



ISEA2020

<MTL> CONNECT·MONTREAL·CANADA

WHY SENTIENCE?

26th
International
Symposium on
Electronic Art
ISEA2020

PROCEEDINGS

OCTOBER 13-18, 2020
ONLINE FROM MONTREAL, CANADA

AN EVENT BY

 **PRINTEMPS
NUMÉRIQUE**

• 26th
**International
Symposium on
Electronic Art
ISEA2020**

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PRESÉNTATION

On behalf of Printemps numérique (Montreal Digital Spring), our partner institutions, and the organizing committee, we are proud to present the ISEA2020 Online: Why Sentience? proceedings. The 26th International Symposium on Electronic Art is the first ISEA edition to be held entirely online and will take place in tandem with the second edition of MTL connect: Digital Week (Printemps numérique's own online symposium), and will act as the latter's creativity pavilion.

We are living in unprecedented times—the global COVID-19 pandemic, with its ensuing social distancing measures, economic shutdowns, sanitary rules and travel restrictions—and as a result the planning for the symposium was swiftly reconfigured to produce what we consider to be its most innovative iteration. The International Symposium on Electronic Art belongs in the digital space, where it can be accessible to all regardless of zone or continent; it is not only suitable but inevitable that the event should move to an online platform, where participants and presenters will reconsider in a myriad of imaginative and surprising ways the conduits of creative information dissemination and exchange.

The online event will consist of four full days of 12 hours of presentations on three different live streams: 108 full papers, 96 short papers, 24 panels and 18 posters, selected from nearly 1000 submissions from 58 countries. Our rich and interdisciplinary programme continues on the weekend with instructive workshops. In addition to this, ISEA will be hosting an entirely virtual series of exhibitions, based on the following themes and their correlation with the symposium's throughline, Why Sentience? : Animality,

The Ecosophic World, Politics of Sentience, Matter's Mattering, The Planetary, Machinic Sense & Sensibility, and Sentient Difference. Happening in tandem with the online offerings, ISEA will be physically present in its host city, Montreal, with in-situ exhibitions and performances at Les maisons de la culture Claude-Léveillé, Janine-Sutto, and Côte-des-Neiges. This hybrid programming represents an exact reflection of our current societal modus operandi: full online connection, limited physical presence, for the optimal reach and impact in our local communities and those at large.

An extraordinary effort and help is required in organizing an International Symposium such as ISEA, especially during a global pandemic. Printemps numérique would like to thank Erandy Vergara, for her extraordinary ability and leadership to guide the team and work together with the Academic and Artistic Chairs and Committees, specially her behind-the scenes work managing the content and form of ISEA2020 Online. We also would like to thank the academic chairs Christine Ros and Chris Salter, whose insight and vision regarding the 26th edition's theme, Why Sentience, were both essential and without comparison, as well as Manuelle Freire, who all together curated the impressive academic programme and talks. Thank you the artistic co-chairs Erandy Vergara, Alice Jim and Caroline Andrieux for their rigorous yet open spirit in making the final selection of ISEA2020's Juried Selection. A deeply appreciative thank you to the ISEA2020 International Program Committee (IPC) and Artistic Jury. Thank you to the ISEA team for their invaluable work, patience, and endless hours devoted to finding solutions for unprecedented challenges, and for their

on-the-spot creativity and flexibility when it was crucial to getting the job done: Pauline Barthe, Maximilien Briat Martin, Sylvaine Chassay, Stephanie Creaghan, Margaux Davoine, Pascal Dufaux, Iriana Rakotobe, Marine Villedieu.

We would also like to thank the supporting institutions and various partners, without whom the symposium would not be possible: the Gouvernement du Québec (Ministère de la Culture et des communications and the Fonds d'initiative et de rayonnement de la métropole), the Conseil des arts et des lettres du Québec, Ville de Montréal, Tourisme Montréal, le Conseil des arts du Canada, le Conseil des arts de Montréal, Patrimoine Canadien, NAD (École des arts numériques, de l'animation et du design), Concordia University, Synthèse, Destination centre-ville, Reflector, ISEA International, the University of Brighton, Maison de la culture Claude-Léveillée, Maison de la culture Janine Sutto, Maison de la culture de Côte-des-Neiges, Maison du développement durable, Sensorium: Centre for Digital Art and Technology (York University) le Consulat de France, OFQJ France (Office franco-québécois pour la jeunesse), Goethe-Institut Montreal, Sporobole, New Media Gallery, Manifestations Festival, Scopitone Festival, Composite, Milieux Institute, ELEKTRA, Centre PHI, Espace art actuel, Ciel variable and Esse.

Lastly, ISEA2020 would like to thank all our participants, artists and scholars who applied to the symposium back in December of 2019 for your willingness to continue to work with us and evolve with us as we transitioned to the new online format. Your understanding and capacity to adapt are what made the symposium the success that

it is. Your generous and insightful reflections on sentience proved more relevant than ever in the face of the pandemic, and we are eternally grateful for your contribution, participation, and adaptability.

Mehdi Benboubakeur

EXECUTIVE DIRECTOR, PRINTEMPS NUMÉRIQUE
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In late August 2019, when the ISEA 2020 academic committee began discussing the theme of "Why Sentience"? little did we know how prescient the topic would become. With the initial themes tossed around – "animality," "the politics of sentience," "sentient difference" and "matter's mattering" – we were trying to capture the significance of a broader symbiotic turn taking place in the technoscientific arts, humanities and social sciences – the term that the late biologist Lynn Margulis used to describe "the living together in physical contact of organisms of different species." [1] Living together, however, involves sensing together – where the etymology of the Latin word *sentientem* signifies being "capable of feeling," not only for ourselves but also for others. But we weren't wholly satisfied with the theme of "sentience" alone – we sought to turn it into a question to demonstrate that living together as different species is not easy, especially among entities and things we wouldn't necessarily consider "like us": nonhuman animals, plants, bacteria but also machines and the Earth itself. By making sentience into the question of "why sentience," we thus hoped to provoke a debate around two core issues: (1) why is sentience something that presently occupies many artists, scholars and scientists and, (2) what degree and nuance of difference would a deeper exploration of sentience imply?

This was in August 2019. One year later, we are living through a triple catastrophe: the novel coronavirus, the resulting economic collapse and the worldwide unrest brought upon by the exposure and explosion of systematic racism, as well as gender-based violence. These crises have resulted in a major transformation of human and nonhuman life, bringing the theme of ISEA 2020 into a new perspective. It is not that the virus - an invisible entity that some 25% of US citizens (as well as others) think has been invented and planned by a worldwide conspiracy but that has visibly wreaked havoc across the world - is unprecedented.

From the Black Death that eliminated at least 60% of Europe's population between 1346-1353 and the 40-100 million lost during the Spanish Flu, to 2003's SARS epidemic, we as humans have long had to live with the otherness of the bacterial and the viral. As historian Mike Davis wrote with uncanny foresight in 2005 in *The Monster at our Door*, "Human-induced environmental shocks—overseas tourism, wetland destruction, a corporate 'Livestock Revolution', and Third World urbanization with the attendant growth of megacities—are responsible for turning influenza's extraordinary Darwinian mutability into one of the most dangerous biological forces on our besieged planet." [2] What, however, is unprecedented is the planetary scale and speed of this entanglement of contemporary conditions in which socio-technical-political-economic systems are so deeply and fundamentally intertwined with and influencing each other.

But what does this global crisis we are all living through have to do with the theme of Why Sentience? First, the "pandemic condition" has demonstrated that viral, machinic and terrestrial forces are indeed symbiotic. For example, a May 2020 Science article reported on a global "quieting" taking place as the amount of "anthropogenic" (human made) vibrations fell by almost 50% due to the effective shutdowns of the world economy. Utilizing a network of 268 seismographic sensors in 117 countries, geophysicists at Imperial College London could observe a literal "wave of silence" sweeping across the globe from China to Europe to Australia to North and South America as transport networks, football games, air traffic and effectively stopped. This near planetary reduction in noise catalyzed by the global shutdown and picked up by machine-automated sensors thus shows the close coupling of technical, natural and human worlds. Meanwhile, the media has also been filled with stories of renewal – the return of the natural world in the canals of Venice, the purifying of air in

normally pollution-choked global cities or the increase in birdsong, usually masked out by the sound of transport infrastructure.

At the same time, if sentience signifies “the ability to feel,” the crisis has also revealed the inability to feel – to sense the plight of others. As Davis argues, “The essence of the avian flu threat ... is that a mutant influenza of nightmarish virulence—evolved and now entrenched in ecological niches recently created by global agro-capitalism—is searching for the new gene or two that will enable it to travel at pandemic velocity through a densely urbanized and mostly poor humanity.” [3] The ingrained injustices of the colonial past and the repeated and acute amplification of these through our pandemic present thus compel us to address the hard questions asked by the Cameroonian philosopher Achille Mbembe concerning what he calls “the ordeal of the world” – “Can the Other, in light of all that is happening, still be regarded as my fellow creature? When the extremes are broached, as is the case for us here and now, precisely what does my and the other’s humanity consist in? The Other’s burden having become too overwhelming, would it not be better for my life to stop being linked to its presence, as much as its to mine? Why must I, despite all opposition, nonetheless look after the other, stand as close as possible to his life if, in return, his only aim is my ruin?” [4]

These questions are not the usual bill of fare for ISEA, which has long been focused on the relationship between technology and the arts. Indeed, in these proceedings you will find this focus again – along with perhaps something new: critical positions in race and anti-racism studies, queer studies and disability studies, Indigenous knowledge, eco-criticism, reflections and interrogations of the histories and geographies, places and non-places, temporalities, processes, and residual colonialisms of sentience through an international cross section of current explorations in the media arts and technological aesthetics. As philosopher

Bernard Stiegler (1952–2020), the great pharmacologist of technology who recently left us, argued: now is perhaps the time to think as a form of healing.

Like most cultural events in 2020, ISEA 2020 is thus both a response to crisis and an experience with a not yet realized imaginary. Experience here is used in the French sense of the word: as both an experiment, an attempt and an experience. Through these contributions from scholars and creators from across the world, it is our hope that the question of why sentience – of not only sensing the world but also acting with it – can be a response to our more than uncertain future.

Christine Ross
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Chris Salter
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NOTES

- [1] Margulis, Lynn. *The Symbiotic Planet: A New Look at Evolution*. New York: Basic Books, 1988, 3.
- [2] Mike Davis, *The Monster at our Door: The Global Threat of Avian Flu*. New York/London: New Books, 2005, 25.
- [3] Davis, 26.
- [4] Achille Mbembe, *Necropolitics*. Durham: Duke University Press, 2019, 2–3.

SUBTHEMES

Animality

Animality treats of the non-human and beyond human senses, of expanded notions of aliveness, panpsychism and hylozoism in species other than the humans of ISEA2020. A few non-humans are accepted at ISEA2020, just not as presenters.

The Ecosophic World

The theme Ecosophic World proposes explorations of sentience understood within the entanglements of scientific, environmental, and multispecies ecologies, and their current crises. Case-studies of symbiotic and expanded ecosystems, both natural and human-made will be explored in 10 different sessions at ISEA2020.

Machinic Sense and Sensibility

Machinic Sense and Sensibility saw a great deal of proposals about the autonomy and agency, and even intentionality of robotic and digital creations. Presentations in this theme take on both the sentience of machines and sentience through machines.

Sentient Difference

Sentient Difference shines a light on ways of navigating the social, natural and materials worlds that go beyond or against normativity in regards to race, gender, queer and trans, and (dis)ability.

Matter's Mattering

Matter's Mattering brings forward the tangible, materials things of sentience: the bodies, circuits, infrastructures, matter, how they come to be and the place they take in modalities of engagement and sentience.

The Politics of Sentience

The Politics of Sentience was tackled by some of the most critical scholars who will present their takes on the post-truth, post-sense, sensorization, surveillance, racism, weaponization, control, inequality, re-bordering, capitalism, neo-liberalism, other isms and the institutions of knowledge creation and management of today.

The Planetary

The Planetary: few but worthwhile proposals rethink the global to reaffirm, through creation, the aesthetics of sharing in the global currents and streams of the natural elements, shared resources, beneath and above this planet's surface.

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TABLE OF CONTENTS

FULL PAPERS

SENTIENCE AS THE ANTIDOTE TO OUR FRENZIED MEDIATED SELVES, Alexandra Bal	21
AFTER THE TUNNEL: ON SHIFTING ONTOLOGY AND ETHOLOGY OF THE EMERGING ART-SUBJECT, Maurice Benayoun and Tanya Ravn Ag	29
CAN ART CONTRIBUTE TO THE RESEARCH ON MULTISENSORY PROCESSES?, Loren P. Bergantini	41
UNDERGROUND SENSINGS, Johannes Birringer School of Arts	47
CHATTERBOX: AN INTERACTIVE SYSTEM OF GIBBERISH AGENTS, Ronald Boersen, Aaron Liu-Rosenbaum, Kivanç Tatar, Philippe Pasquier	55
SCHIZOMACHINE: A WEARABLE SCHIZO-INTERFACE FOR A SCHIZO-BODY, Maria Lucília Borges	63
EXPERIMENTING WITH ROBOTIC SOFTNESS, Samuelle Bourgault, Emmanuelle Forgues, Jennifer Jacobs	71
CREATIVE AUDIO DESIGN FOR A MASSIVELY MULTIPOINT SOUND AND LIGHT SYSTEM, Oliver Bown, Anthony Rowe, Liam Birtles	77
SENTIENCE AND PLACE: TOWARDS MORE-THAN-HUMAN CULTURES, Douglas Brock, Stanislav Roudavski	83
SHIFTING IMMEDIATIONS: FIELDS OF EXPERIENCE ACROSS MEDIA ART AND DESIGN, Christoph Brunner, Jonas Fritsch	91
RISONANZE DI VINO: TUNING WINE WITH SOUND THROUGH THE SENSES AND CULTURE, Jo Burzyńska	99
DANCE AND CODE WITH EMPATHY: A READING OF JOANA CHICAU AND MERCE CUNNINGHAM, Renee Carmichael	107
PLANTCONNECT AND MICROBIAL SONORITIES: EXPLORING THE INTERSECTION OF PLANT, MICROBIAL AND MACHINE AGENCIES, Carlos Castellanos	115
ARCHIVE OR ALIVE: THE EXPERIMENTAL VR DIGITAL COLLECTION OF SHOU-YOU LIU'S SHAPDE 5.5, Chih-Yung Aaron CHIU, Hsing-Jou YEH	123
THE MATTERING OF ALGORITHMS: READING THE MEDIA PERFORMANCE OF ERICA SCOURTI THROUGH ORIGINARY TECHNICITY, Kevin T. Day	129
CYBORG ENCOUNTERS: THE ABILIZING CAPABILITIES OF EMBODIING DISABLING AVATARS, Serenda Desaulniers	135
WATERWAYS VISUALIZATION COMPUTATIONAL REFLEXIVITY FOR SUSTAINABILITY ACTION, Aleksandra Dulic, Miles Thorogood	145
TWTTRGRAPH: I WISH TO SPEAK WITH YOU. A TELEGRAPHIC SOUND INSTALLATION, Paul Dunham, Mo H. Zareei, Dale Carnegie, Dugal McKinnon	153

TABLE OF CONTENTS

EXPANDED NOTES ON THE EXHIBITIONARY CONDITIONS OF VIRTUAL REALITY, Vince Dziekan	161
SEEING IS SENSING: THREE STRATEGIES FOR MULTISENSORY EXPERIENCE IN MIXED REALITY ART, Liron Efrat, Brittany Myburgh	169
DATA POLLUTION DEVICES: ARTISTIC STRATEGIES AGAINST BEHAVIOR CAPTURE, César Escudero Andaluz, Christa Sommerer	177
QUALIA FORMATION THROUGH SENSORY SUBSTITUTION IN ARTISTIC LABORATORIES IN RUSSIA, Ksenia Fedorova, Elena Demidova	185
ON PLACES, SPACES AND OBJECTS OF INTERDISCIPLINARY SCHOLARSHIP: THE CASE OF USEFUL FICTIONS, Manuelle Freire	193
SENSING THE REALITY: REFLECTIONS ON ARTISTIC ACTIONS TO DEFOCUS THE REAL, Pablo Gobira, Adeilson "Froiid" William da Silva, Antônio Mozelli	199
SOCIAL JUSTICE & ARTIFICIAL INTELLIGENCE, Adnan Hadzi	205
DESIGNING TECHNOLOGY FOR A SYMBIOSIS BETWEEN NATURAL SYSTEMS AND INFORMATION INFRASTRUCTURE, Matthew Halpenny	213
THE ART OF TRAJECTORY: CELESTIAL MECHANICS V, Scott Hessels	221
PIXELS IN THE MATERIAL WORLD: MAKING MARCHING CUBES, Jesse Colin Jackson, Luke Stern	227
STONEMAPS: A SLOW INTENTIONAL NETWORK FOR COLLECTIVE SENTIENCE, Hanif Janmohamed, Maria Lantin, Alex Hass, Renrong Guo, Devon Girard	235
NEO//QAB: CREATING A WORLD THROUGH SPECULATIVE PLAY, Rilla Khaled, Steven Sych, Samuelle Bourgault, Pippin Barr	243
BENEATH THE SURFACE AND INTO THE PLANETARY: LISTENING TO/FOR COEXISTENCE IN CONTEMPORARY SOUND INSTALLATIONS, Chanelle Lalonde	251
ENCHANTING MATERIALITIES: E-TEXTILES INSTALLATIONS FOR AN ECOSOPHIC WORLD, Jo Law, Agnieszka Golda	261
SENSORY AND SPATIAL KOANS, Liz Lessner	267
TAXONOMY FOR THE CONTIGUOUS SPECTRUM: CORPOREAL COMPUTING FUTURES AND THE PERFORMANCE OF SIGNAL TRANSMISSION, Nancy Mauro-Flude, Kate Geck	275
TRANSLATING DISCIPLINARY PRACTICES FOR TRANS-SENTIENT COLLABORATION, G. Mauricio Mejíaa, Roger F. Malinab, Yumeng Xiec, Alex García Topeted	283
AESTHETIC QUALITIES OF THERMAL AND VIBROTACTILE MATERIALS FOR SOMATIC CONTEMPLATION, Claudia Núñez-Pacheco, Lian Loke	291
GIT SHOW: MUSICAL CREATIVITY, IDEATION, AND GITHUB, Michael Palumbo, Doug Van Nort	299

TABLE OF CONTENTS

AIBO: AN EMOTIONALLY INTELLIGENT ARTIFICIAL INTELLIGENT BRAINWAVE OPERA: PART 2, OR THE MAKING OF A “SICKO” AI, Ellen Pearlman	307
EMBODIED COGNITION, DIGITAL CULTURES AND SENSORIMOTOR DEBILITY, Simon Penny	315
ODORAMA V2: PROTOTYPING TOUCH-SMELL SYNESTHESIA TO PROMOTE NEUROCOGNITIVE EMPATHY, Géraldine Piguet and Aleksandra Kaminska	323
ART AND THE BROKEN MIRROR: A TECHNOGENETIC PERSPECTIVE ON DIGITALLY EXPANDED REALITIES, Tanya Ravn Ag	331
ART AND SCIENCE INTRA-ACTION OF COLLECTING WATER FROM FOG ETHICAL RESPONSE-ABILITY IN KAREN BARAD’S MATTERING, Ana Rewakowicz	341
INHALING CONSCIOUSNESS: ECOLOGICAL SENTIENCE AT MOLECULAR LEVEL, Clarissa Ribeiro	349
GLOWING LICHEN: VISUALLY SENSING SOCIAL SPACES, Ana Rodrigues, Bruna Sousa, Penousal Machado, Amílcar Cardoso	357
LIMINAL SCAPE, AN INTERACTIVE VISUAL INSTALLATION WITH EXPRESSIVE AI, Mahsoo Salimi, Nouf Abukhodair, Steve DiPaolo, Carlos Castellanos and Philippe Pasquier	365
AURALROOTS: LEARNING ABOUT SENTIENCE THOUGH EMBODIMENT AND SIMULATION IN THREE SONIC ENVIRONMENTS, Jill Scott	373
NEOSENTIENCE, Bill Seaman	377
SEEING PLANTS THROUGH BOTANICAL ILLUSTRATION, Christa SOMMERER & Laurent MIGNONNEAU	385
OPEN-SOURCE SENTIENCE: THE PROOF IS IN THE PERFORMANCE, Joseph Thibodeau, Ceyda Yolgörmez	393
INDIGENOUS SENTIENCE: FERNANDO PALMA’S ELECTRONIC DIVINITIES, Reynaldo Thompson, Tirtha Mukhopadhyay	401
DATA, SENSE, RESONANCE: AN ART OF DIABETIC SELF-TRACKING, Samuel Thulin	405
SENTIENCE AND THE VIRTUAL BODY, FROM DUAL SUBJECTIVITY TO THE EROS EFFECT, Francisco Gerardo Toledo Ramirez	411
GESTURAL METAPHOR AND EMERGENT HUMAN/MACHINE AGENCY IN TWO CONTRASTING INTERACTIVE DANCE/MUSIC PIECES, Doug Van Nort	419
TACTILE POTENTIALS: A MIXED REALITY PROJECT FOR LIVE PERFORMANCE, Rewa Wright, Simon Howden	425
CYBORG AND PROSTHESIS: THE BODY OF SUBJECTIVE MOTIVATION EXTENSION, Yan-xuan Miguel Xiao	431

TABLE OF CONTENTS

SHORT PAPERS

THE PROBLEM WITH IMMERSION, Nick Alexander	439
A LITTLE BETTER: EMOTIONS IN THE AGE OF CRYPTOCURRENCY, Rodrigo Azaola	445
BEYOND THE TURN AND TOWARDS THE EVENT: ANALYZING THE CURATORIAL AS A MATERIAL-DISCURSIVE PRACTICE, Renata Azevedo Moreira	449
SLEEPING EYES: VR NARCOLEPSY STORYTELLING THROUGH THE DUALITY OF PRESENCE, Sojung Bahng, Nina Rajcic, Elliott Wilson, Jon McCormack, Sungeun Lee	453
POST-IMMERSION: TOWARDS A DISCURSIVE SITUATION IN MEDIA ARTS, Budhaditya Chattopadhyay	457
SENSING CONTEMPORARY MEXICAN ART: ARIEL GUZIK'S SONIC MACHINES, Claudia Costa Pederson	461
"I TRY TO STAY NEUTRAL": DIGITAL ASSISTANTS AND THEIR STANCE TOWARDS GENDER, Pedro Costa, Luísa Ribas	465
UNMASK - DIGITAL THINKING WITH BRUTALISM, Jacob Cram	469
MYCORRHIZAL CURATION: MINIMAL COGNITION FOR MAXIMAL COOPERATION, Eleanor Dare, Elena Papadaki	473
MACHINE GENERATED 'PORTRAITS' AS IMPERSONAL GESTURES, Nicole De Brabandere	477
EXPANDING SENSITIVITY IN IMMERSIVE MEDIA ENVIRONMENTS, Desiree Foerster	481
BLIMPY – AN ARTISTIC FRAMEWORK FOR CREATING A SPATIAL AUGMENTED REALITY EXPERIENCE WITH HELIUM BLIMPS, Martin Fröhlich, Maximilian Kriegleder, Serena Cangiano, Joel Gähwiler, Roman Jurt, Christian Iseli	485
PLAYING WITH EMOTIONS: BIOSIGNAL-BASED CONTROL IN VIRTUAL REALITY GAME PROJECT H.E.A.R.T., Erin M. Gee, Alex M. Lee, Sofian Audry	489
THE REVISIT OF SENTIENCE: NAM JUNE PAIK'S BIG SLEEP IN INTERACTIVE ART, Byeongwon Ha	493
THE BARBICAN TOTEM: LIGHTING UP THE BRAIN, ZONING IN ON SYNAPSES, REDISTRIBUTING SENTIENCE, David Howes	497
REVALUING WOMEN'S LABOR THROUGH MATERIAL ENGAGEMENT WITH MUSICAL INSTRUMENTS BUILT FROM DOMESTIC TOOLS, Jocelyn Ho, Margaret Schedel, Matthew Blessing	501
PHYSICALITY AND SPATIALIZATION IN SOUND ART, Bridget Johnson	505
RECLAIMING AND COMMEMORATING DIFFICULT FELT EXPERIENCES, Aisling Kelliher	509
CONSTRUCTING XENOLOGICAL ENCOUNTERS, Adriana Knouf	513
EXPLORING AI ETHICS THROUGH INTELLIGENT EVERYDAY OBJECTS, Tomas Laurenzo, Katia Vega	517

TABLE OF CONTENTS

MACHINE-ENACTED MODES OF CREATIVE EXPLORATION, Sang-won Leigh, Harshit Agrawal, Abhinandan Jain	521
FAKE PUBLISHING AS ART AND ACTIVISM, Alessandro Ludovico	525
PHYSICAL GRAINCLOUDS: GRANULAR SOUND ART IN THE PHYSICAL WORLD, Jim Murphy	529
AN INVITATION TO DANCE: MAKING SENSE OF VIEWER INTERACTION IN INSTALLATION ART, Minke Nouwens, Noud Heerkens, Michel van Dartel	533
ANY ONE, ANYWARE: PERCEIVING SENTIENCE AND EMBODIMENT IN A DISTRIBUTED SCULPTURE, Cindy Poremba, Jane Tingley	539
USING BIOPHILIC DESIGN AND THE ORIENTING REFLEX TO DEVELOP GENERATIVE AMBIENT PUBLIC DISPLAYS, John Power	543
IN PIECES VR: MICRONARRATIVE AND ABSTRACTION IN THE DESIGN AND CONCEPTUALIZATION OF A VR-BASED EXPERIMENTAL DOCUMENTARY, Joan Soler-Adillon	549
AEON PERFORMANCE SYSTEM FOR VISUAL MUSIC, Miles Thorogood, Aleksandra Dulic	553
AURAL SOILSCAPES: SENSORY CHALLENGES IN A SUBTERRANEAN WORLD, Sandra Volny, Ruth Schmidt	561
OPEN WATERS [NORTHWEST PASSAGE OPEN POLAR SEA ARCTIC + GREAT LAKES PLASTIC], Andrea Wollensak, Brett Terry, Judith Goldman, Bridget Baird	567
INTERCULTURAL DIALOGUE IN MUSEUMS THROUGH MIXED REALITY, Peiheng Zhao, Alexis Morris	571
PANELS	
WHO IS SPEAKING? ARTSCIENCE STAGINGS OF NONHUMAN SENTIENCE, Edwige Armand, Sofian Audry, Frédéric Garcia, TeZ Maurizio Martinucci	579
MACHINE LEARNING AS MATERIAL: RESEARCH-CREATION APPROACHES TO BEHAVIOR AND IMAGINATION, Ben Bogart, Stephanie Dinkins, Sofian Audry, Stephen Kelly, Suzanne Kite	587
SENTIENCE IN THE CONTEXT OF OPERATIVE IMAGES, Nans Bortuzzo, Alexandre Castonguay, Jean Dubois, Alice Jarry, Guillaume Pascale	593
SCALING SENTIENCE: THE EARTH, THE SKY, AND OUTER SPACE, Marie-Pier Boucher, Kathy High, Kira O'Reilly	599
BREEDING SENTIENCE: QUEERING LINEAGE AND VOGUING ENHANCEMENT, Roberta Buiani, Felipe Shibuya, Adam Zaretsky, Charlotte Jarvis, Jaden Hastings, Dalila Honorio	607
SENTIENCE AND TRANS-SPECIES COLLABORATION: CONSIDERING THE AIMS, DESIRES AND PERCEPTUAL LANDSCAPES OF THE NON-HUMAN, Carlos Castellanos, Elizabeth Demaray, Tyler Fox, Ken Rinaldo, Amy Youngs	613
HUMAN COLLABORATION & MACHINE GENERATION ACROSS MEDIA, Roderick Coover, Nick Montfort, Scott Rettberg	617

TABLE OF CONTENTS

THE OCEAN THAT KEEPS US APART ALSO JOINS US: CHARTING KNOWLEDGE AND PRACTICE IN THE ANTHROPOCENE, Nina Czegledy, Pier Luigi Capucci, Ian Clothier, Roberta Buiani, Elena Giulia Rossi	621
KINSHIP AND DISEMBODIMENT IN MEDIATED CLOUD SPACES, Steve Daniels, Alexandra Bal, Lila Pine, Kathleen Pirrie-Adams	625
AGENCY & AUTONOMY: INTERSECTIONS OF ARTIFICIAL INTELLIGENCE AND CREATIVE PRACTICE, Johnny DiBlasi, Carlos Castellanos, Eunsu Kang, Fabrizio Poltronieri, Leigh Smith	629
AESTHETIC AND USER EXPERIENCE IN BIOFEEDBACK ART, Raivo Kelomees, Varvara Guljajeva, Oliver Laas, Sean Montgomery	637
BEYOND ANTHROPOCENTRISM: ART PRACTICES TO EXPAND HUMAN EXPERIENCE, UNDERSTANDING, AND CREATIVITY, Su Hyun Nam, Stanzi Vaubel, Garrett Johnson, Sanglim Han	643
SOME PROVOCATIONS FROM SKEPTICAL INQUIRERS ABOUT ANIMAL SENTIENCE, Patricia Olynyk, Ellen K Levy, Meredith Tromble, Bob Gluck, Joel Ong	649
QUEERING INFRASTRUCTURE: THE SYSTEM THROUGH THE EROTIC, Joel Ong, Antonia Hernández, Kathy High, Stephanie Rothenberg	655
LIFE, A SENSORIUM: PERSPECTIVES FROM THE SENSORIUM EXHIBITION AT ISEA2020, Joel Ong, Melanie Wilmink, Janine Marchessault	659
MICROSCOPIC OTHERNESS AND SIGNS OF SUB-MOLECULAR SENTIENCE, Andrea Rassell, Paul Thomas, Chris Henschke	661
MENTAL ECOLOGIES: CONSCIOUSNESS AS AN EMERGENT PHENOMENA, Clarissa Ribeiro, Claudia Jacques, Liz Lessner	667
POSTERS	
#MFGA: MAKE FLOORS GREAT AGAIN, Janna Ahrndt	673
THE PRIMARY EXPERIENCE OF SENTIENCE – EXHIBITIONS OF ART AND MEDIA AS A PARKOUR FOR PARTICIPATIVE VISITORS. FIELD REPORT AND CRITICAL REFLECTION, Harald Kraemer	675
EXPLORING SOCIAL COORDINATION THROUGH COMPUTATIONALLY AUGMENTED ARTIFACTS USING AUDITORY FEEDBACK, Yanjun Lyu, Lauren Hayes	677
IMMERSIVE DREAMS: A SHARED VR EXPERIENCE, Alex MacLean, David Ogborn	679
PRESERVING THE PAST: ISEA AND SIGGRAPH ARCHIVES RESEARCH AND DEVELOPMENT, Bonnie Mitchell, Wim van der Plas, Janice Searleman	681
VVV: VOLUMETRIC VIDEO IN VIDEOGAMES, Cindy Poremba	683
TOWARDS A POSTCOLONIAL ONTOLOGY OF SENTIENCE, Roopesh Sitharan	687

TABLE OF CONTENTS

ISEA2020 SUMMIT ON NEW MEDIA ARCHIVING

PREFACE, Wim van der Plas et al	688
MUSEUM NETWORK FOR DIGITAL ARTS: A CONCERTED COLLECTION, DOCUMENTATION, AND CONSERVATION STRATEGY, Oliver Grau & Wendy Jo Cooness	689
PRESERVATION BEGINS AT CREATION: INTEGRATING AN EMBEDDED DIGITAL ARCHIVIST WITHIN AN ACADEMIC MEDIA ART PROGRAM, Devon Mordell	695
ARCHIVING INTERACTIVE ART FOR ART PRACTITIONERS AND THEORISTS, Byeongwon Ha	698
VR AS A PRESERVATION AND SIMULATION TOOL FOR MEDIA ART INSTALLATIONS, Adam Lockhart	700
A DATABASE OF INTERDISCIPLINARY ART IN RUSSIA, Vladlena Gromova	704
EPPA PROJECT: TELLING PERU'S VIDEO ART HISTORIES THROUGH A UNIFIED PLATFORM, Elisa Arca Jarque	707
CARVING OUT A PATH: BUILDING RESEARCH AND KNOWLEDGE ENVIRONMENTS (RKE) IN A DIGITAL CULTURE, Bertrand Gervais	711

Liminal Scape, an interactive visual installation with expressive AI

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Abstract

Liminal Scape is a visual art installation with an expressive AI system that has been trained to recognize human emotion and generate abstract images at will. The proposed system receives an image (photographic portrait) and labels it based on the recognized emotional valence. Our system takes this initial photo and paints it red, yellow, or blue depending on the recognized emotions (from the facial expression) using a painterly algorithm which in turn becomes an input for a two modified Deep Convolutional Neural Network (CNN) models known as Deep Dream and Neural Style. These systems along with a final particle system pass generate a range of latent images that convey the initial emotion, unique to the given input (photographic portrait) and the labeled category (R, Y or B). Our system combines emergent and arbitrary behavior and breeding aspects of CNNs (in the low level) with a hybrid ML/particle stroking system to explore art creation within a high complexity space of artificial creativity.

Keywords

Convolutional Neural Networks (CNNs), Style Transfer, Deep Learning, Emotive Art, Expressive AI, Pastiche, Generative Art

Introduction

The impact of art on emotional state has been studied in brain research and neuroscience (Silvia, 2007). For instance, Neuroesthetics studies the neural bases behind aesthetic experiences such as art creation or contemplation (Chatterjee, 2011).

Moreover, emotional responses to art known as aesthetic emotions have been the topic of interest in philosophy, psychology, and art criticism (Robinson, 2004). In particular, the field of color psychology showed how hues evoke human emotions (Whitfield & Whiltshire, 1990).

Humans respond differently to color stimuli dependent on their past experiences and biological traits (Hurlbert and Ling, 2007). For example, the color red is widely used to

describe emotions such as rage, warmth, energy, passion and love (Wright, 1995; Carruthers et al., 2010).

Scientific studies validated that emotions such as awe (Shiota et al., 2007) and wonder (Zentner et al., 2008) are frequent while contemplating artworks. More recent studies emphasized that emotional responses to art are very diverse (Silvia, 2012), including Sadness (Vuoskoski and Eerola, 2012), Nostalgia (Barrett et al., 2010), and Anger (Silvia & Brown, 2007).

More notably, the emotional responses of perceiving artworks are not always cognitive (or in detached mode), but often lead to affective congruent states (i.e. facial expressions, postures, etc.) on a subjective and bodily level (Freedberg and Gallese, 2007; Azevedo and Tsakiris, 2017; Ishizu and Zeki, 2017). For example, audience show frowning in response to artworks with negative emotional content and smiling in front of artworks with emotionally positive content (Cacioppo et al. 1986; Lang et al. 1993). Moreover, the physiological synchrony (with the observed or experienced emotion) depends on a few important factors: the empathic accuracy and the intensity of the emotional experience (Dimberg et al. 2011; Sato et al. 2013; Korb et al. 2014; Künecke et al. 2014).

There is an emerging interest in artificial emotions or otherwise mediated emotional life to produce expressive and empathic media such as music, poetry or paintings (McStay, 2018). Behavioral or interactionist AI have shaped the discourse between AI and cognitive science with the core assumption that intelligence is a property of embodied interaction with the world. Interactionist AI is concerned with creating intelligent systems that exhibits the essential properties of intelligence. Expressive AI (or creative AI) focus on the authoring of AI system as cultural artifacts and performance (Kolker, 2006).

In generative art in particular, some artists conduct research using AI to stimulate emotions. Most of these studies focused on non-aesthetic stimuli (e.g., geometrical shapes) and broad aesthetic preferences instead of specific emotions (Jacobsen & Höfel, 2002) or emotional soundscape (Fan et al., 2018).

Here, we focus specifically on the aesthetic representation of emotions (derived from facial expressions) to create an emotive AI model that is capable of generating expressive emotional artworks.

Our preliminary results (Figure 6) present features from generated images that are commonly associated with the underlying emotion of the content images such as the representative colors, and styles (strokes, textures).

Background

Facial Recognition

Psychological, anthropological and neuroscientific research employs a particular definition for basic emotion. For example, Paul Ekman introduced Facial Action Coding System (FACS) to describe facial expression. FACS is based on Action Unit detection and temporal dynamics analysis system, each corresponding to a particular muscle group in the face (Ekman & Friesen, 1971).

Many researchers proposed to use convolutional neural networks (CNNs) as an appearance-based classifier to detect facial expression (Dailey et al., 2002; Zhao et al., 2004). Moreover, artists began using facial expressions as a tool to create empathic art, Colton et al. (2008) proposed emotionally aware portrait painting, a non-photorealistic rendering (NPR) system. They used a machine vision system that recognizes emotions to produce enhanced emotional portraits.

Augello et al. (2013) proposed a cognitive architecture originated from the model of blending or conceptual integration (Fauconnier & Turner, 1998) linking the representational spaces (i.e. color perception), and emotions.

DiPaola et al. (2019) proposed an empathy based affective portrait painter using cognitive based empathy in AI conversational agents and a cognitive-based creativity AI painterly system, and art analysis tools (i.e., texture and palette synthesis) to parameterize a generative artistic painting process based on mood, conversation and emotion.

Deep Generative Image Modeling

From the artificial intelligence perspective, automatic generation of art has been a long-standing objective (DiPaola & Gabora, 2009). Recent advances in generative models have been successfully applied to the artistic domain. There are several frameworks for image generation, using recurrent neural network (Gregor et al., 2015), auto-regressive models (Oord et al., 2016), generative adversarial networks (GANs) (Goodfellow et al., 2014), and more (Ma et al., 2018; Xu et al., 2018).

Outstandingly, GANs have achieved the most impressive visual quality and is the most popular technique among artists for generating photorealistic and non-photorealistic visuals. GANs have also been applied to style transfer, for example Elgammal et al. (2017) proposed a method to generate art by learning about styles and deviating from style norms.

Mordyintsev et al. (2015) presented Deep Dream which uses a guide-image mode, back propagation and gradient ascent, to analyze the strong features from one “guide” image and emphasize the best-matching features from a second source image by transforming the pixels in this second image. This results in the emphasis of pre-existing shapes and patterns as well as the appearance of hallucinated patterns in which the network gravitates towards “seeing” patterns it has learned to recognize.

Gatys et al. (2016) then presented style transfer, called Deep Style (DS) by matching features in convolutional layers of VGG-19. In a follow-up study, they proposed ways to control the color preservation, the spatial location, and the scale of style transfer (Gatys et al., 2017). Ruder et al. (2016) improved the quality (i.e. consistent and stable stylized) of video sequence transfer by imposing temporal constraints. Alvarez-Melis and Amores (2017) proposed using style transfer for creating emotional art using Generative Adversarial Network (GAN) trained on a dataset of modern artworks labeled with emotions.

Concept and System Description

Liminal Scape is a multi-screen interactive visual installation that fills the interior of a gallery space across 6 screens (same size) as shown in Figure 1. The screens portray the stylized paintings of our AI system. The visuals are reflected back in the space and the viewers, creating a sense of intimacy. A viewer is then on a journey through a landscape of colors, textures and compositions that expresses and evokes cognitive and bodily emotions. The front wall (screens) display the most immediate results of the system and the screens on the back walls present the more abstract results (generated from the evolving system after a few runs) as shown in Figure 1.



Figure 1. An overview of *Liminal Scape* installation layout

Interaction Scenario

Upon stepping into *Liminal Scape*, a viewer encounters 6 visual screens, each displaying a temporal series of abstract visual feeds (varying in colors, textures and compositions). The artwork invites visitors to take their participation further through an Apple iPad or Tablet, where they can take a selfie (expressing different emotions) which will be “painted” and added to the existing pool of faces (the contents of the artwork) as shown in Figure 2.

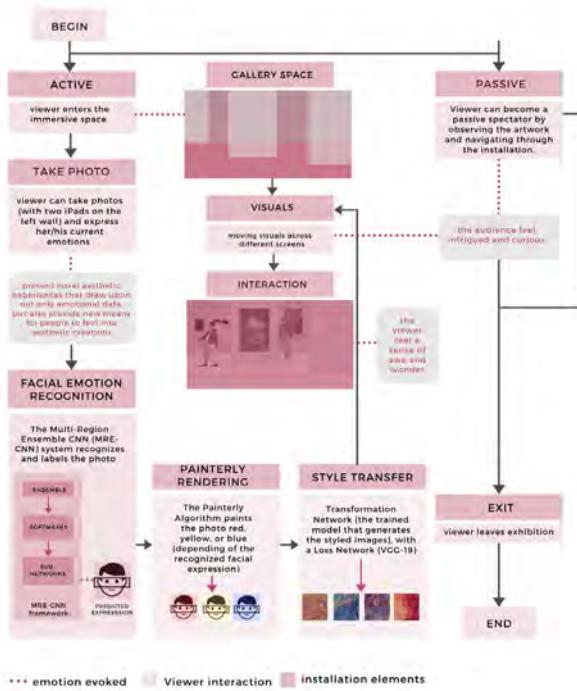


Figure 2. An overview of *Liminal Scape* interaction diagram

Our Approach/ Architecture

-Facial Recognition

We use a Multi-Region Ensemble CNN (MRE-CNN) for facial expression recognition (adapted from Fan et al., 2018). We take three sub-regions of the human face: the left-eye, the nose and the mouth, combined by its corresponding whole facial image, to form a double input subnetwork. We adopt 13 CNN layers and 5 max pooling layers and an output layer of 3 neurons, one for each emotional category grouped together: R: anger, rage, wrath, resentment, passion, lust, love, Y: happiness, joy, delight, pleasure, bliss, and B: sadness, sorrow, despair, grief, melancholy. The networks then generate labels and colorize (red, yellow, or blue) the photographic portraits as shown in Figure 3.

-Modified Deep Dream and Neural Style Transfer

We use a two-phase approach starting with our modified Deep Dream and Deep Style (or Neural Style) pass. Our

modified Deep Dream system specifically trains new CNN models with creative art generation (style recognition) as its goals as opposed to more typical object recognition, using paintings and drawings as training data. We now have amassed a specific to fine art painting data set of 160,000 labeled and categorized paintings from 3000 labeled artists for a total size of 67 gigabytes of artistic visual data.

Since in our system, detecting and identifying regular objects ‘within’ an image is less important than the overall artistic style of the entire image (e.g. style of stroke, texture and color palette), we develop a “hierarchical tight style and tile” process (DiPaola et al., 2018) which uses a more art based texture and style based labeling syntax as well as hierarchical stochastic tiling method to produce a training set that is more conducive to painterly style over object recognition. This method is combined with our neural style transfer model as proposed by Elgammal et al. (2017) to make abstract emotional paintings influenced by the given photographic portrait (facial expressions).

The style transfer architecture has two different CNNs in the training phase: An Image Transformation Network (the trained model that generates the styled images), and a Loss Network (pre-trained VGG-19 classifier) to compute the Style-Loss and the Content-Loss and in turn train the Image Transformation Network (Dumoulin et al., 2016). Our goal is to generate abstract novel images from the infinite possibilities in the creative space and emphasizing semantic and/or stylistic qualities to highlight certain emotions as shown in Figure 5. The training process is as follows: stylized paintings are produced by feeding a content image (emotionally labeled face) through the style transfer network. The content image, along with a fitted style image (selected from one of the 18 abstract paintings of Joan Miró, Wassily Kandinsky, and Mark Rothko), are passed through the Loss Network (VGG-19) as shown in Figure 5 and generates a series of abstract paintings dependent of the intensity of the emotional valance and the selected labeled category.



Figure 3. An overview of our Facial Recognition phase using Multi-Region Ensemble CNN (MRE-CNN) framework (adapted from Fan et al., 2018)

-Adaptive Instance Normalization (AdaIN)

We use adaptive instance normalization (AdaIN) for the interpretation adapted from Huang and Belongie (2017)

model. Given a content image and a style image, AdaIN simply adjusts the mean and variance of the content image to match those of the style image by transferring feature statistics. Then the decoder network learns to generate the stylized images by inverting the AdaIN output back to the latent image space.

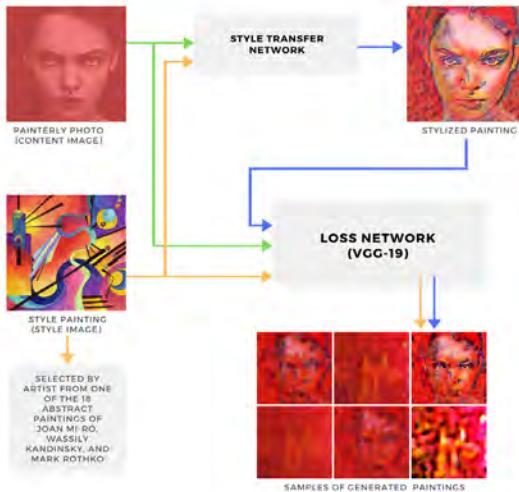


Figure 4. An overview of our style transfer. We use VGG-19 network to encode the content and style images. An AdaIN layer is used to perform style transfer in the feature space. A decoder is learned to invert the AdaIN output to the image spaces

-Final Rendering (ePainterly)

In the last phase, the source image created from the previous steps is further manipulated by our hybrid AI/particle system, ePainterly system, which is an extension to our cognitive painting system (DiPaola and McCaig, 2016) and models the cognitive processes of artists based on years of re-

search in this area. It uses additional Deep Style, algorithmic, particle system and noise modules to generate artistic color palettes, stroking and style techniques. It is the NPR subclass of stroke-based rendering that is used as the final part of our process to realize the internal Deep Style models with stroke-based output informed by historic art making. Specifically, aesthetic advantages of this additional system include reducing noisy artifacts of the generated Deep Style output via cohesive stroke-based clustering as well a better distributed color space.

Conclusion and Future Work

The notion of Sentient AI, capable of feeling and perceiving emotion (sentient) sounds promising, since we live with technologies that feel and are sensitive to human life in ways that until now not seen. Moreover, empathetic art presents novel aesthetic experiences that draws upon not only emotional data, but also provide new means for people to feel aesthetic creations. Our intention behind the Liminal Scape is to create an exploratory AI system in the form of an installation to present abstract emotional paintings, in which users will reveal and explore their affective states. We aim to create expressive/emotional experience, and are curious to know what is the overall experience of the users while interacting with the system. We recognized the potential of artificial creativity for creating novel artworks supported via interactive environments in the future. Our initial results (Figure 6) show the potential of creating emotive paintings that will evoke a range of emotions/aesthetic reactions such as pleasure, anger and arousal. To this end, we will explore expressive AI by mimicking human emotions (facial expressions) and mapping them into low level features such as colors, strokes, intensity. These features are most effective in steering the emotional state of the artworks in the desired direction. We hope that with this work and future research we are getting closer to the design of an emotive AI capable of perceiving and expressing emotions.

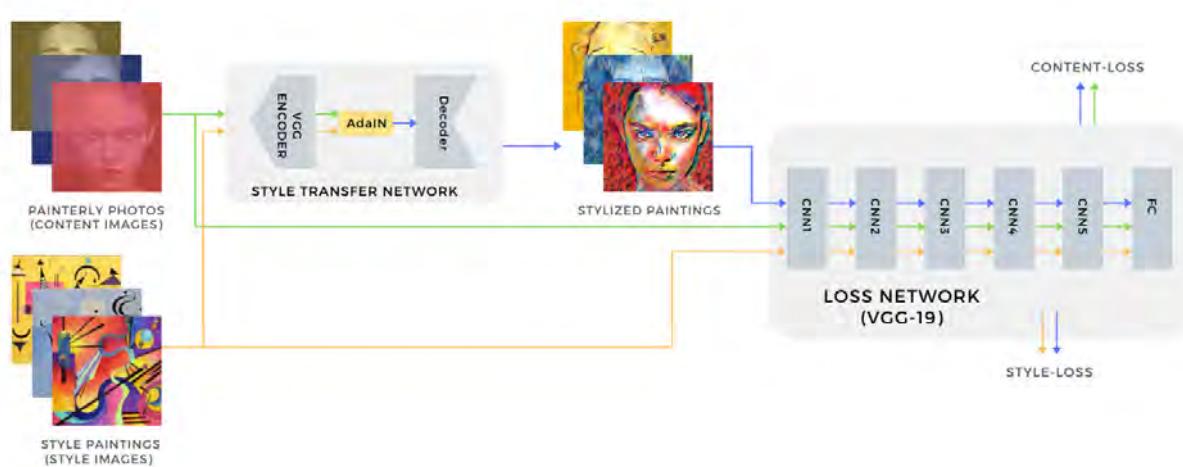


Figure 5. The overview of arbitrary style transfer in real-time with Adaptive Instance Normalization (AdaIN) and Deep CNN (VGG-19) (adapted from Elgammal et al., 2017; Huang & Belongie, 2017)

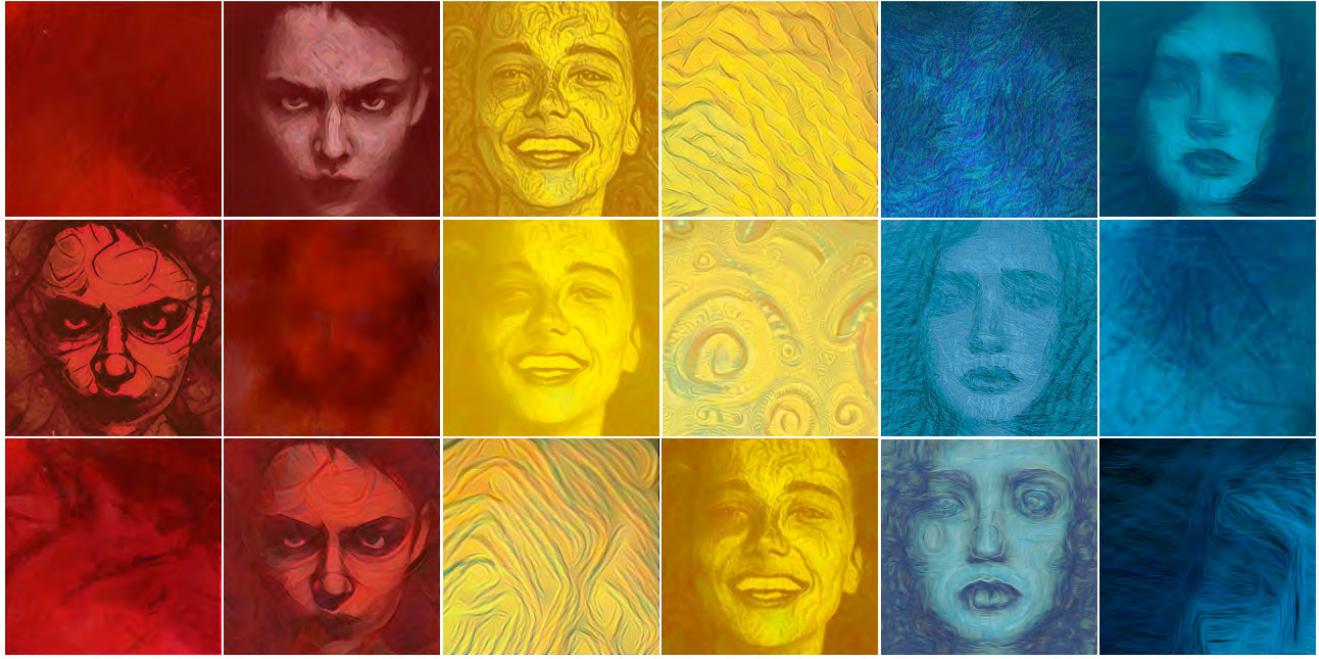


Figure 6. Artworks generated by the *Liminal Scape* resulted from different emotional detection, from left to right: categories R, Y, and B. (R: anger, rage, wrath, resentment, passion, lust, Y: happiness, joy, delight, pleasure, bliss, and B: sadness, sorrow, despair, grief, melancholy)

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Steve DiPaola: active as an artist and a scientist, he is the past director of the Cognitive Science Program at Simon Fraser University, and leads the iVizLab (ivizlab.sfu.ca), a research lab that strives to make computational systems bend more to the human experience by incorporating biological, cognitive and behavior knowledge models.

Carlos Castellanos: is an interdisciplinary artist and researcher whose work bridges science, technology, education and the arts, developing a network of creative interaction with living systems, the natural environment and emerging technologies. His artworks have been exhibited at local, national and international events such the International Symposium of Electronic Art (ISEA), SIGGRAPH & ZERO1 San Jose.

Philippe Pasquier: in his artistic practice, focused primarily on generative arts, he is bringing forward forms that are exploring the nonverbalisable dimensions of the sublime. Philippe has been acting as a performer, director, composer, musician, producer and educator in many different contexts. He also serves, or has served, as an active member and administrator of several artistic collectives and companies (Robonom, Phyilm, Miji), art centers (Avatar, Bus Gallery) and artistic organizations (P: Media art, Machines, Vancouver New Music) in Europe, Canada and Australia. Philippe was director of ISEA2015.



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