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Kissing Data

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E.E.G. KISS © Lancel/Maat.

Kissing Data

Distributed Haptic Connections through Social Touch

Authors: Karen Lancel, Hermen Maat, Frances Brazier

2018

Abstract

Haptic social connections are increasingly mediated digitally. Biofeedback of haptic encounters, that support affective communication and social cohesion, well-being and trust, is often no longer based on physical touch or face-to-face connection. Instead, through interfaces such as skin sensors, smart textiles and Brain Computer Interfaces, relational haptic biofeedback is disrupted and extended in time and space, merging various social and sensory processes simultaneously in on- and offline realities. In such merging realities, people meet in distributed mirror processes with data as co-actors. This paper addresses the question: 'Can haptic connections through social touch be orchestrated in merging realities?'

Three artworks are described that explore a radical new approach to synthesize familiar and unfamiliar mirroring of social touch. In this approach, the person touching and being touched does not have to be the same (tele-matically present) person to whom the haptic connection is attributed. Paradoxically, one can even touch oneself to haptically relate with others.

Keywords: Haptic connection, participatory performance, digital synaesthetic interface, distributed touch, mirroring, vulnerability, merging realities, public space.

Artists researchers Karen Lancel and Hermen Maat have been developing the 'Shared Senses' series with a team of hard- and software developers and international partners. These have been presented internationally, in various dynamic public spaces, including Venice Biennial 2015, Stedelijk Museum Amsterdam, Ars Electronica / Volkswagen Forum Berlin, TASIE Beijing, Waag Society Amsterdam; Connecting Cities Berlin, AILab / University of Applied Arts Vienna, RIXC Riga; Transmediale Berlin, Banff Center Canada, Beall Center Irvine CA, USA.

The research bridges theory, scientific experiments and artistic practices, in public spaces.

Haptic social connections are increasingly mediated digitally. Biofeedback of haptic encounters, that support affective communication and social cohesion, well-being and trust, is often no longer based on physical touch or face-to-face connection. Instead, through interfaces such as skin sensors, smart textiles and Brain Computer Interfaces, relational haptic biofeedback is disrupted and extended in time and space, merging various social and sensory processes simultaneously in on- and offline realities. In merging realities, people meet in distributed mirror processes with data as co-actors. Unfamiliar and unpredictable experiences emerge from social, haptic experiences through distributed networks.

This paper addresses the question “Can haptic connections through social physical touch be orchestrated in merging realities?” through artistic research. This research is positioned within the domains of performance art, installation art and new media arts, that propose new participatory, performative, sensory environments for haptic senses of touch, kinaesthesia and synchronization. These performative environments are often a critical response to the culture in which the senses of seeing and hearing are dominant over the haptic senses. In many of such participatory environments, tactile communication technologies do not necessarily frame ‘users’ as ‘senders’ and ‘receivers’ of bio feedback, as is often practice in industry (Salter, C. & Howes, D., 2016). Instead, sending and receiving of haptic biofeedback is part of complex, responsive data environments, in which communication takes place in on- and offline distributed connections simultaneously. (Salter, C. & TeZ & Rodil-Fernández, L., 2016; Blast Theory, 2007).

Such artworks show the strong desire to socially touch and be touched as confirmation of physical presence and relation with the world. Critical and sensitive reflection is evoked through re-orchestration of disrupted social sensory connections between seeing, touching and hearing. In interactive media art theory, such relational, disrupted sensory perception has been described as ‘digital synaesthesia’ for ‘collective embodiment through technology’ (resp. Gsöllpointner, K. et al., 2016; Hansen, M., 2006). At the same time, these artworks present new forms and concepts to establish distributed haptic connections for affective communication.

Unfamiliar Biofeedback

In many artworks digitally mediated, distant haptic experiences are explored by participants, based on tacit knowledge, social relations and environment. Interaction among participants is carefully designed. In various social configurations, artists, active and observing participants (tele-matically) experiment together. Their unfamiliar haptic performativity, in symbiosis with technology, is staged to provoke immersive engagement. (Kwastek, K., 2013).

In works such as ‘Body Movies’¹, ‘Telematic Dreaming’², ‘Can you see me now?’³ and responsive environments such as ‘TGarden’⁴, participants are seduced to appropriate and synthesize familiar and unfamiliar social biofeedback of haptic connections. New syntheses are then based on combined processes of mirroring, in which familiar haptic gestures and connections evoke a more intense resonance than those that are unfamiliar (Johnstone, M., 2017).

Vulnerability of physical touch

Often, social engagement for such new haptic syntheses is aroused through corporal vulnerability of an artists’ body. In such orchestrations, participants are challenged to consider approaching, touching or even physically abusing the artist/performer, leading to new social, reflective connections (Cillari, S., 2006-2009; Abramovic, M. & Dikker, S. & Oosterik, M., 2011).

Vulnerability and precariousness are core to these artworks, and can be considered to be a feature of interdependency in social bonds, building on social values of responsibility, empathy and trust (Butler, J., 2017). As a consequence, unfamiliar vulnerability often calls for dialogue to re-negotiate these social values.

¹ Sermon, P. (1992). *Telematic Dreaming*. <https://www.leonardo.info/gallery/gallery332/sermon.html>. Last visited April 9, 2018.

² Lozano-Hemmer, R. (2001). *Bodies Movies, Relational Architecture 6*. http://www.lozano-hemmer.com/body_movies.php. Last visited April 9, 2018.

³ Blast Theory. (2007). *Can You See Me Now?*. <http://www.blasttheory.co.uk/projects/can-you-see-me-now/>. Last visited April 9, 2018.

⁴ Sha, XW, 2000. *TGarden*. <http://v2.nl/archive/works/tgarden>. Last visited April 10, 2018

In orchestrations, in which the public can influence a central performer's well-being tele-matically (Netband, 1994; Cheang, S., 1998; Sermon, P., 1992; Stelarc, 2015), social values of responsibility are challenged in completely different ways, requiring a better understanding of what can be called 'distributed vulnerability'.

Distributed Vulnerability

Orchestrations of social touch with disrupted connections, of participants in interplay with each other, require a radical different approach. In such environments, vulnerable social and bio-feedback are by nature intertwined. This paper describes three artworks that explore such connections, through mirroring and dialogue, in digitally distributed environments to answer the leading question: 'Can haptic connections through social physical touch be orchestrated in merging realities?'.

Three questions are:

Can I haptically connect with the network, through social physical touch?

Can I haptically connect with you in the network, through social physical touch?

Can we haptically connect with you in the network, through social physical touch?

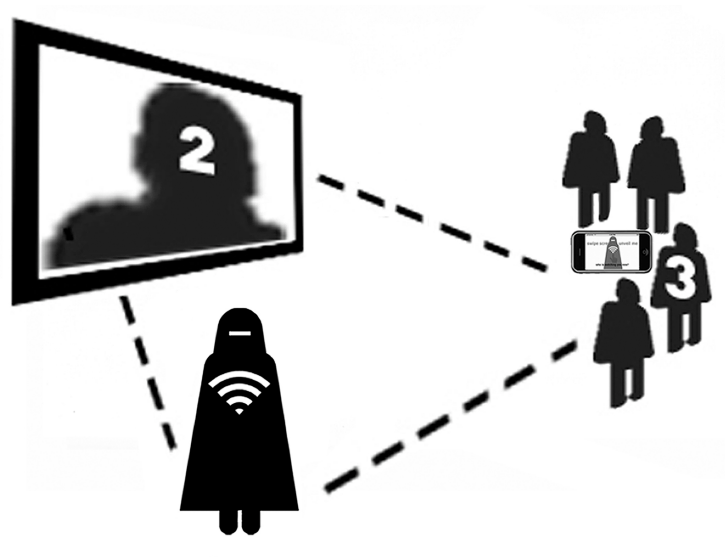
Approach

In these three artworks, familiar and unfamiliar haptic gestures are performed in a new sensory synthesis of merging realities in public spaces. Sensory connections between touching, seeing and hearing are deconstructed and re-orchestrated. In a new synthesis, participants physically and virtually mirror each other and mirror themselves. Orchestrations are designed to explore if distributed haptic connections of touch can be evoked, through social, vulnerable gestures in a social interplay.

Skin sensors, face recognition- and –merging interfaces, smart textiles and Brain Computer Interfaces are developed to facilitate the performance of vulnerable haptic acts of kissing and caressing, to evoke new forms of social and biofeedback mirroring. The first artwork *Tele_Trust*, explores the individual haptic connection to the network as a social mirror. The second artwork *Saving Face*, explores a novel haptic relation from the individual to others in the network. E.E.G. *KISS*, the third artwork, explores a sense of communal haptic connections with others in the network.

All three artworks are performative environments in which the public are invited in various roles: Actors (this notion is used to describe a more active than passive role of participation), Observers and 'Data as Co-actors'. Dialogue is hosted to provoke agency, shared expression and imagination, of implicit social values, embodied cognition and a haptic sense of knowing (Gill, S., 2015). They are in fact co-researchers in 'Artistic Social Labs'.

This paper describes the three artworks mainly from the perspective of the Actors.



Tele_Trust. Banff Center Canada Liminal Screens, 2010. © Lancel/Maat.

The DataVeils visual design is based on a monk's habit, a burqa and Darth Vader; Gender Neutral and One size fits All, in collaboration with Women Center Jasmijn Groningen and AZIZ designer Amsterdam.

1. Tele-Trust

2009 – ongoing, <http://www.lancelmaat.nl/work/tele-trust/>

This artwork was developed to address the question: **‘Can I haptically connect with the network through physical touch?’** Actors are invited and hosted to wear full body covering DataVeils. In the smart fabric of these ‘synaesthetic skins’, flexible touch sensors are woven, to transform the wearer's body into an intuitive, tangible interface.

By caressing their data-veiled bodies, (1) their portraits are unveiled on smartphones of the surrounding public (i.e. Observers), (2) They can hear spoken statements of the surrounding public in their head phones, answering the question ‘Do you need to see my eyes to trust me?’.

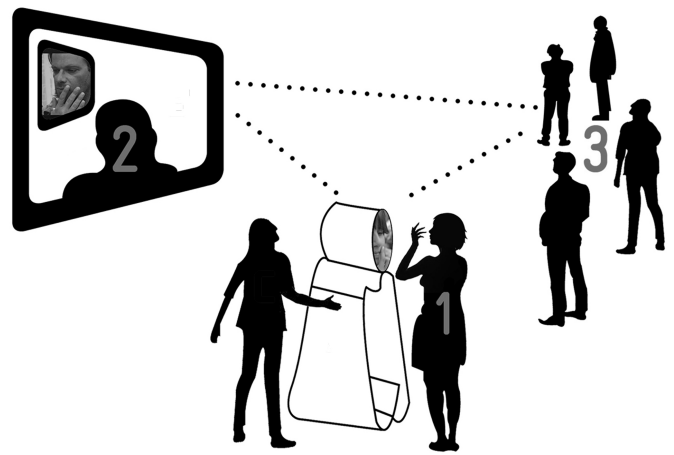
3) Simultaneously, both the portraits and statements are exposed on a public screen, in sequence with portraits of previous DataVeil wearers. Veil wearers walk in the public space (street, museum square) for as long as they wish, in practice between 5 and 30 minutes. Hosts stay with them at a distance, in a museum or on a square, to make sure they are safe. Afterwards, Actors share their experiences with the Host and surrounding public.

Individual Connections with the Social Network

Actors individually disappear in the veil, unrecognizable and anonymous for others, as indicated in reactions such as: “I felt safe inside. I love this power.” and “No one can see me watching. I can see them all.” and “Like I was a walking surveillance monitor.” Precarious acts of caressing the body in the veil are performed in many ways: surprised, slowly, in stillness, carefully scanning or as if touching buttons, through grasping the body.

(Un)familiar Connections with Others

Familiar relations between ‘who you see, who you touch and who is being touched’ are re-orchestrated. Veil wearers caress their own bodies to haptically connect with unfamiliar strangers in the public network. This mirror-process, with the portraits and texts visible on screen and the voices audible in the head phones, is in fact, partially, a familiar imitation of a traditional encounter. Feeling touched (by themselves, in the veil) leads to seeing someone on the screen and hearing someone else in the head phones. Veil wearers comment: ‘When I touch myself, I am together with others, when I hold off, I am alone’, and “I could hear your voice in my skin. I remembered you remembering. My body is your body.” These reactions synthesize familiar and unfamiliar mirroring of haptic connections as a new form of socially, corporal mirroring.



Saving Face. Utrecht, Festival aan de Werf, 2012.

Saving Face is an innovative multimodal, system of face recognition and face merging technologies. Every portrait is saved in a database from which merged portraits appear as 'virtual Personas' on a public screen. © Lancel/Maat.

2. Saving Face

2012 – ongoing, <http://www.lancelmaat.nl/work/saving-face/>

This artwork was developed to address the question: **'Can I haptically connect with you in the network?'** Actors are invited to caress their faces in front of an aluminium sculpture with a camera to create their portrait on public screen. On the screen, their portraits appear and then slowly merge with the portraits of previous Actors. Each new face-caressing gesture generates further merging on screen over time. Hosts stay with Actors at a distance, in a museum or a on square, to make sure they are safe. Actors perform in a ritualized production, which the Hosts describe to them as: 'Caress to Mirror and Merge'.

Individual Connections with Others

Although caressing can be performed as long as desired, in practice it takes between 0.30 and 5 minutes. Precarious acts of caressing are performed in many ways: tenderly, surprised, giggly, silently, provocatively, carefully scanning or as if touching buttons, most often leading to concentrated, individual experiences. Halfway through the process, some Actors close their eyes. While caressing, many seem to lose touch with Observers around. However, they indicate that when no Observers are around, they perceive their acts of caressing as merely instrumental for merging on screen, rather than for exploring a haptic experience.

Caressing Actors do not question if they want to make private caressing public, instead they are curious how they will merge with others. Afterwards, caressing Actors share their experiences with the Host and surrounding public.

(Un)familiar Connections with Others

When Actors caress their faces, the subsequent appearance of a portrait on screen, is in fact, partially, a familiar imitation of a traditional haptic encounter, that in this case is orchestrated by 'Feeling caressed (by themselves) leading to seeing someone on a screen. Many describe their haptic experiences as being part of a digitally distributed system. For example, one Actor commented: "When I closed my eyes caressing in front of this technologies, knowing that that my caressing act was exposed, it seemed as if a hand outside caressed me, as if it was not my hand but the hand of God." Others would be turned inside, immersed in the connection between seeing and feeling their faces, for a long time - and then stop, as if awakening. Some said that they felt like giving away a piece of themselves to a 'digital grid'. One person called the merging persona on screen a 'Shadow-friend': "...like someone you are not but who is travelling with you, as a second 'I'."



E.E.G. KISS. Stedelijk Museum Amsterdam 'Stedelijk Statements'
& University of Amsterdam, conference 'Worlding the brain'. 2017. @ Lancel/Maat.

3. E.E.G. KISS

2014/2016 – ongoing, <http://www.lancelmaat.nl/work/e.e.g-kiss/>

This artwork was developed to address the question: **'Can we haptically connect with you in the network through touch?'** As an ultimate haptic connection, a tele-matic kiss was designed. To this purpose, the act of kissing was deconstructed, to reconstruct a BCI mediated, 'communal kiss'. Actors are invited to kiss one another while wearing e.e.g.-headsets.⁵ Their electrical brain-activity during kissing is projected real-time on the floor (as 'Dancing Data') around the kissing Actors, together with a soundscape based on the same unique e.e.g. measurements.⁶ Measurements of Observers' heartbeat rhythms were sampled and included as part of this soundscape.⁷ Hosts stay with the kissing Actors as at a distance, in a museum or on a square, to make sure they are safe. Afterwards, kissing Actors share their experiences with the Host and surrounding public.

Couples, friends and strangers, people of all ages, kiss. They perform kissing in many ways: carefully, passionate, laughingly, in stillness, shyly, provocative, surprised, emotionally, tenderly. Kissing can take as long as they desire, in practice between 0,5 and 2 minutes (with exceptions of 10 minutes). Actors indicate not being worried about privacy issues, instead they are interested in how this form of kissing will feel, with Observers and measured by e.e.g. data.

Share a Kiss for Connections with Others

While kissing, Actors close their eyes, they hear the sound, and immerse in each other's kiss. Afterwards they are asked whether they feel sharing their kisses with the data and the Observers. Actors often express two points of view, in one statement: "Data are neutral" and "The sound made my kiss more intense and more focussed. The tickling sound, that emerged from my brain activity, made me imagine electric rain drops that enhanced and merge with my experience of electrified kissing."

Some Actors say that they experience the Observers' potential judgement of their kisses to be distracting. As a form of protection against such judgements, they often claim to have lost touch with the Observers. However, it seems they actually mean 'semi-losing' touch. In practice, the Actors' hands often dwell towards sexually arousing parts of the body but suddenly stop, as if being watched and judged by the Observers.⁸ In other words, they do not completely lose touch with the Observers.

⁵ These e.e.g. brain measurements mostly indicate muscle movement. Lancel/Maat argue that these muscle movements are part of a reciprocal intimate process, including motoric intention in the brain. Scientific analysis of e.e.g. data from intimate kissing is not available (yet) and as a consequence, such interpretation cannot be shared with Actors and Observers.

⁶ An algorithm has been designed to this purpose with STEIM (Studio for Electro-Instrumental Music) Amsterdam

⁷ This element of heartbeat rhythms was introduced at Gogobot Media Art Festival 2015.

⁸ This is also visible on video documentation.

'Semi-losing touch' with the Observers is found to be essential for the intimacy of kissing. Interestingly, when Actors *cannot* see Observers before starting to kiss, acts of kissing are not experienced as being intimate, but instead instrumental to digital data production and interpretation. In these cases, Actors describe not the Observers, but instead the data-interpretation (through visualization and sonification) to be potentially judging and often to be distracting from intimate kissing.

Kissing Data: (Un)familiar Connections with Others

Participants experience kissing the other person as both familiar and unfamiliar. Feeling kissed (by someone) leads to seeing and hearing visual, abstract data and sound, that is merged with heartbeat sounds from Observers around. Often, Actors describe that they experience Observers to be part of their kisses: "It felt like our kiss was being borne by the Observer's heartbeats".

How does your kiss feel in E.E.G. data?

After the kissing act, Actors are given the opportunity to re-read the data, together with the Host. Scientific analysis of e.e.g. data from intimate kissing is not available (yet)⁹. Actors interpret their shared kiss experiences into the data.¹⁰ They internalize the e.e.g. data as a representation of their intimate kissing, only when given the opportunity to critically investigate these data based on imagination and shared memories. They interpret their shared memorized kiss experiences through dialogue.

Discussion, Conclusion, Future Research

'Can haptic connections through social physical touch be orchestrated in merging realities?'

Three artworks explore a radical new approach to synthesize familiar and unfamiliar mirroring of social touch, in public digitally distributed environments. In this approach, the person touching and being touched does not have to be the same (tele-matically present) person to whom the haptic connection is attributed. Paradoxically, a participant can even touch him/her self to haptically relate with others.

This is the case in the first artwork *Tele_Trust*, that has shown to facilitate individual haptic connections to the network. The second artwork *Saving Face*, shows a novel haptic relation from the individual to others in the network. *E.E.G. KISS*, the third artwork, creates a sense of communal haptic connections with others in the network.

In all three participatory artworks, the public plays an important role in these distributed social interplay and dialogue. However, 'semi-losing' touch with the public in the network has shown to be essential, for concentrated, intimate shared touch, in particular for kissing and caressing. These orchestrations show a new haptic synthesis for 'Distributed vulnerability'.

Current artistic research focusses on shared BCI mediated experience, with 'data as co-actors' in haptic, social relations. Future research will focus on the notion of proximity in relation to datafied haptic performativity, as a form of 'Distributed vulnerability'.

⁹ Scientific analysis of e.e.g. data from intimate kissing is not available (yet). Moreover, this research does not focus on scientific interpretation of measurements but instead on experience and understanding of measurements and datafication as part of social cohesion.

Biography

Lancel/Maat

www.lancelmaat.nl

Karen Lancel and Hermen Maat, artist duo and researchers, are considered pioneers, exploring the tension between embodied presence, intimacy, privacy and trust in current social-technological systems. They re-orchestrate automated control technologies, bio-feedback and sensory perception, to create 'trust-systems' for distributed mirroring experiences. Their visually seductive meeting places, function as 'Artistic Social Labs' in public space, with the public as 'co-researchers'. Their 'Presence Rituals' invite participants to reflect on their perception of mirror processes for future and imaginable sustainable social eco-systems. For the artistic research 'Shared Senses', participant's private bodies are extended with immersive technologies for augmented human-network interaction, thorough smart textile wearables, BCI, face recognition technologies, responsive data environments, for reflection. Works are shown with related drawings, video's; artist's books. Performances and installations are represented by Public Art Lab Berlin and have been shown internationally in exhibitions including the Venice Biennale 2015, Zentrum für Medienkunst Karlsruhe, Stedelijk Museum Amsterdam, Rijksmuseum Amsterdam, ISEA Istanbul – Helsinki - Hongkong, TASIE Millennium Museum Beijing, Beall Center Irvine CA, HeK Basel, Ars Electronica Linz, RIXC Riga, Transmediale Berlin.

Lancel headed the MFA interactive media art department at Frank Mohr Institute, Groningen and is currently PhD candidate at the Technical University of Delft 'Participatory Systems Initiative'. Their works emerged in collaboration with artistic labs STEIM Amsterdam, V2_Lab Rotterdam. They have been awarded grants and fellowships from the Mondriaan Fund, Banff New Media Institute Canada, Baltan Laboratories Eindhoven, Waag Society Amsterdam, FWF der Wissenschaftsfonds Austria; Amsterdam School of the Arts, European Institute for Technology EIT ICT, IASPI Stockholm, Netherlands Organisation for Scientific Research (NWO), EMAP European Media Art Platform, TASML Tsinghua Art Science and Media Lab - Tsinghua University Beijing.

Frances Brazier

Frances Brazier is a full professor at the Delft University of Technology. Her research focuses on the design of complex, emergent social technical participatory systems in merging networked realities. The design of witnessed presence, agency and awareness, self-management, and distributed coordination are core challenges within her research and the Participatory Systems Initiative.

Prof. dr. Frances Brazier holds the Engineering Systems Foundations chair within the Systems Engineering Group of the Multi-Actor Systems Department of the Faculty of Policy and Management, at Delft University of Technology. The group's research agenda focuses primarily on the design of socio-technical participatory systems (www.participatorysystems.org), complex systems by nature.

Frances Brazier holds a MSc in Mathematics and a doctorate in Cognitive Ergonomics from the VU Amsterdam. She has held positions in the Departments of Cognitive Psychology, Artificial Intelligence, and Computer Science at the VU Amsterdam where she was granted full professorship in 2000. She (and her research group) moved to the Delft University of Technology in 2009.

Parallel to her academic career she co-founded the first ISP in the Netherlands: NLnet and later NLnet Labs. She is currently a member of the editorial board of "AI in Design and Manufacturing", Birkenhauser's Autonomic Computing series, and Springer's Journal of Requirements Engineering.

References

Artworks EEG KISS, Saving Face and Tele_Trust are developed in collaboration with many partners, over a longer period of time, some of which we are able to thank here:

Tele_Trust (2009 – ongoing)

Developed with: (Technical and interaction design) Banff Center BNMI Canada, V2_lab Rotterdam, Mart van Bree, Technical University of Delft. (Visual Design) AZIZ Amsterdam, Women Center Jasmijn Groningen, Erwin Slegers. Supported by: Mondriaan Fund, ISEA2011 Istanbul, AFK, Lectoraat AHK Amsterdam, V2_Lab Rotterdam, De Balie Amsterdam, Banff New Media Institute Canada, ADA Web New Zealand, Embassy of Canada, Consulate of Istanbul. Fellowships- Artists' Residencies: IASPIS Stockholm (2011-2012), Banff Center BNMI Canada 'Liminal Screens' (2010). Presentations (selection): Transmediale Berlin (2016), Stedelijk Museum Amsterdam (2010, 2011), ISEA & Istanbul Biennial (2011), World Expo Shanghai - DCC Mobile Platform (2010), Banff New Media Institute Canada (2010), Gogbot media Festival Enschede (2012), Waag Society Amsterdam (2009), University for Technology Delft (2012), Festival a/d Werf Utrecht & PSI (2011), ElectroSmog: De Balie Amsterdam - Banff center Canada – ADAWeb New Zealand (2010), V2_Institute & Architecture Biennale Rotterdam (2009), Lumineus Amersfoort' (2009), IASPIS Stockholm (2012), Kulturstiftung des Bundes (2017).

Saving Face (2012 – ongoing)

Developed with: Mart van Bree, Matthijs ten Berge, Sylvain Vriens, Tim Olden. Software is based on Jason Saragih's/ Kyle McDonald opensource Facetracker library. Supported by: Mediafonds@Sandberg, MediaFonds, Mondriaan Fund, SICA NLTR 400, Festival aan de Werf Utrecht, Netherlands Embassy Beijing, BCAC Beijing Culture and Art Center, BCAF Beijing Culture and art Fund, Dutch Embassy Berlin, Connecting Cities Network / Public Art Lab Berlin. Sponsoring: Holland Screen. Presentations (selection): 56th Venice Biennale - China Pavillion (2015), BCAC/BCAF Beijing (2015-2016), Holland Festival/De Balie Amsterdam (2015), Rijksmuseum Amsterdam (2013), Public Art Lab Berlin - Connecting Cities Network (2013), Festival a/d Werf Utrecht (2012), IASPIS Stockholm (2012), 3rd TASIE Art/Science Exhibition, Science/Technology Museum Beijing (2013).

E.E.G. KISS (2014/2016 - ongoing)

Developed with: STEIM Amsterdam (Tijs Ham: sound, algorithm), Waag Society Amsterdam, Institute for Provocation Beijing, Baltan Laboratories Eindhoven. Research groups: *Dutch Touch* University Twente; *Urban Interfaces* University Utrecht; *Participatory Systems* University for Technology Delft; *Neurocultures* University of Amsterdam. Supported by: Mondriaan Fund, ZKM Karlsruhe, City University of Hong Kong, Austrian Science Fund FWF. Sponsoring: TNO Nederland, Holst Center and Fourtress Eindhoven, Phillips Lab Eindhoven, Eagle Science Amsterdam. Fellowships - Artists' Residencies: Digital Synesthesia Group University Vienna (2016), EMAP European Media Art Platform - RIXC-Riga (2018), TASML, Tsinghua art, science, media Lab at Tsinghua University Beijing (2014). Presentations (selection): Robot Love Eindhoven (2018), Ars Electronica /Volkswagen Forum (2017), HeK Basel (2017), ISEA Hongkong (2016), RIXC, Riga (2016), Waag Society Amsterdam 'Hack the Brain' (2014, 2016), Angewandte Innovation Lab (AIL) Vienna (2016), BeallCenter for Art + Technology at California University, Irvine L.A. (USA 2016), Frascati Theatres Amsterdam (2016), Gogbot media Festival Enschede (2015), VPRO Medialab (2015); EYE Film Institute Amsterdam / Beyond Biennale (2014), Stedelijk Museum Amsterdam (2017).

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