FACE TIME
Semiotic Temporalities in Biometric Art

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TACTICAL INTERVENTION

o Is biometric art that uses emotion recognition fundamentally a time-based and time-critical art praxis?

o In what ways and to what extent does biometric art tactically intervene with the hegemonic temporalities for facial behavior that are established in the scientific and technological cultures of the face?

o Denaturalizing these codes and ideologies by making explicit the implicit conventions behind face measuring as well as emotion modelling, why and for what purpose does biometric art generate novel temporalities for the lived present of the human face?

FACS-BASED EMOTION AI

o in recent decades, so-called "new" media art, also sometimes known as digital art, has utilized a wide range of measurement systems for the statistical analysis of numerical data from physiological sources, including DNA identification, eye tracking, and gait analysis, to name but a few

o by the late 2000s, face recognition technology (FRT) and automated facial expression analysis (AFEA) begin to become available as commercial software that non-expert users can configure into large-scale applications, such as the hybrid objects that I term "biometric art"

Fig. 1: FaceReader analysis visualization with temporal segmentation of dynamic facial behavior into the Action Units (AUs) of the Facial Action Coding System (FACS), including the onset, apex, and offset periods for these facial events. Adapted from © Noldus Information Technology 2019

o these biometric artworks are intelligent machines that intermedially combine: a face recognition algorithm on a computer server either local or cloud-based, digital cameras, a display of some variety, and the participation of spectators, among any number of other materials

o in contrast to its historical progenitors that representationally implement physiognomic science, this biometric art 1) detects, 2) extracts, and 3) classifies the faces of participants in an open system that relies upon engagement and interaction
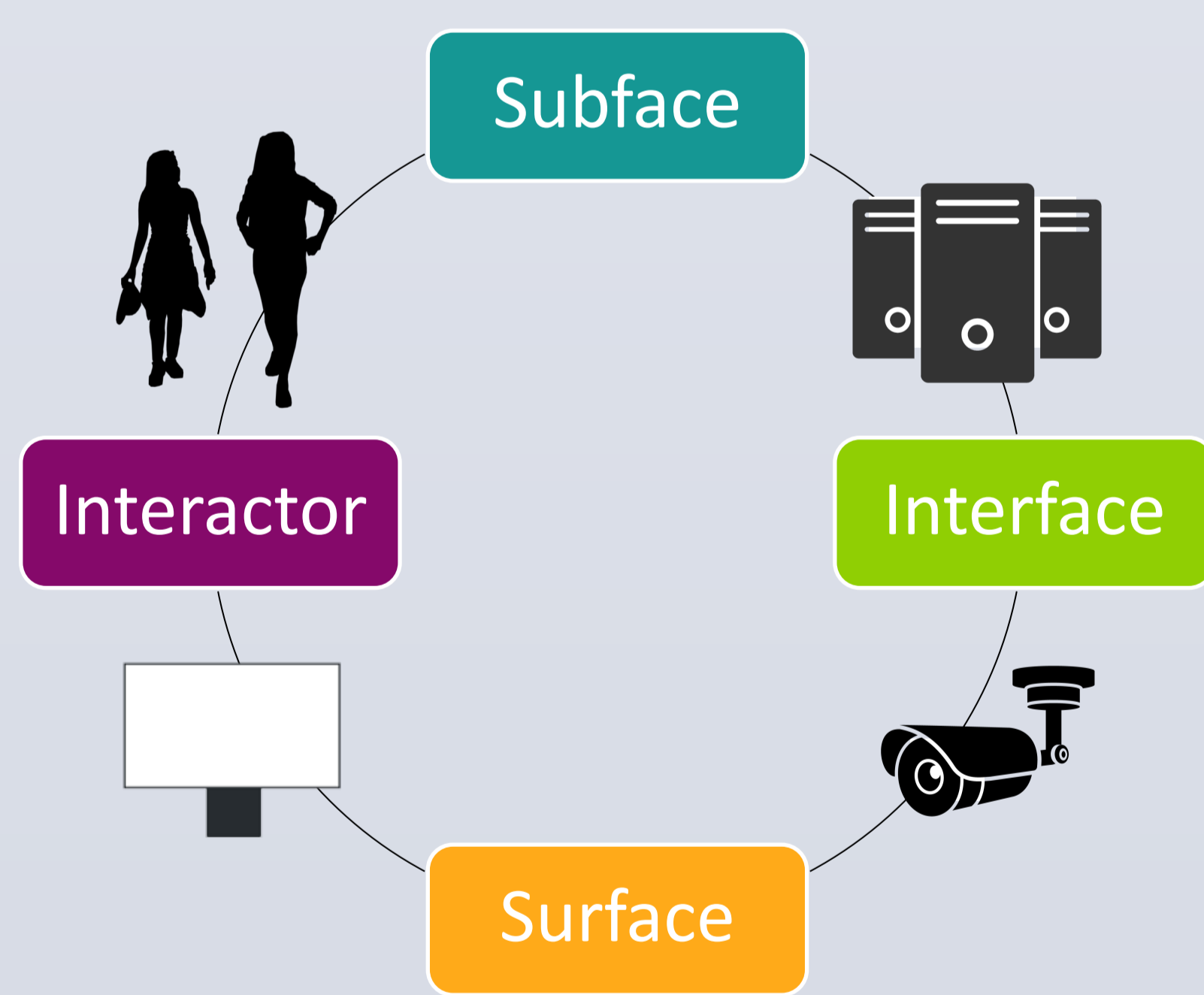

Fig. 2: Cycle diagram with the different media that intermedially combine and continuously interact within biometric art. © Schiller 2021

o emotion artificial intelligence (EmotionAI), and the computation of emotion "on the basis of face," depends first and foremost on the data template and predictive model that is being applied

o this operational functionality derives from the Facial Action Coding System (FACS), a semiotic technique for the comprehensive description of all visible facial behaviors that was designed by American psychologist Paul Ekman, and Basic Emotions Theory (BET), which Ekman among others advocates
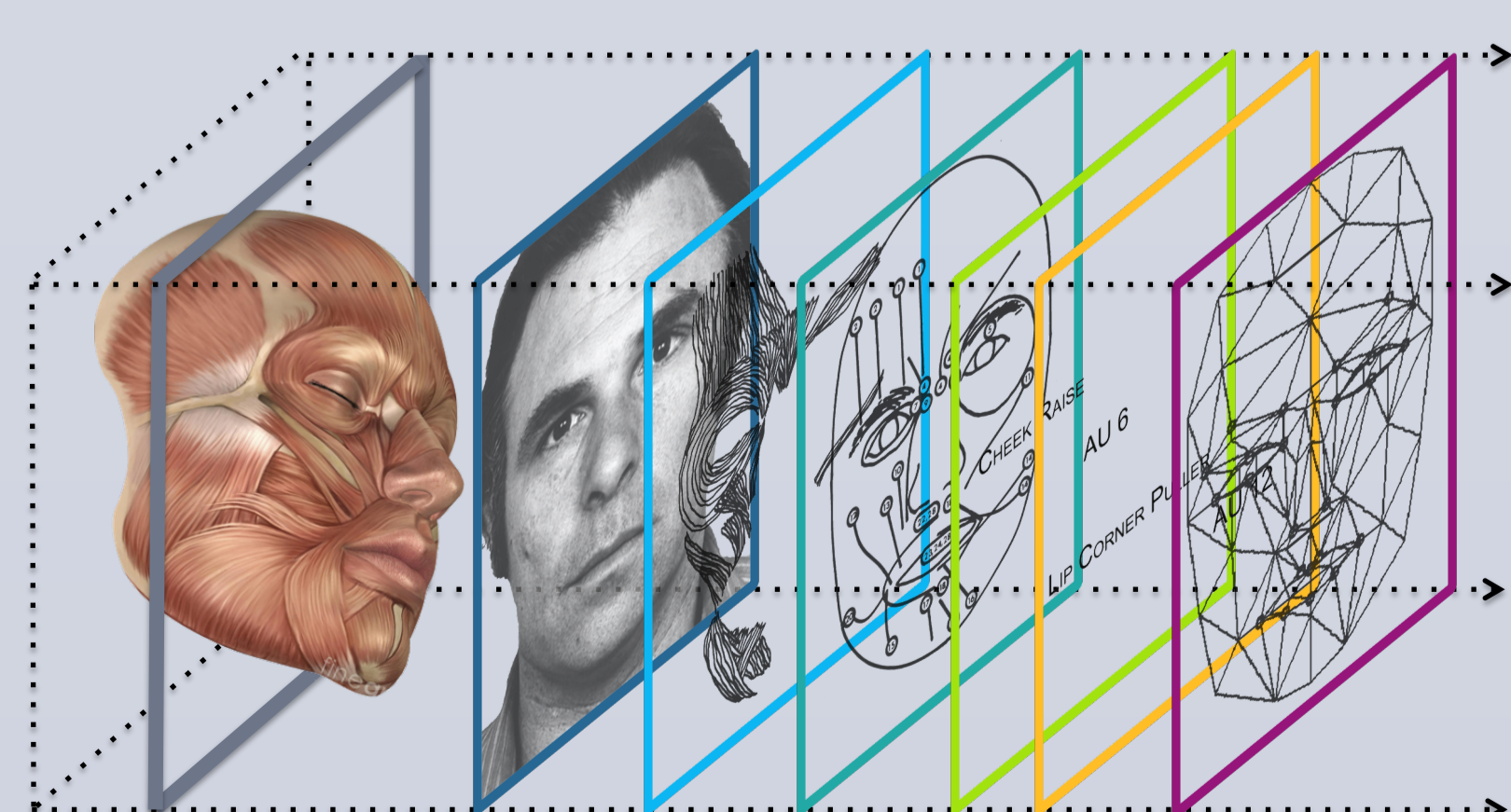

Fig. 3: 4D onto-cartographic projection representing the iconic continuum of facial signs from human muscular movement, through photographic, illustrational, diagrammatic, textual, coded, and parametrized levels of abstraction, to machine descriptive category. © Schiller 2021
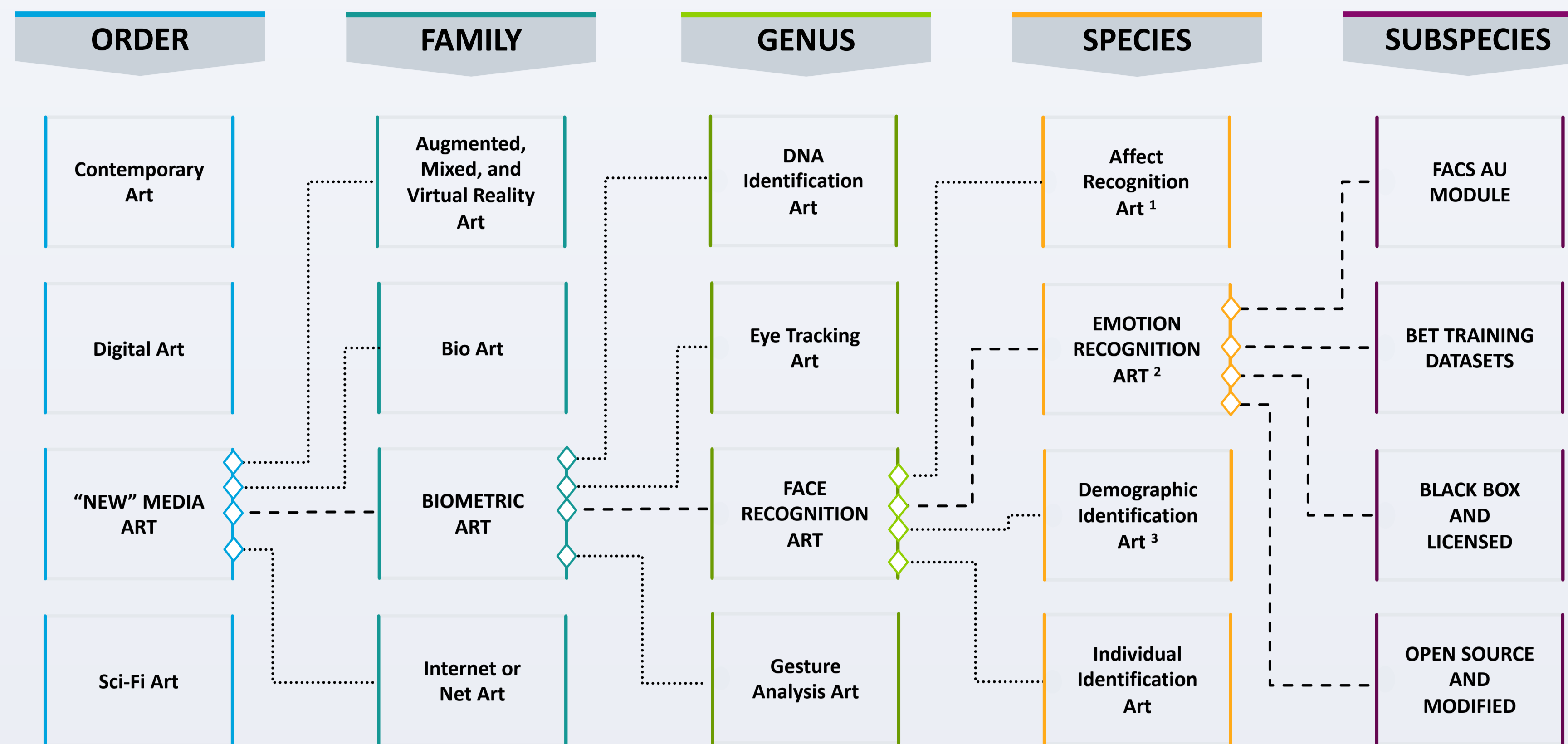
EMOTION RECOGNITION ART

ORDER	FAMILY	GENUS	SPECIES	SUBSPECIES
Contemporary Art	Augmented, Mixed, and Virtual Reality Art	DNA Identification Art	Affect Recognition Art [1]	FACS AU MODULE
Digital Art	Bio Art	Eye Tracking Art	EMOTION RECOGNITION ART [2]	BET TRAINING DATASETS
"NEW" MEDIA ART	BIOMETRIC ART	FACE RECOGNITION ART	Demographic Identification Art [3]	BLACK BOX AND LICENSED
Sci-Fi Art	Internet or Net Art	Gesture Analysis Art	Individual Identification Art	OPEN SOURCE AND MODIFIED

Fig. 4: Tree diagram for biometric art taxonomy. [1] Affect: arousal, boredom, confusion, interest, pain, etc. [2] Emotion: anger, contempt, disgust, fear, happiness, neutral, sadness, surprise. [3] Demographic: e.g., age, ethnicity, gender. © Schiller 2021

o emotion recognition art is one of several face recognition art forms in biometric art, which also intersects and overlaps with a multitude of contemporary media forms as well as traditional art forms, however, it is critically important to differentiate individual artworks by the functionalities of the recognition technology that is being used
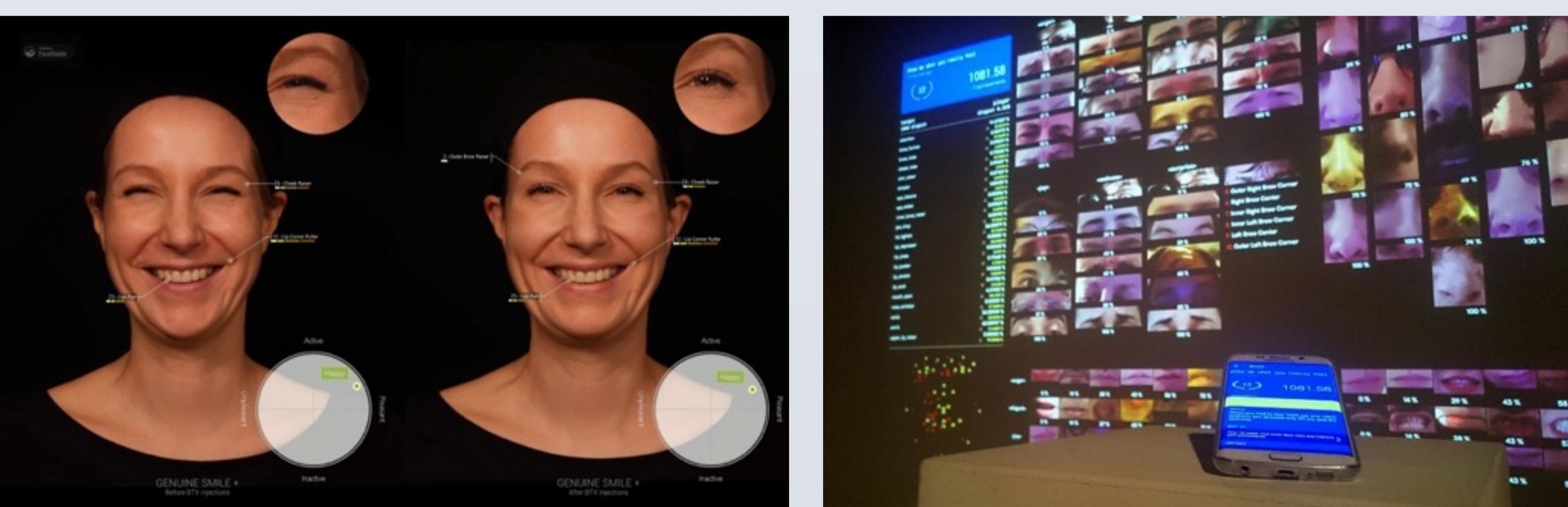
CHAPTER ORGANIZATION AND CONCEPTUAL FRAMEWORK

Fig. 5: Exemplary case studies. © Ishiguro 2010, Meshi 2019, Gao 2016, Wichers 2019, and Van de Ven 2016

o **(top left) Felt Time and the Prosthetic in Hiroshi Ishiguro's *Geminoids* (Japan, 2010)**
  • tele-operated androids with pneumatic actuators and silicon skin that simulates facial behavior during human-robot interaction
  • perceptibility and subjectivity in face time, e.g., the "flow" or "stream" of dynamic behavior and facial movement, normative as well as non-normative speeds of behavior, and the uncanniness of asynchronicity between verbal and nonverbal modalities

o **(top center) Metric Time and the Computational in Avital Meshi's *Classification Cube* (Israel/U.S., 2019)**
  • immersive installation where participants perform facial behaviors that are then classified in comparison with those of animated figures
  • measurability and objectivity in face time, e.g., the duration of a facial action or event, time-series segmentation, onset, apex, and offset periodization, slope of interval, and the smoothness of acceleration or deceleration

o **(top right) Proper Time and Interactivity in Ying Gao's *Neutralité: Can't and Won't* (China/Canada, 2016)**
  • digital fashion that activates with light and movement if and only if the participants' facial behaviors remain neutral rather than emotive within a smart environment
  • processuality and relationality in face time, e.g., facial feedback modulates emotional stimuli and initiates emotional response, facial mimicry simulates other people's emotions by "mirroring" their expression, rendering possible complex inter-individual interactions such as empathy and compassion

o **(bottom left) Tensed Time and Multimodality in Marsha Wichers' *Face Design* (Netherlands, 2019)**
  • film of a performance in which the artist analyzes her own facial behaviors before and after having injected herself with Botox
  • illusiveness and ordering in face time, e.g., the anticipation of before and after the facial enhancement of cosmetic medicine, memory of the cause and effect behind facial disfigurement or facial positivity, and the chronoception of timing deficits or impairments in facial behavior

o **(bottom right) Labor Time and the Speculative in Ruben van de Ven's *Emotion Hero* (Netherlands, 2016)**
  • video game for mobile devices where players win by matching their own facial behaviors to those instructed through various prompts and tasks
  • commodification and valuation in face time, e.g., quantification of the facial expression of emotion and its frequency, collection of this face data in real-time or aggregation, and the use of techno-labor for data behaviorism and predictive analytics
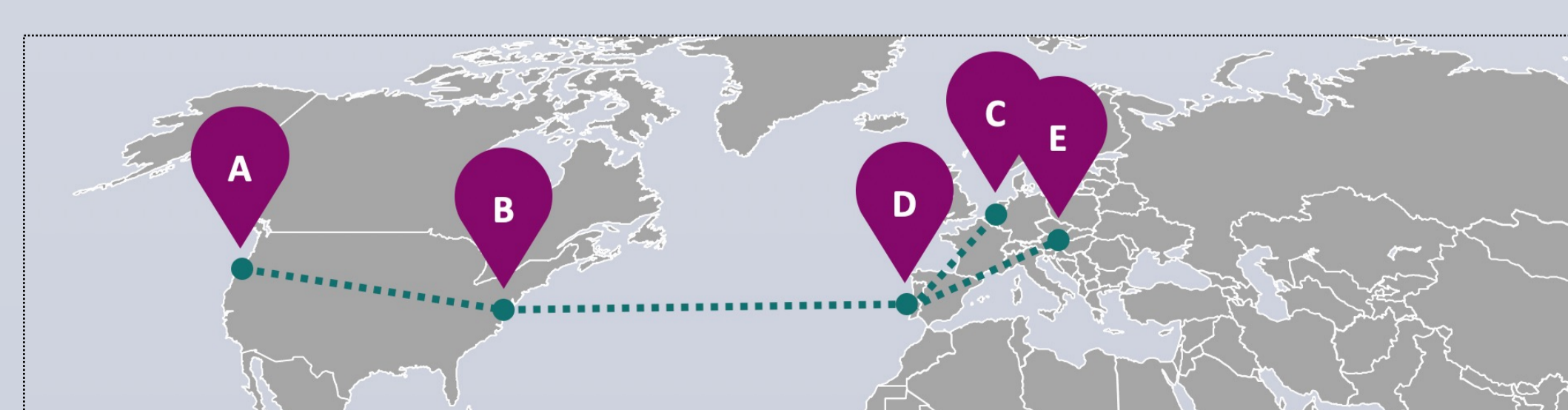

Fig. 6: Transnational development of biometric art, for example, Ruben van de Ven's *Emotion Hero*. © Schiller 2021

concept: FACS, UC San Francisco, California
medium: Affectiva, Cambridge, Massachusetts
sponsor: V2_Lab for the Unstable Media, Rotterdam Netherlands
production: Arquivo 237, Lisbon, Portugal
exhibition: Ars Electronica Festival, Linz, Austria

PROBLEMATICS OF TEMPORALITY

o the problematics of temporality is one of the oldest and most venerated in the histories of theory and the practices of culture

o however, even after the affective turn in the early to mid-1990s, cultural studies by and large still neglects the "crucial dimension" of time (Grosz 4)

o there is a "need to ground knowledge of the social relations of time in particular practices and technologies" (Adam 2)

o time can be considered as "constructed by technological, economic, and geo-political forces over centuries, rather than simply being a natural given" (West-Pavlov 3)

o images and objects can actively create multiple temporalities (Birth; Poidevin)

o secondary literature on biometric art has only just begun to develop:
  • single chapters from related books (Fedorova; Lee-Morrison; Twardoch)
  • essays for exhibitions (Himmelsbach et al. eds.; Stein ed.; Weigel ed.)

o other literature on temporality that contributes to this analysis includes, for instance:
  • time and media (Barker; Bergson; Deleuze; Ernst; Lefebvre; Stiegler)
  • media and face (Ellenbogen; Prodger)
  • face and time (Agamben; Levinas)

AMERICAN PRAGMATIC SEMIOTIC TRADITION

o developed out of classical as well as medieval diagnostics, logics, and hermeneutics

o founded by Charles Sanders (C.S.) Peirce in the late 19th and early 20th centuries

o in contrast to the binarist, verbocentrist semiology of the continental tradition, the pragmatic semiotics of the American tradition is "not linguistics but logic" (Jappy xi)

o this cenoscopic science with a complex formalism that is useful for understanding the practical functions of text, image, and artwork

o role and importance of temporality in the semiotics of Peirce only started to be specified in the mid-1980s (Kevelson)

o since then, there have been only a few conference proceedings on the signs of time (Hess-Lüttich and Schlieben-Lange eds.; Haworth ed.)

o relevant subfields include cognitive semiotics (Berson; Paolucci), computer semiotics (Anderson; Kockelman), and the semiotics of scientific representation (Dondero and Fontanille)

APPLIED CRITICAL VISUAL SEMIOTICS

o applying the critical methodology of semiotic analysis, this dissertation maps and models the multiplicity of modalities through which meaning is made about facial temporalities in biometric art
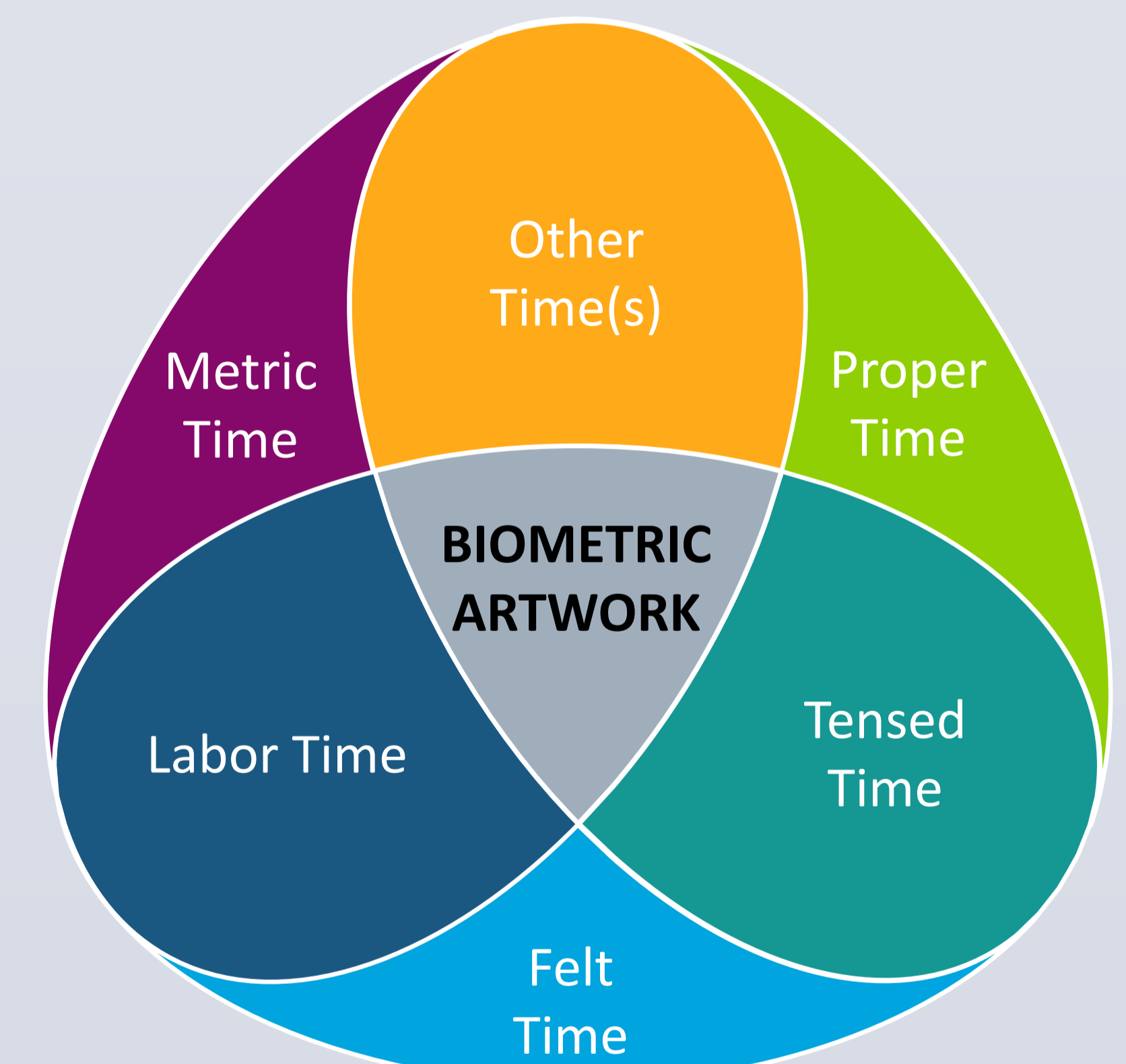

Fig. 7: Euler diagram with Venn-like intersections depicts the multiple temporalities in biometric art that are critically analyzed in this dissertation project. © Schiller 2021

o semiotic analysis in four stages:
  • *describe:* what sort of things a sign of time can be in a work of biometric art and what meanings these signs can signify in and of themselves
  • *analyze:* how these time signs relate to other signs, mapping the movements of a signified between the many signifiers in a biometric artwork, and the various modes of representation that these signs can adopt
  • *interpret:* the relations of these time signs, as well as the relations of these relations, to referent systems in cultural discourse, such as codes and ideologies, that is, regulating systems of social conventions in the knowledge domains of the behavioral and brain sciences as well as the computer sciences, and their schemes of ideas and ideals for what facial behavior can or should be in a society
  • *evaluate:* these signs via their codes to explore the articulation of such ideologies, how this information is obtained from these signs, and the ways in which time signs produce their intended effects upon the interpreter