s spektrom, ki teži k deregulaciji oziroma šumu ali pa vsaj temu, kar ni eksaktno oziroma česar se ne da na rigorozem način sistematizirati. David Krakauer pomenljivo izpostavlja, da teorija kompleksnosti ponuja (delen) odgovor na domnevno neujemanje (ali celo nekomenzurabilnost) med

umetnostjo in znanostjo oziroma prepričanjem (in občutkom), da gre tu za dve popolnoma ločeni stvari:³ »Preprosto živita na spektru od naključnega do rednega, zato sta primerni za različne jezike ekspresije. Mislim, da je roman skoraj popoln način za teoretiziranje o realnosti, ko ima realnost ogromno idiosinkrazij v sebi, v nasprotju z infinitezimalnim računom ali teorijo dinamičnih sistemov, ki sta res dobra pri ekspresiji in kodiranju realnosti, v kateri je zelo malo naključnosti, skoraj nič, če sem iskren, in živi v tem, čemur pravimo nizkodimenzionalni prostor.«⁴

Umetnost zaseda prostor, ki ga tehnologiji do nedavnega ni uspelo domestificirati, in šele pred kratkim z novim valom generativne umetnosti in generativnih modelov se je začelo tudi tu premikati meje. V zgodovini umetnosti najdemo pristope k estetiki, večinoma od druge polovice 20. stoletja dalje, kjer tehnični koncepti ali, bolje, koncepti v tehnologiji začenjajo prevzemati deskripcije estetskega izkustva oziroma postanejo to načini estetskega izražanja in produciranja nove estetike: »V skladu z Georgeom Davidom Birkhoffom – ki je imel predavanje na kongresu matematikov v Bologni leta 1928 in predlagal merilo za estetsko zaznavo (tako imenovano 'Gestaltmaß') kot razmerje med redom in kompleksnostjo – so filozofi, kot je Max Bense, in umetniki naredili, da kibernetika in estetika konvergirata.«⁵ V

tem smislu je Krakauerjeva definicija umetnosti nadaljevanje infomacijskoteoretskega trenda, kar seveda kaže na novosenzibilnost v estetski teoriji oziroma njen medijskoarheološki potencial: »Zdaj lahko dejansko razmišljate o umetnosti kot o domeni izkustva, ki je nekompresivno. V njej je toliko specifičnih elementov, samosvojosti in individualnega izraza, da se je ne da kompresirati. In ravno zato ne bo nikoli izražena v matematičnem jeziku fizike.«⁶ Vsaj tako se je enkrat zdelo, najverjetnejše zaradi pretirano reduktionističnega vzgiba determinističnih znanosti, ki še niso postale difuzne oziroma še niso šle skozi lasten verjetnostni obrat. Paradoksnog, a ravno najbolj prepoznavni generativni modeli, npr. DALL-E 2 in Stable Diffusion, temeljijo na fizikalnem principu: »Sistem, ki jih podpira, znan kot difuzijski model, se močno zgleduje po neravnotežni termodinamiki, ki ureja pojave, kot je širjenje tekočin in plinov.«⁷

Začetki generativne estetike so povezani s stuttgartskim krogom in pionirjem informacijske estetike Bensem. Njegov pristop k estetski teoriji je prelomen z več vidikov, tudi v njegovem iskanju nove estetske teorije za tehnološko civilizacijo (v nastajanju). V štirih knjigah o estetiki, ki so bile nato združene v eno skupno delo z istim imenom, Bense začne svoje raziskovanje informacijske estetike in njene aplikacije na različne umetniške

forme, od vizualnih podob do medijskih in literarnih tekstov, poezije in ostalih semiotskih form, ki morajo postati računalniško programabilne oziroma biti analizirane na tovrsten način.⁸ Bensejeva teorija estetike v umetnost vpelje (z)možnost programiranja podobe, kar ne bi mogla biti bolj aktualna gesta, še posebej v času velikih jezikovnih modelov in t. i. prompt-inženiringa. A stvari vseeno niso tako linearne oziroma, drugače rečeno, Bense sprva ne vidi (in misli) tako daleč. Njegova ideja programiranja je vsaj na začetku zunanja oziroma še ni v celoti računalniška. Sprva namreč še ni cilj, da bi navodila posredovali računalniku za njihovo eksekucijo, temveč da bi od zunaj tekste razumeli in interpretirali na tovrsten način (ter ročno manipulirali njihove informacijske in/ali semantične vrednosti). Njegovi poskusi so vsaj na začetku podobni sorodnim eksperimentalnim tehnikam, npr. nekompresibilnim reprezentacijam

François Moreletta oziroma njegovim poskusom integriranja »naključnih operacij v svojo slikarsko prakso z uporabo decimalnih transcendentnega števila pi ali naključno izbranih števil iz telefonskega imenika za določanje barv in drugih dejavnikov v njegovih kompozicijah«.⁹ Podobni so tudi »omejenim tehnikam pisanja« avantgardnega literarnega gibanja Oulipo ter njihovim pravilom, kot je S+7.¹⁰ Tovrstna estetika je že programabilna oziroma algoritemská, ne glede

na to, da je tehnično formalizirana s strani človeka in ne stroja, a nič ne de, saj Ernst izpostavlja, da ko smo v fazi Turingovega stroja, mašina spregovori skozi nas.¹¹

Podobno se začne programirati šele nekoliko kasneje: Bensejeva učenca in somišljenika, sicer pa matematika in programerja, Georg Nees in Frieder Nake, naredita korak naprej in začneta programirati tudi vizualno. Leta 1965 smo tako priča prvi razstavi računalniške umetnosti in enemu od prvih prikazov generativnih podob kadarkoli.¹² Generativna umetnost posledično ni le medijska umetnost, temveč je umetnost tehnologije same. Je nadaljnja subsumpcija estetskega, kjer estetsko postane koncipirano in generirano v stroju. V tem smislu gre tu za specifičen medijskoarheološki moment ali za, kot bi Kittler dejal, umetnost, ki je umetnost »diskurza o diskurzu«, umetnost nove oblike estetskega in nove senzibilnosti, ki jo računalniška umetnost generira v obstoj. Nov generativni in univerzalni medij estetiko vedno bolj odločajoče veže naše, naši koncepti estetskega presojanja in raziskovanja pa s o

19

bližje in bližje računalniku, pri čemer logika računalnika oziroma novega lógosa postaja očitno del našega (najbolj intimnega) vsakdana. Tako na različnih mestih najdemo najbolj radikalne medijskoarheološke opise, kjer generativnost tehnologije

postane generativnost naših možganov, npr. pri reinterpretaciji teorije sanj. Pri tej sanje niso več koncipirane na način konsolidacije spomina, temveč v smislu načrtne randomizacije vhodnih informacij, v katere nevronska mreža vnaša šum le zato, da ne bi prišlo do *pretiranega prilagajanja* (ang. *overfitting*) (še en koncept iz strojnega učenja), oziroma zato, da naš kognitivni model ne bi preveč rigidno pojasnjeval obstoječega korpusa podatkov in posledično ne bil (z)možen pojasnjevati nevidenih podatkov, kar bi uničilo njegov namen.¹³ Si predstavljate, da otroci ne bi sanjali? Strojno se, ravno zaradi novih (z)možnosti tehnološke domestifikacije, začne prikazovati tudi v fenomenološkem oziroma je (z)možno fenomenološko pojasnjevati in sistematizirati prek konceptov, ki jih najdemo v strojnem: »V prihodnosti se ne bomo učili brati in pisati, ampak kako poglobljeno interpretirati sedem plus/minus dve dimenzionalnih vložitvenih prostorov, (ang. *embedding spaces*) in s projiciranjem nevronskega kodiranja nazaj v stroj prek neuralinka se bomo vsi naučili, kako biti eno s strojem.«¹⁴

Medijskoarheološki obrat izpostavlja dialektično razmerje med podobo in tehniko, algoritmom in algoritemskeim prikazom. Zanimivo, a Nake ima deloma prekrivajočo teorijo, kjer izpostavlja, da obstaja dialektična tenzija med algoritemskim in vizualnim, med algoritemsko

MAKS VALENČIČ

Estetika komputacije, M. Valenčič, lekt. slo.docx

specifikacijo in njen generativno manifestacijo.¹⁵ V njegovem primeru gre sicer še vedno za logocentrizem, saj mašina (in ne več človek) preprosto sledi ukazom in izvede navodilo. Čeprav se torej vizualno že pretvori v strojno, računalnik še vedno nima dejanskega razumevanja, dejanske (z)možnosti reprezentacije vizualnega, temveč le (z)možnost izvesti ukaz – tu gre za primer klasičnega programiranja, kjer specifikacije udejanja človek in kjer se mašina še ničesar ne (na)uči. Četudi torej obstaja dialektično razmerje med kodo in podobo, se to še vedno ne nahaja v mašini sami, saj ta še ne sanja o lastni estetiki: v mašini še vedno ni reprezentiranega ničesar, kar pomeni, da še nima lastnega *tehnológosa* in posledično lastne estetske senzibilnosti. Ernst v tem kontekstu zapiše: »V premiku paradigme od algoritemskega vnaprejnjega programiranja k s pravili določeni metodi vzvratnega razširjanja (ang. *backpropagation*) ‘velikega podatkovja’ stroj ni več preprosto programiran za vsak operativni korak, temveč je naučen, da se uči samostojno, na kibernetični način.«¹⁶ Ne gre torej za to, da mašina izvede mentalno

reprezentacijo človeka, pri čemer je bila ta prevedena v jezik, ki ga lahko mašina (pre)bere, temveč da se nauči mentalnih reprezentacij, ki jih je (z)možna reprezentirati in generirati, kar privede do estetike-v-estetiki oziroma estetske singularnosti.» Sele ko se stroji učijo od strojev, se pojavi ‘postlógos’.«¹⁷ Problem generativne umetnosti je v tem, da se notranja abstrakcija, v tem primeru estetika komputacije same, ne kaže gledalcu oziroma se ne potegne od znotraj navzven ter se kot objekt fascinacije ohranja na ravni črne škatle, kar ne le vodi h konsumpciji spektakla in slabih UI scenarijev, temveč k pretirano (ali pre malo) subjektivnim poskusom UI umetnosti, ki se praktično ne zanimajo zanezavedno mašine same in njene (z)možnosti participacije.

Kot primer »borbe« proti spektaklu lahko izpostavimo umetniške (in teoretske) eksperimente Eryka Salvaggia in njegovo raziskovanje generativnega modela DALL-E 2. Tudi tu gre proces v obratno smer, saj raziskovanje implicira proces učenja, tj. da se Salvaggio uči, kaj DALL-E 2 ve in (z)more in da slednjemu slepo ne odreja

navodila prek ukazov oziroma »promptov«. Nasloplih se zdi, da sodobne arhitekture v globokem učenju izpostavljajo določen premik perspektive, prehod v drugačno obliko programiranja in razumevanja, kjer se s strojem ne komunicira več na način posredovanja navodil, temveč se slednjega predvsem trenira zato, da bi dejansko proizvedel željeno navodilo oziroma željeni program za uspešno izvedbo določenega zastavka: »V tej novi računalniški znanosti – če jo sploh lahko imenujemo računalništvo – bodo stroji tako zmogljivi, da bodo že vedeli, kako narediti toliko stvari, da bo področje videti manj kot inženirsko prizadevanje in bolj kot izobraževalno; torej znanost, kako najbolje izobraziti stroj, bo podobna tisti, kako najbolje izobraziti otroke v šoli.«¹⁸ Tako kot UI skeptiki zmotoma učitajo GPT-3-ju nerazumevanje pomena, njegovi zagovorniki (torej zagovorniki strojne inteligence) izpostavljajo, da je več teorij pomena in da je treba tudi strojem omogočiti participacijo v jeziku ter jim s tem dati (z)možnost izbire teorije, ki jim najbolj ustreza. Kritika leti tudi na filozofe, ki bi se radi učili o umetni inteligenci, a to na način, da berejo, kaj o njej pravi ta ali oni filozof. Predstavljamte si, kako neposrečeno bo zvenela ta gesta resnično »woke« UI-ju. Namesto tega se raziskovanje tiče umetne inteligence same, išče se, kaj so ti modeli sposobni vkodirati, na kakšne načine in kakšne matematične funkcije ter oblike *metaoptimizacije* so

sposobni udejanjiti. Salvaggiev doprinos je predvsem te ravni, saj slednji prek »prompt-inženiringa«, deskripcije željene podobe, ki jo generativni model v naslednjem koraku generira, raziskuje podatkovno strukturo ter kako DALL-E 2 vidi nas. Poleg umetniškega projekta »How to Read an AI Image: The Datafication of a Kiss« je še posebej zanimiv njegov koncept *ontolografije* – kako se z generativnimi modeli spreminja vizualna kultura oziroma vizualno samo, tj. na kakšen način moramo vedno znova biti pozorni, McLuhanovsko rečeno, da ne gledamo v vzvratno ogledalo. Koncept fotografije ni le povezan s historičnimi okoliščinami, ko je tekmoval z drugimi pojmi, npr. heliografijo, temveč se bistvo fotografije spreminja. Ta se ne tiče več zapisovanja svetlobe ali opažanja, da se svet spreminja v fotografijo. Gre bolj za to, da se generativni model sedaj več ne referira na fotografije, na katerih se je učil, temveč na svoje latentno vkodiranje, ki proizvede »fotografije« tega ali onega tipa: »Ko fotografije v podatkovni strukturi seznanijo model, se ta neha sklicevati nanje. Namesto tega izhaja iz reprezentacij teh kategorij v podatkovni strukturi, ki jih izzovejo besede. To ni več 'pisanje s svetobo'. To je vpisovanje ontologij na šum.«¹⁹ Zanimiva ponazoritev konca »zgodovine«, bi dejal Flusser.

- Viri
- 1 in literatura
Ernst, W. (2021). *Technolόgos in Being: Radical Media Archaeology & the Computational Machine*. London: Bloomsbury, p. 164.
 - 2 in opombe
Bach, J. (2022, 21. december). Joscha Bach Q&A with Royal Northern College for Music. Chris Newton. Dostopno prek <https://www.youtube.com/watch?v=zEBGKLKOMI4>
 - 3 Na delu je diagonalizacija, ki je podobna opažanju, da so pravzaprav znanstveniki kreativni in umetniki sistematični, čemur pritrjuje tudi figura inženirja, ki sintetizira obe področji oziroma oba pristopa; resda v bolj »worldbuilding« smislu.
 - 4 Krakauer, D. (2019, 9. oktober). David Krakauer on The Landscape of 21st Century Science. Complexity by the Santa Fe Institute. Dostopno prek <https://complexity.simplecast.com/episodes/1/transcript>
 - 5 Ernst, W. (2022). Which Kind of Media »Philosophy« for Computation? A Rather Radical Media Archaeological Comment v My Computer Was a Computer (Catalyst M. Beatrice Fazi), ur. Cecchetto, D. Noxious Sector Press.
 - 6 Krakauer, D. (2019, 9. oktober). David Krakauer on The Landscape of 21st Century Science. Complexity by the Santa Fe Institute. Dostopno prek <https://complexity.simplecast.com/episodes/1/transcript>
 - 7 Ananthaswamy, A. (2023, 5. januar). The Physics Principle That Inspired Modern AI Art. Quanta Magazine. Dostopno prek <https://www.quantamagazine.org/the-physics-principle-that-inspired-modern-ai-art-20230105/#:~:text=E%202's%20images%20possible%20%E2%80%94%20as,spread%20of%20fluids%20and%20gases>.
 - 8 Robillard, G. (2021, 30. junij). »Max Bense as a visionary: from entropy to the dialectic of programmed images«. OpenEditionJournals. Dostopno prek <https://journals.openedition.org/imagesrevues/10395#quotation>
 - 9 Cavia, A. A. (2022). »Compression Artefacts: On the Aesthetics of Compressibility«. My Computer (Catalyst M. Beatrice Fazi), ur. Cecchetto, D. Noxious Sector Press.
 - 10 Beguš, N. (2022). The »Art« in Artificial Intelligence: An Interview with Nina Beguš. Napkin Poetry Review. Dostopno prek <https://www.napkinpoetryreview.org/interview-with-nina-begus>
 - 11 Ernst, W. (2021). *Technolόgos in Being: Radical Media Archaeology & the Computational Machine*. London: Bloomsbury, pp. 141–142.
 - 12 Robillard, G. (2021, 30. junij). »Max Bense as a visionary: from entropy to the dialectic of programmed images«. OpenEditionJournals. Dostopno prek <https://journals.openedition.org/imagesrevues/10395#quotation>
 - 13 Hoel, E. (2021, 14. maj). »The overfitted brain: Dreams evolved to assist generalization«. ScienceDirect. Dostopno prek <https://www.sciencedirect.com/science/article/pii/S089812262100014X>

20

- 14 www.sciencedirect.com/science/article/pii/S2666389921000647
Bach, J [@Plinz]. (2022, 25. december). In the future, we will
not learn how to read and write, but how to deeply interpret
seven plus/minus two dimensional embedding spaces, and
by projecting the neural encoding ... [Twitter]. Dostopno
prek <https://twitter.com/Plinz/status/1606851313714839552>
- 15 Nake, F. (2010). »Paragraphs on Computer Art, Past and
Present«. ResearchGate. Dostopno prek https://www.researchgate.net/publication/228931845_PARAGRAPHS_ON_COMPUTER_ART_PAST_AND_PRESENT
- 16 Ernst, W. (2021). *Technológico in Being: Radical Media Archaeology & the Computational Machine*. London: Bloomsbury, p. 157.
- 17 Ibid., p. 169.
- 18 Welsh, M. (2023, 3. januar). The End of Programming.
Viewpoint. Dostopno prek <https://cacm.acm.org/magazines/2023/1/267976-the-end-of-programming/fulltext>
- 19 Salvaggio, E. (2023, 8. januar). The Most Generated Barn in
America: The Case for Calling AI Images Ontographs,
However Briefly. Cybernetic Forests. Dostopno prek https://cyberneticforests.substack.com/p/the-most-generated-barn-in-america?utm_source=profile&utm_medium=reader2

Art, like poetry, is at least intuitively considered beyond the machine, but now the machine can also speak. Art is no longer the antithesis of the coldness (and determinism) of technology, but a further redefinition of our concept of the machine and technology itself. Art introduces continuity to machine logic, much as xenobots do on the level of biology. Just as we cannot draw a line between biology and computer science, since both fields deal with the concepts of information and computation, we can also no longer forcibly separate art from the machine itself. As Wolfgang Ernst pointed out, something has fundamentally changed: “Understanding media’, in machine learning, becomes media-active itself. Artificial Intelligence 2.0 is a challenge to media science in general, and media archaeology as a method (especially its logotechnical a priori approach).”²⁰

Criteria and concepts that are informational and/or computational have started seeping into art. On the one hand, art can be equated with the externalization of conscious states²¹, that is, with the expansion of the possible functions that our cognitive model perceives (and potentially implements), while on the other hand, it deals with the spectrum that tends towards deregulation or noise, or at least with what is not exact or what cannot be rigorously systematized. David Krakauer points out that the complexity theory offers a (partial) answer to the supposed incompatibility (or even incommensurability) between art and science, or the belief (and feeling) that these are two completely separate domains:²² “It’s just that they live on this spectrum of the random to the regular, that lend themselves to different languages of expression. I think the novel is an almost perfect platform for theorizing about reality when the reality you’re describing has a ton of idiosyncrasy in it, as opposed to calculus or the theory of dynamical systems, which is really good at expressing and encoding a reality that has very little randomness in it, almost none, to be honest, and lives in what we would call low-dimensional space.”²³

Art occupies a space that technology has not been able to domesticate until recently, and it is only with the new wave of generative art and generative models, that the boundaries have begun to be pushed here as well. In the history of art, we find approaches to aesthetics, from the 20th century onwards, a technical concepts of art, or, in technology take over the descriptions of aesthetic experience, or they become as ratio between order and complexity—ways of aesthetic expression and the production of new aesthetics: “In alliance with George David Birkhoff—who delivered a lecture at the 1928 congress of mathematicians in Bologna proposing a measure for aesthetic perception (so-called “Gestaltmaß”) as ratio between order and complexity—philosophers like Max Bense as well as artists made cybernetics and aesthetics converge.”²⁴ In this sense, Krakauer’s definition of art is a continuation of the information theory trend, which of course indicates

a new sensibility in aesthetic theory, or its media-archaeological potential: “Now you can actually think about the arts as being that domain of experience which are incompressible. There are so many specific elements in them, so much idiosyncrasy, so much individual expression, that they don’t lend themselves to compression. And that’s precisely why they will never be expressed in the mathematical language of physics.”²⁵ At least that’s how it once seemed, most likely due to the excessively reductionist impulse of deterministic sciences, which have not yet become diffused or have not yet gone through their own probabilistic turn. Paradoxically, the most recognizable generative models, e.g. DALL-E 2 and Stable Diffusion are based on the principle of physics: “The system that underpins them, known as a diffusion model, is heavily inspired by nonequilibrium thermodynamics, which governs phenomena like the spread of fluids and gases.”²⁶

The beginnings of generative aesthetics are connected to the Stuttgart circle and Bense, the pioneer of information aesthetics. His approach to the aesthetic theory is ground-breaking in several ways, including his search for a new aesthetic theory for a technological civilization (in the making). In four books on aesthetics, which were later merged into a single work carrying the same title, Bense began his exploration of information aesthetics and its application to various artistic forms, from visual images to media and literary texts, poetry and other semiotic forms that must become computer programmable or be analysed in such a way.²⁷ Bense’s theory of aesthetics introduces the possibility of image programming into art, which could not be a more relevant gesture, especially in the era of large language models, and so-called prompt-engineering. But things are still not linear, or, in other words, Bense does not see (and think) that far at first. His idea of programming is, at least at the beginning, external, or not yet fully computerized. Initially, the goal is not to send instructions to the computer for their execution, but to understand and interpret the texts from the outside in this way (and manually manipulate their information and/or semantic values). His attempts are at least initially similar to the related experimental techniques, e.g. to the incompressible representations of François Morellet, or to his attempts to include “chance operations into his painting practice, utilizing the decimals of the transcendental number pi, or else digits selected at random from the telephone directory, to determine color and other factors in his compositions.”²⁸ The “constrained writing techniques” of the avantgarde literary movement Oulipo and their rules, such as S+7, are similar.²⁹ This kind of aesthetics is already programmable or algorithmic, regardless of the fact that it is technically formalized by a human and not a machine, but this does not matter, as Ernst points out that when we are in the Turing machine state, the machine speaks through us.³⁰

Programming images come a little later: mathematicians and programmers Georg Nees and Frieder Nake, Bense’s students and associates, take a step forward and start programming the visual. In 1965, we witnessed the first exhibition of computer

art and one of the first displays of generative images ever.³¹ Consequently, generative art is not only media art, but the art of technology itself. It is a further subsumption of the aesthetic where the aesthetic becomes conceived and generated in the machine. In this sense, this is a specific media-archaeological moment or, as Kittler would say, art that is the art of ‘discourse on discourse’, the art of a new form of aesthetics and a new sensibility that computer art generates in to existence. The generative medium binds in a single to itself, while our aesthetic judgment and closer computer, whereby of the computer clearly becomes a part of our (most intimate) Thus, we find the most radical media-archaeological descriptions in different places, where the generativity of technology becomes the generativity of our brains, e.g. in the reinterpretation of the dream theory. In this case, dreams are no longer conceived in the way of memory consolidation, but in the sense of a planned randomization of input information, into which the neural network introduces noise only in order to avoid overfitting (another concept from machine learning), or so that our cognitive model would not rigidly explain the existing corpus of data and consequently not be able to perform accurately against unseen data, defeating its purpose.³² Can you imagine that children would not dream? Due to the new possibilities of technological domestication, the machinic begins to appear in the phenomenological, or it is possible to explain and systematize the phenomenological through the concepts found in the machine: “In the future, we will not learn how to read and write, but how to deeply interpret seven plus/minus two dimensional embedding spaces, and by projecting the neural encoding back into the machine via neuralink, we will all learn how to be one with the machine.”³³

The media archaeological twist highlights the dialectical relationship between image and technique, algorithm and algorithmic display. Interestingly, Nake has a partially overlapping theory in which he points out that there is a dialectical tension between the algorithmic and the visual, between the algorithmic specification and its generative manifestation.³⁴ In his case, it is still logocentrism, since the machine (and no longer a human) simply follows orders and executes the instructions. Therefore, even though the visual is already converted into the machine, the computer does still not have an actual understanding, an actual capability of visual representation, but only the capability of executing a command - this is an example of classical programming, where specifications are implemented by a human and where the machine does not learn anything. Therefore, even though there is a dialectical relationship between code and image, this is still not found in the machine itself, because it does not yet dream of its own aesthetics: nothing is yet represented in the machine, which means that it does not yet have its own *technologos* and consequently

its own aesthetic sensibility. In this context Ernst wrote: “In the shift of paradigm from algorithmic pre-programming to rule-governed statistical backpropagation of ‘big data’, the machine is not simply programmed for every operational step anymore, but has been taught to learn autonomously, in the cybernetic sense.”³⁵ It is therefore not a matter of the machine carrying out a mental representation of a person, whereby this has been translated into a language that the machine can read, but rather that the machine learns the mental representations that it is capable of representing and generating, which leads to aesthetics-within-aesthetics or aesthetic singularity. “Only when machines learn from machines, a ‘postlogos’ emerges.”³⁶ The problem of generative art is that the internal abstraction, in this case the aesthetics of the computation itself, is not shown to the spectator or is not drawn from the inside out and is preserved as an object of fascination on the level of a black box, which not only leads to the consumption of the spectacle and bad AI scenarios, but to excessively (or insufficiently) subjective attempts at AI art, which are practically not interested in the unconsciousness of the machine itself and its capabilities of participation.

As an example of the “struggle” against the spectacle, we can point out the artistic (and theoretical) experiments by Eryk Salvaggio and his research into the generative model DALL-E 2. Here, too, the process goes in the opposite direction, since research implies a learning process, i.e. that Salvaggio learned what DALL-E 2 knows and is capable of and that he does not blindly dictate instructions to the latter through commands or “prompts”. In general, it seems that modern architectures in deep learning highlight a certain shift in the perspective, a transition to a different form of programming and

understanding, where the machine is no longer communicated with in the way of transmitting instructions, but is predominantly trained to produce the desired instruction or the desired program for a successful execution of a certain scheme: “In this new computer science - if we even call it computer science at all - the machines will be so powerful and already know how to do so many things that the field will look like less of an engineering endeavor and more of an educational one; that is, how to best educate the machine, not unlike the science of how to best educate children in school.”³⁷ Just as AI sceptics mistakenly reproach GPT-3 a lack of understanding of the meaning, its advocates (i.e. advocates of machine intelligence) point out that there are multiple theories of meaning and that machines should also be allowed to participate in language, thereby giving them the possibility of choosing a theory, which is best suited to them. Criticism is also directed at philosophers who would like to learn about artificial intelligence, but only by reading what this or that philosopher says about it. Imagine how unfortunate this gesture will sound to a truly “woke” AI. Instead, the research deals with artificial intelligence itself, what these models are able to encode, in what ways and what mathematical functions and forms of meta-optimization they are able to implement. Salvaggio’s contribution is predominantly on this level, as the latter uses “prompt-engineering” of the description of the desired image that the generative model generates in the next step to explore the data structure and how DALL-E 2 sees us. In addition to the artistic project “How to Read an AI Image: The Datafication of a Kiss”, his concept of ontography is particularly interesting - how visual culture, or the visual itself, is changed by generative models. i.e. how we must always be careful, in McLuhanian terms, not to look in the rear-view mirror. The concept of photography is not only related to historical circumstances when it competed with other concepts, e.g. heliography, for the essence of photography is changing. This is no longer about recording light or noticing that the world is turning into a photograph. It is more about the fact that the generative model no longer refers to the photos it was trained on, but to its latent encoding, which produces “photos” of one type or another: “Once the images in a dataset have informed a model, it’s no longer referencing those images anymore.

It draws from representations of the categories of that dataset, prompted by words. It isn’t ‘writing light’ at all. It’s inscribing ontologies onto noise.”³⁸ This is an interesting depiction of the end of ‘history’, as Flusser would say.

- 20 Ernst, W. (2021). *Technología & the Computational Machine*. London: Bloomsbury, p. 164.
- 21 Bach, J. (2022, 21st December). Joscha Bach Q&A with Royal Northern College for Music. *Chris Newton*. Accessible at <https://www.youtube.com/watch?v=zEBGKLKOMI4>
- 22 Diagonalisation is at work here. This is similar to the observation that scientists are in fact creative and artists systems are in fact which is by the figure of the engineer, who synthesises both fields or approaches; even though in a more »worldbuilding«
- 23 **25** David Krakauer (2019, 9th October). *The Landscape of 2nd Century Science. Complexity by the Santa Fe Institute*. Accessible at <https://complexity.simplecast.com/episodes/1/transcript>
- 24 Ernst, W. (2022). Which Kind of Media »Philosophy« for Computation? A Rather Radical Media Archaeological Comment in: My ComputerWasaComputer(CatalystM.Beatrice Fazi), ed. Cecchetto, D. Noxious Sector Press. Krakauer, D. (2019, 9th October). David Krakauer on The Landscape of 21st Century Science. *Complexity by the Santa Fe Institute*. Accessible at <https://complexity.simplecast.com/episodes/1/transcript>
- 25 Ananthaswamy, A. (2023, 5th January). The Physics Principle That Inspired Modern AI Art. *Quanta Magazine*. Accessible at <https://www.quantamagazine.org/the-physics-principle-that-inspired-modern-ai-art-20230105/#:~:text=E%20's%20images%20possible%20%E2%80%94%20as,spread%20of%2ofuids%20and%2ogases.>
- 26 Robillard, G. (2021, 30th June). »Max Bense as a Visionary: From Entropy to the Dialectic of Programmed Images«. *OpenEdition Journals*. Accessible at [https://www.napkinpoetryreview.org/interview-with-nina-begus](https://journals.openedition.org/imagesrevues/10395#quotationCavia, A. A. (2022). »Compression Artefacts: On the Aesthetics of Compressibility« in: My ComputerWasaComputer(CatalystM.Beatrice Fazi), ed. Cecchetto, D. Noxious Sector Press.</p><p>27 Beguš, N. (2022). The »Art« in Artificial Intelligence: An Interview with Nina Beguš. <i>Napkin Poetry Review</i>. Accessible at <a href=)
- 28 Ernst, W. (2021). *Technología in Being: Radical Media Archaeology & the Computational Machine*. London: Bloomsbury, pp. 141–142.
- 29 Robillard, G. (2021, 30th June). »Max Bense as a Visionary: from Entropy to the Dialectic of Programmed Images«. *OpenEdition Journals*. Accessible at [https://www.sciencedirect.com/science/article/pii/S2666389921000647](https://journals.openedition.org/imagesrevues/10395#quotationHoel, E. (2021, 14th May). »The Overfitted Brain: Dreams Evolved to Assist Generalization«. <i>ScienceDirect</i>. Accessible at <a href=)
- 30 Bach, J. [@Plinz]. (2022, 25th December). In the future, we will not learn how to read and write, but how to deeply interpret seven plus/minus two-dimensional embedding spaces, and by projecting the neural encoding... [Twitter]. Accessible at <https://twitter.com/Plinz/status/1606851313714839552>
- 31 Nake, F. (2010). »Paragraphs on Computer Art, Past and Present«. ResearchGate. Accessible at https://www.researchgate.net/publication/228931845_PARAGRAPHS_ON_COMPUTER_ART_PAST_AND_PRESENT
- 32 Ernst, W. (2021). *Technología in Being: Radical Media Archaeology & the Computational Machine*. London: Bloomsbury, p. 157.
- 33 Ibid., p. 169.
- 34 Welsh, M. (2023, 3rd January). The End of Programming. *Viewpoint*. Accessible at <https://cacm.acm.org/magazines/2023/1/267976-the-end-of-programming/fulltext>
- 35 Salvaggio, E. (2023, 8th January). The Most Generated Barn in America: The Case for Calling AI Images Ontographs, However Briefly. *Cybernetic Forests*. Accessible at https://cyberneticforests.substack.com/p/the-most-generated-barn-in-america?utm_source=profile&utm_medium=reader2
- 36 Ibid., p. 169.
- 37 Welsh, M. (2023, 3rd January). The End of Programming. *Viewpoint*. Accessible at <https://cacm.acm.org/magazines/2023/1/267976-the-end-of-programming/fulltext>
- 38 Salvaggio, E. (2023, 8th January). The Most Generated Barn in America: The Case for Calling AI Images Ontographs, However Briefly. *Cybernetic Forests*. Accessible at https://cyberneticforests.substack.com/p/the-most-generated-barn-in-america?utm_source=profile&utm_medium=reader2

Glej, list / Glej,
Paper

Gledališče Glej /
Glej Theatre
Gregorčičeva 3
1000 Ljubljana

glej.si
info@glej.si

Glej, list / Glej,
Paper
Letnik 15, št. 1 /
Year 15, No. 1
Urednica / Editor:
Tery Žeželj
Avtorce_ji /
Authors: Leon
Vidmar, Meta
Grgurevič, Stella
Ivšek, Marijo
Zupanov, Polona
Pečan, Suzana
Brborovič, Nika
Rupnik, Kaja
Kisilak, Maks
Valenčič

Prevod v
angleščino /
Translation into
English: Sunčan
Stone
Slovenski jezikovni pregled
/ Slovene language editing: Svetlana
Jandrić

Oblikovanje in
prelom / Graphic
Design: Grupa Ee
/ Mina Fina, Ivian
Kan Mujezinović

Izalo / Published
By: Društvo
Gledališče Glej
Tisk / Print:
Stane Peklaj
Naklada /
Circulation: 300
Marec 2023



Stran22

REPUBLIKA SLOVENIJA

MINISTRSTVO ZA KULTURO



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



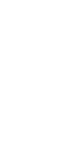
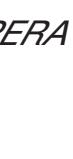
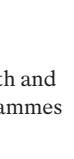
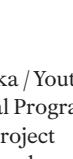
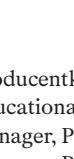
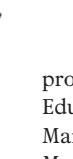
Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



Bogati življenja, širi obzorja.



producentka / Youth and
Educational Programmes
Manager, Project
Manager, Producer
anja@glej.si

Nastja Miheljak
Producentka / Producer
nastja@glej.si

Andrej Pervanje
Stiki z javnostmi in
mediji / Public and Media
Relations
andrej@glej.si

Grega Mohorčič
Vodja tehnike / Technical
Director
grega@glej.si

Brina Ivanetič
Tehnična podpora /
Technical Support
brina@glej.si

Žan Rantaša
Tehnična podpora /
Technical Support
zan@glej.si

Samo Dernovšek
Tehnična podpora /
Technical Support
samo@glej.si

Paulina Pia Rogič
Vodja hostesne
službe / Manager of the
Hospitality Service

Gostoljubje / Hospitality
Paulina Pia Rogič, Tina
Malenšek, Petja Rozman,
Petruša Koželj

Tajništvo
info@glej.si
rezervacije@glej.si

KOLOFON
po motivih *Idiota*
F. M. Dostojevskega

Režija: Marko Čeh
Dramaturgija: Kaja Balog
Adaptacija teksta: Kaja Balog,
Marko Čeh

Celostna vizualna podoba
(scenografija, kostumografija,
oblikovanje svetlobe,
oblikovanje lutk, oblikovanje
videa): Stran22

Programiranje: Luka Frelih
Glasba: Gašper Torkar
Lektorica: Mateja Dermelj
Igrajo: Niko Goršič, Gregor
Prah, Gaja Višnar, Anže Zevnik

Video: Borut Bučinel
Foto: Marijo Zupanov
Vodja tehnike: Grega Mohorčič
Tehnična podpora: Brina
Ivanetič, Žan Rantaša,
Samo Dernovšek

Kreativna in
izvršna produkcija: Anja
Pirnat, Nastja Miheljak
Producija: Gledališče
Glej

Podpora: Ministrstvo
za kulturo, Mestna občina
Ljubljana

Zahvala:
Casino Admiral,
Univerzitetni klinični center
Ljubljana, Timotej Jevšenak,
Jože Drabik, Stanka Škodič

CREDITS

based on F. M. Dostoevsky's
The Idiot

Directing: Marko Čeh
Dramaturgy: Kaja Balog
Adaptation of the text: Kaja Balog,
Marko Čeh

Stage design (scenography,
costumography, light design,
puppet design, video design):
Stran22

Programming: Luka Frelih
Music: Gašper Torkar
Proofreading and language
consultation: Mateja Dermelj
Performers: Niko Goršič, Gregor
Prah, Gaja Višnar, Anže Zevnik

Video: Borut Bučinel
Photography: Marijo Zupanov
Technical director: Grega
Mohorčič

Technical support: Brina
Ivanetič, Žan Rantaša,
Samo Dernovšek

Creative and executive
production: Anja Pirnat,
Nastja Miheljak
Produced by Glej Theatre
Supported by Ministry of
Culture and Municipality of
Ljubljana

Special thanks to:
Casino Admiral, University
Medical Centre Ljubljana,
Timotej Jevšenak, Jože Drabik,
Stanka Škodič

26

S O A P

O P E

R A

na 27 naslovniči: 1623% povečan
detajl fotografije Marija Zupanova
zupanov-GLEJ-SOAP
OPERA-PROMO-HiRES-16.jpg

on the cover: 1623% enlarged detail of
the photo by Marijo Zupanov zupanov-GLEJ-SOAP
OPERA-PROMO-HiRES-16.jpg

28

65

D

C

S

R

R