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Editorial: Design for Tangible, Embedded and Networked Technologies Special Interest Group (tentSIG)

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Editorial: Design for Tangible, Embedded and Networked Technologies Special Interest Group (tentSIG)

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tentSIG is interested in the design of networked and embedded technologies, and the human dimensions of experience as a result of living with them. This second DRS conference tentSIG track brings together papers that explore cultural practices and daily lives, catalysed, disrupted and managed through tangible, embedded, and networked technologies.

With research interests in intuitive interaction, sensory anthropology and design methodologies, this year's track chairs take the position that technology is not neutral, and that design efforts embed implicit values and attitudes to human agency, identity and power relations. We welcome the papers here in their acknowledgement that material, sensorial, and participatory design research practices have the cultural potential to influence the behaviours and practices of individuals and their communities in diverse ways, beyond instrumental goals.

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Managing daily life

Both papers in this section address networked and tangible technologies that have the ability to expand the human dimensions of daily experience through informing and empowering people. Kim, Cho and Jun focus on the positive opportunities offered by addressable LEDs as a mode of data visualisation. Six parameters of lighting are used to conduct a series of experiments. These are: intensity (the level of illuminance), colour (consisting of colour temperature and hue as stimulation in the retina by spectrum of light), area (illumination area by lighting), movement (automated changes of lighting), texture (the degree to which light scatters) and distribution (the direction of emitted light). They studied how individuals responded to a collection of objects designed for their experiments. Results suggest that creative approaches to working with light output as a material, and as a glanceable information channel in situations when abstraction and lower levels of legibility of information, is acceptable.

Guzin, Bahar and Jump take a similarly positive view of the potential of in-car infotainment systems to 'empower' the front-seat passenger through technologies for pragmatic (informative) and hedonic (entertaining) ends. What, how and why goals are used to structure an analysis of the extant literature of passenger experience, relating to tasks to achieve concrete goals ('do-goals'), operational steps, and emotion and meaning ('be-goals'). Infotainment systems for front-seat passengers are found to be a future scenario, not yet included in production cars. Input modalities



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being explored in concept cars include touch recognition, gesture recognition, eye-gaze recognition and audio recognition; an output modalities include curved OLEDs, flexible OLEDs, 3D panel LED projection, head up displays, shape changing and haptic displays, and audio feedback. Touch sensitive control surfaces are found to be spreading across new zones of the car interior in addition to the central console and dashboard, while the physical is becoming co-located with the digital in output displays. As a result, empowerment is discussed in terms of relatedness, autonomy, security and stimulation, which in turn conceptualises the passenger as active rather than passive; 'passenger' is suggested as a complement to 'driving'.

As daily life becomes more nuanced due to increasingly sensitive technologies, so too do cultural awareness and design practices become more informed due to increasingly complex relationships between technology and user comprehension in the section below.

Catalysing cultural and design practices

Tangibility and the sensory dimension emerge here as entangled catalysts in the design process, which is challenged by the often dispersed, sometimes concealed, and undefinable contemporary technological artefact. The three papers in this section share a pragmatic concern with how such systems can be made humanly sensible, whether in use or in user informed development processes.

Hong goes beyond speculative design propositions in which tangible aspects of technology are presented as potential solutions for the maintenance of long distance human relationships. This work reclaims the separation of individuals as worthy of a pragmatic user centred design approach and treats participant designers as experts in their own experiences. Through engaging creative participatory methods, end users identify important criteria for technologies which may help support their human-human relationships over geographical distance. Importantly, technology in this case does not have to be digital – accessories, perfume and photos were able to function as representations of remote presence through personal customisation, and customisation is presented as a central concern for future technology development in the context of long distance relationships.

Manohar and Briggs discuss making the dispersed, and therefore intangible dimension of blockchain transactions materially available to multidisciplinary and participatory design teams. The political nature of tangibility is revealed as increased user comprehension highlights tokenistic policy efforts in data privacy and protection. By making blockchain transactions comprehensible in use, negative cultural practices ('fraping') are discouraged or thwarted; by making them more tangible during the design process, diverse stakeholders and end users can build mental models of the platform in order to catalyse critique and co-design desired interactions. In this view, tangibility supports comprehension and is contrasted with the hidden workings of 'black box' technologies, and human agency is deliberately built in to digital products and services.

Lee, Cooper and Hands discuss the design challenges for industry, outlining a network ontology, which demands novel approaches to new product development (NPD) and new service development (NSD). As digital objects are added to the field of existing products, a platform is created upon which there are exponentially increasing possibilities for user experience; an 'array' of service and innovation opportunities. Representations of data become entangled with physical artefacts rather than coupled in a one-to-one relationship, and new services and content can be generated after the creation of a technology as platform. The IoT is shown to be ontologically ambivalent, without discrete boundaries and features. This 'geometric expansion' of the design space cuts across and exceeds boundaries as functions are not only decoupled from, but exist outside the physical device and its form. In the face of this new environment, of potentially endless combinations of hardware, software and connection, sequential models of development are bound to fail, and the authors suggest a new model that combines iterative, concurrent and incremental change to address the challenge.

While the papers in this section address implications for designing with and for users, based on their practices with and knowledge about the technological artefacts, the next section moves beyond the human-centred paradigm altogether.

Disrupting the human-centred expectations of design

Liu and Pschetz question the normative anthropocentrism of design and technology. Is there anything more disruptive than new forms of life? This paper throws us back upon ourselves, revealing 'disruption' itself to be an anthropocentric concern. Autonomy in this view is the preserve not only of humans but of machine learning and artificially intelligent technologies, as part of an equal ecology. In such a horizontal ecology, humans may become more or less tangible to machines, as well as the other way around. By extension, design may or may not be undertaken by humans, as algorithms become capable of designing themselves.

These tentSIG papers span a broad range of perspectives about the human and non-human experiences that the future of tangible, embedded and networked technologies promise. They suggest that human agency may be gently augmented or even overlooked, and confirm that technology is, indeed, not neutral. TentSIG's concerns with experience, power relations, comprehension, tangibility, critique and appreciation are all challenged by this orientation to technology, even to the extent that robots may have poetic sensibilities, playing out their time in solitary existential wanderings on a beach (Liu and Pschetz, these proceedings). The unthinkable happens as power relations are taken out of our hands and we are simply ignored.