

Investigations on Sonic Narratives of Future Spaces of Human Being

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Abstract

From an evolutionary perspective adopted by us as humans, *Sound* can be said to help living beings navigate in the flowfield of information represented by objects in the phenomenal world. It is then a distinct mode on which a phenomenon is coded in part, (apart from other known/unknown modes) and made an object of human perception. Sound has a distinct modal power to shape the mental space human beings perceive themselves to be in. This distinct mental space formed by sonic sensory modality interacts with those formed by other sensory modalities viz. sight, kinaesthesia etc. and the result is a formation of an overall space of being that human beings *perceive* themselves to be in. Changes in its components can affect the overall space perception and hence the behaviour and performance of the beings. *Composing* a way in which these modes interact with each other in the formation of a behaviour space, can be thought of as a practice of design, being investigated through ages, with manifestations in the built environments around. For instance this medium here concerning the transmission of *this very* information in a human context is a manifestation of the investigation of optimisation of transmission of information. On similar lines, this paper attempts an investigation of taking control over a phenomenon, *Sound*, which affects our human way of life and investigate its commensurately optimum place in the practices of the design of future spaces of human being. (Note that 'human' is used here as adjective.)

Keywords: Sonic Narrative, Future, Spaces of Human Being

1. Introduction

Introduced are domains on which this investigation is founded, which are investigated, interconnected and crossed over together towards production of a novel value.

A spectrum of the phenomenon of propagation of energy in the form of pressure waves, brings information into our investigated space, forms human perception and is perceived by humans as ***Sound***.

Space is one of the very basic and abstract concepts within which the human *phenomenon* is *grounded*. Space can take on diverse interpretations. It is required for activity and passivity. It is required for being. It can be interpreted as behaviour space inducing kinds of behaviours from its inhabitants. It can also be interpreted

as a mental space. Then there also are space design practices investigating the optimisation of these spaces.

Time is another abstract foundation of the human phenomenon. ***Future*** is present as a context in time for situation of efforts. There is a dynamic dialogue between us (in the present) and the future. The narrative of investigation of future is akin to a game narrative where the participation of both parties is in fuzzy proportions. Future is unexplored territory in time whose control is vied for, analogous to that for uncharted territories in space.

Narratives are elements of human perception, inherently associated with acts of activities. Consider also acts of *passivities* as having

their own narratives. Narratives are associated with ways of change in space, in time and in perception. Narratives are associated with our human way of being. Narratives provide for infinite ways of transitions from A to B. Narratives are manifested as cultural artefacts. *Interactivity* and *dynamism* are concepts of narratives which form an important context of this investigation.

Humans form that system of life within which this whole investigation is ultimately situated and in the context of which, its overall usefulness is evaluated.

2. Origins

This investigation occurs off the prevailing disposition, towards gradually weeding out injustice - a hypothesised underutilization of a sensory modality, audition, in this case.

Humans are endowed with fundamentally different senses with varying resolutions and abilities to deal with fundamentally different kinds of inputs. They can be thought of as having minimal interdependence amongst them, their functions and their cognition. They have their dedicated brain areas.

This acknowledgement is important in our context. Like other sensory modes, audition is fundamentally different from others. In certain dimensions it has edges over other modalities. A 2010 study [1] established that the mean visual reaction time is around 331ms as compared to the mean auditory reaction time of around 284ms. A 1961 study [2] established that typical values of auditory sensory memory lie between 0.5 and 2 seconds as compared to the visual sensory memory lying between 0.1 to 0.2 seconds.

A reflection on the nature of *media technologies* dealing with audio and video, distils that in certain dimensions, sonic media technologies may have edges over visual media technologies. Sound as product of sonic media fills and interacts with the entire space it is released into and is by nature more immersive as compared to the product of visual media technologies [3] which fill only a portion of the visual field. Com-

pared to contemporary mass visual media technologies, can it be said that more potent immersion can be economically produced in the sonic mode?

The prevailing architecture and space design paradigms were reflected upon over the parameters of directionalities of control, narratives in the designed spaces and degrees of dynamism and interactivity.

There are provisions of systems in specific modes, in which both the user and the used can progress through a movement to come to an agreement over a final user experience. The interior visual design, interior natural/artificial lighting, interior climate, logical arrangement of objects and the usability of the physical spaces is subject to change. There is a *composition* of the spaces of being with the inhabitants having a participation in it and hence having an underlying participation in composition of their own states of being.

Conducting similar investigations on the acoustic component of physical spaces, it was observed that the physical space is bound with more or less static acoustics. The acoustics (good or bad) of a designed space become its permanent characteristic and cannot be altered significantly as the visuals might be. There hardly exists a provision for painting new acoustics in spaces designed in the prevailing paradigms. It's like the room that always wears the same acoustic clothes and the inhabitant is locked into what, by the physical architecture, upon it, is imposed.

The question was, if the behaviour of light inside is subject to change, why not something analogous for sound? If the space perception is subject to change in the visual mode, why not something analogous in the sonic mode? What participation the being has/should have in consciously designing its own acoustic space? Towards an objective perhaps? In the prevailing paradigms, acoustically, are there jails being designed? Could such an investigation lay important foundation of the ways, spaces of human being are designed in the future, of ways in which narratives in other modes are constructed and of the ways the behaviour of our future selves is composed, perhaps also in other modes?

3. Progressions

This investigation runs on the prevailing bid for investigation of novelty, optimisation, efficiency and sustenance.

Currently we do see a rising concern in architectural and space design practices to incorporate sensitivity towards ears of the inhabitants with significant focus on reduction of unwanted sounds including noise, reverb etc. Julian Treasure talks about how productiveness is 1/3rd in open plan offices as compared to quiet rooms [3], how there is so much of prevailing audio-visual cacophony that it becomes tiring to listen [4] and that a sensitivity towards what is heard should be an important consideration for architects [5], establishing sound as an important component for further investigations on innovations, on multimodal systems, on schools, office spaces, work places or to put it all together, on design of spaces of human being.

The progression being investigated here is towards positioning sound as an important component of the interior design of future spaces of human being and investigate a shift from: the acoustics of spaces being static and/or sensitive (as discussed above) to the inhabitants in the current paradigms to: interacting and maintaining a dynamic dialogue with them in the investigated space design paradigms.

The investigation is on creation of space for provision of systems that allow an acoustic freedom - an ability to have a participation in composition on what is heard and how. The idea is to open the acoustic mode to stimulations diverse, not just by the way of music and/or by certain demarcated installations but also by the greater way of environmental sounds under the aegis of acoustic ecology in our general spaces of being. These compositions might also be practiced as instances of interior sound design.

Computer audition is investigating sound processing and auditory grouping akin to that done by the human auditory system [6]. Semantic audio recording formats are being investigated to give the listener a choice to choose what instruments to listen to in the mix. Thought trying to rethink static paradigms with

the tools of the digital age are progressing into place. For instance, the notebook phenomenon in the paper media and in the digital media. The thought is on the flexibility of rearrangement of the content after it has been delivered onto the media. The progression is towards flexibility and dynamism from former to the latter media. Restrictions on restructuring of narratives are progressively easing up. Information in digital domains is being broken down to many number of tiny modules with capabilities for restructuring and reorganization.

One of the busiest places for information management, with significant amount of traffic, is the internet. A significant fraction of the minds of these times are engaged in investigations on optimisation of and movement into the cyberspace. Big data, the internet of things and greater levels of complexity in information management are happening. The web has advanced significantly in employing the advances on interactivity and dynamism. For instance, in web apps, information can be sourced in realtime to be delivered to placeholders which can hold varied instances of the class of information they are supposed to exhibit.

Thoughts are happening about physical spaces that have dynamic dimensions and are sensitive and responsive to and interacting with their inhabitants. For instance, GINA is a shape shifting sports car concept by BMW.

These acknowledgements are relevant in the context of our investigation. A general progression can be seen in narrative structures across media. It can be inferred that in general the progression might be from systems that are static or minimally sensitive towards their human context to those that are interactive and maintaining a dynamic dialogue with their human context in the investigated design paradigms. Perhaps the sonic narrative of the future may also evolve in parallel with such domains.

4. Imaginations

What possibly can then be imagined as a sonic narrative of the future spaces of human being? Imaginations can be diverse. In this investigation, the principal thought was on the abilities

of acoustic spaces to interact and maintain a dynamic dialogues with their inhabitants.

One question was, in what ways can the interior acoustic spaces be dynamic? Imagined were abilities for the interior spaces to take on diverse acoustics. The perception of same physical space was thought to traverse, for instance, an axis of large space-small space probably by the way of large to a small or negative reverb. The same physical space was imagined to have abilities to exhibit diverse soundscapes from live/non-live sources spread in space-time and also to allow for creating a mix of soundscapes from such sources.

Also imagined were advanced interior materials with dynamic behaviours, manipulatable physical responses, controllable reflectivity, dynamic transfer functions and EQ towards the reflected sound. Imagined also were advanced computer audition systems with their abilities to group and filter sounds based on parameters such as source, distance, frequency content etc. so as to allow for a richer palette of categorized live/non-live sounds to compose the interior acoustic spaces with. Diverse acoustic palettes to live in were imagined to provide interesting objects of mental stimulation and interesting new ways of human being.

Imagined also were applications for advanced systems for accurate sound field capture and reconstruction. A probable link can be seen here with the presentation of Poème Électronique by Edgard Varèse at the 1958 Brussels Expo [7] and also with the project CoS at IEM, KUG whose investigation is on the choreography of sound in space. Imagined were novel applications bringing similar choreography to the living room to investigate, for instance, new modes for archiving events in sonically sensitive spaces with abilities to capture and recreate events in sound and *in space* in a manner similar-to-different from their original occurrence.

Other question was, in what ways can the interior spaces be interactive? Interactivity was thought of as manifestation of the participations the inhabitants have in the formation of their own spaces of being. The ways in which interactivity in our context was imagined fell under broad heads of voluntary and involuntary interactions.

In the voluntary model, imagined were interfaces dedicated to control of sonic attributes of spaces in the investigated space design paradigms. Similar interface was prototyped through the installation discussed in the next section.

In the involuntary model, perpetually alive links between the beings and their spaces were thought of, drawing upon data readable from the beings themselves. Bio-signals viz. heart rate, skin conductance, body temperature, neural rhythms and thought processes (via BCI) and the live/archived sounds of (non)biological origin made by the inhabitants were imagined as ingredients in the composition of the sonic narratives of the spaces. Within the larger paradigm of intelligent future spaces of being, application of such data to produce more optimised, economic and intelligent systems in other modes as well were also thought of. With advances in AI, thought of were provisions for systems that could be taught to interpret such data and behave in a certain way (also in the sonic mode) and work in agreement with the user towards the achievement of a sustained novel state of being. An abstraction of the user itself was imagined to be adopted into the system to extend the drama in the form of narratives of interacting with the self as AI.

Information management systems singularly in the sonic mode, i.e. sonic user interfaces to the intelligent home, drawing upon auditory scene analysis [8], computer audition and NLP, were thought of, also as a means to distribute cognitive load of information management also to the auditory faculty.

Also pondered over was the sensitiveness of interpretation of such data read about the state of the beings. The question was, what would decide the action the system is to take over a particular state of the inhabitant? If the bio-signals pointed towards a *sad* state of being, what should the AI system intervene into? Imagined were elements of *drama* on the axis of augmenting-suppressing such states by the way of sound and accompanying use/misuse of such data. The stand on interpreting such data here was felt sensitive as the issue is a regular intervention of sonic information which would affect and form the state of being. Analogue was

drawn from the visual media technologies whose ubiquitous presence is used to buy bandwidths to send information to the inhabitants of that space and hence form their *sentience*.

Overall, such investigations might be poking, at emotional interactions, at intimate dialogues, at elements of drama between the beings and their spaces and provisions for plural states of being in the investigated space design paradigms. The analogue for explorations on alternative *consciousnesses* was drawn to the narrative of a quantum jump made by an electron to *sustain* in a new orbit.

Creativity being thought of as a joint agreement between the creator, the cradle and the created, could **we** here be distilling the process of design of such sustained states of being and looking at behaviour design, (drawing upon several multidisciplinary components,) being resolved as a singular subset of the practice of design?

5. Prototype

Provisions for interactivity and dynamism in the acoustic spaces were investigated by the creation of an experimental space. From an abstracted perspective, there were primarily three spaces across which the information (sonic here) traversed in this (vimeo.com/64472775) instance of the experiment. The possibility of this information being non-sonic was also acknowledged, extending imaginations to dynamic audio-visual signature of general spaces of being, for instance, as in the Sonmi escape scene at around 1:02:20 in the movie *Cloud Atlas* [9].

Conceptually, *external space* was from where natural or artificial sonic information spread in space-time could be sourced from. For this installation, sound was sourced live from acoustic spaces from immediate outside of the physical setup, via 8 mics. The acoustic palette that was thus available consisted of sounds of electronic beeps, human conversations, leaves rustling close by, a/c plant, construction work, cafeteria and birds.

Conceptually, *manipulation space* was where all sorts of processing was at our disposal

for the sourced sounds. For this installation, this space programmed in pureData was where an agreement could be reached between the user and the system over the final user experience. Provisions were to control the loudness of and/or apply a reverb to the sounds coming *in* from each of the 8 directions via an interface physically present in the internal space.

Conceptually, *internal space* represents that created in the minds of the inhabitants. Practically, it was where the final composition was to be projected into. For this installation, it was where the projection was done via 8 overhead speakers into a relatively anechoic space of dimensions approximately 18 X 28 ft. as documented in the demo video.

In the experimental runs, prototyped thus were thoughts on *tuneable acoustic transparencies* between the external and internal space and thoughts on manipulating space perception through interventions, e.g. added reverb, in the sonic sensory modality. The experimental runs did arouse interest in the visitors. The space experience was found to be different from the normal experience. In some instances, the experience did get dramatic, such as when a sudden burst of sound, a door bang, occurred somewhere in the external space which was replayed in internal like a reverberating blast, as if the setting was of an endless hall. Thoughts ensued such as those on active cancellation of speech itself; of employing the interaction with curtains for light, to sound, as a physically interactive manifestation for tuneable transparencies between external and internal spaces.

Previously dubbed 'limitations' there were some special modes of operation for this setup. The sounds designed thus were overlaid not on silence as there weren't sufficient provisions to control acoustic bleeding from the external space. There was latency involved in the A/D conversion and a significant fraction of information wasn't at our disposal due to specific 8 points of input and output. The hardware used was as follows: Sennheiser ew 135-p G3 wireless mic system, Sennheiser MD21 electrodynamic mics, Sony shotgun mics, Logitech 5.1 speaker systems, MAudio Fast Track Ultra 8R USB Audio Interface, Win PC. A schematic of the setup is given in Figure 1.

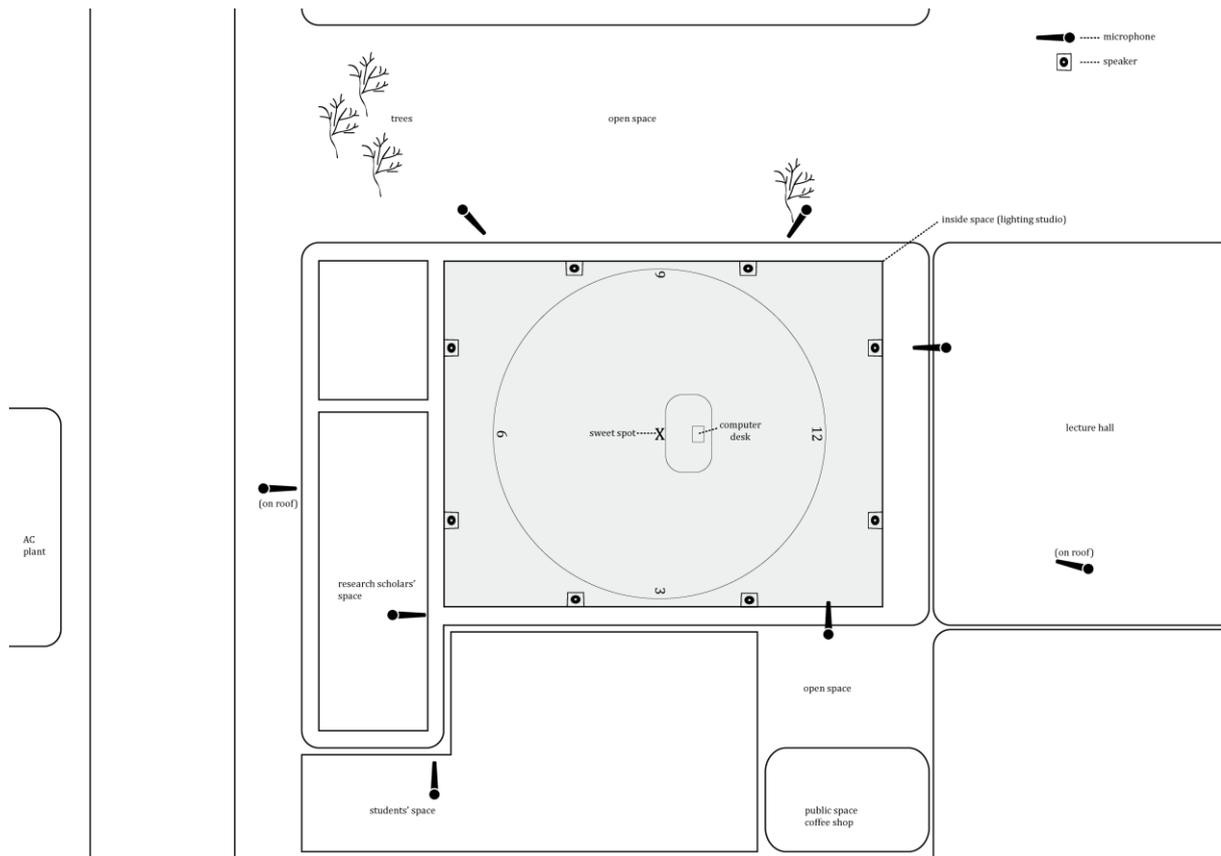


Figure 1. A schematic of the installation

6. Conclusion

This section stands as a lens to observe the entire investigation from a zoomed out perspective in a larger space-time context. Closing thoughts in philosophical dimensions formed thus.

Sensitiveness was felt over the *Artificial Natural*, an attempt to tweak perception and create one of natural entities notwithstanding their actual physical state. Recall from the abstract that perception and its evolution has been critical to the being's survival. We might be looking at extension of thoughts on creation of more dependent and *perceptually* complete *bubbles*: small discrete space time settings that tend to *externalize* their superset physical environment and its health which are critical guides to states of action of the beings in that greater context.

Also happened were doubts over the value and/or use of this investigation and the fuzzy

stands it could take on the axis of human want - human need. Could this be just a sonic luxury which may be had just because it can be had? Or could it have/develop some evolutionary significance? On such scales, appear into consideration are issues as the biological wiring and evolution of the audition faculty and its specifications. Is the formation of an evolutionary significance a dynamic system co-evolving with the environment? Can it be asked whether our brains were prepared to invent and deal with the invention of, media? Of paper? How is its evolution entrenched in contexts to media, to the phenomenon of retaining information outside of mental faculties?

The answers to the questions raised (on a practical-impractical axis) might be at variable points in the narratives of their investigations. The ideas mentioned might not also be totally new. What is a question that has never been

asked before? Digressions might also be observed from a main subject, open to be considered as manifestation of inherent particularities about our own spaces of being. In the *definitely large* context of future spaces of being, questions might always be bankable to be answered and be questioned back again in cycles. Remapping the questions, answers and ideas was thought of as relevant first step in the method of creating a unique composition of the proposition of *this* investigation which is not concluded much concretely yet.

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