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Urban Design vs. Science of cities

From the Digital Gap to the AI Barrier

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Synopsis

Our future cities design challenge will be to deal with unpredictability and cognitive ethics derived from A.I. implementation at a wide range of scales. When AI machines are dealing with social-cognitive dimensions previously dealt through human-decision making, transparency of the algorithm as well as it analysis easiness in situations of un-appropriate behaviour become main issues.
Added to that challenge, as Architects and Urban Designers we have a very particular challenge added to the already mentioned one:dealing with the process of changing from the Digital Gap to the AI Barrier for our built environment inhabitants.
Main pillars for avoiding the appearance of the A.I. barrier will be discussed through this research taking into account most recent investigations and ethical debates regarding A.I. procedures implementation on our routines as a society.

Key words: Digital Gap, Artificial Intelligence barrier, cognitive ethics, Urban Design.

Urban Design vs. Science of cities
Cocho-Bermejo, Ana; Navarro-Mateu, Diego

385

1. Urban design versus design for citizens

Using an innovative and interdisciplinary approach Jane Jacobs (Jacobs, 1961) set the grounds of cities as problems of organized complexity. Until then, academics had defended the idea that any urban planning problem could be perfectly described with a clear definition for all of its variables, classifying it as a problem of disorganized complexity or even as a problem of simplicity[1].

For the first time, thanks to the emergence of Big Data and the Internet, we are able to properly study cities as the complex systems Jacobs described, using the interaction between citizenship and data.

In the current city design scenario the term "Smart City" has recently emerged referring to a series of characteristics inherent to the idea of cities as complex systems, but it has not yet been well defined. We do believe that it is of fundamental importance that a proper term—that will imply complexity of research methods and intelligent technologies implementation—should be defined for our new city design procedures.

Truly Smart Cities, "A.I. Intelligent cities" will be the ones using technology for building a new common decision cloud.

Although humans are natural sharers, reports of participation failures in the first experiments. Reasons might be anonymity, but also the lack of results in a human life time duration can influence. Just citizens that understand its impact are currently enrolled. Moreover, only some clusters of societies well located in the world have access to technology.

The main problem this new protocols have generated in our cities nowadays might be: the **Digital Gap**.

2. From the Digital Gap to the AI Barrier

Prof. Carlo Rati, states in the AMS presentation manifesto, that technologies allow for a new approach in the study of the built environment. As the tools for understanding and impacting the urban spaces emerge, the way we operate in and on the city is radically transformed. As he puts it, we are creating: a new, sociable, networked urban ecology.

One of most ubiquitous though among citizens is that AI will strongly damage society through job losses. Major damage will be done through the enhancement of society gap between the more disadvantaged citizens in access to technology. Work loss worry or failing of very advance systems take in Architecture and city design a second position in the most urgent topics to deeply develop.

On the other hand, some experts as Dignum defend that our main worry should be the transition process, like in the self-driven car example.

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[1] Within the three types of problems in scientific thought, problems of simplicity, problems of disorganized complexity, and, problems with organized complexity, Jacobs argues that, despite normally being treated as problems type 1 or 2, cities are really problems of the third type

Urban Design vs. Science of cities
Cocho-Bermejo, Ana; Navarro-Mateu, Diego

386

3. Cities, Data and A.I.

3.1. The A.R.T. of A.I.

Dignum's A.R.T. of A.I., Accountability, Responsibility and Transparency, must be one of the pillars of the new city design methodology model. Also, Bostrom, adds to Dignum's A.R.T. four more terms regarding not only data but also algorithms, (auditability, incorruptibility, predictability and the non-harm tendency), being all criteria that is considered needed by any A.I. trying to replace human social judgement.

Design A.I. dealing with social-cognitive dimensions previously performed by humans must imply not creating more disadvantaged people in society.

Following the basic ethical rules, veracity, privacy, confidentiality and fidelity, should be the second main pillar for designers.

3.2. Well-being vs. quality of life

In 2007, at the "Beyond GDP conference" and, afterwards, in 2010, the Stiglitz report, state that the time has come to include in our measurement system not only economic production but also well-being and all its dimensions.

However, should be taken into account that Ethical considerations for A.I. have little resistance to economic market force. As stated by Juna Heikkilä: society cannot hold progress (association, 2017). Also, Bostrom agrees about advancing too fast as a society and the possibility of making discoveries that are clearly not beneficial for our society (Cortés, 2017).

3.3. Three Levels of Autonomous Systems

As Virginia Dignum describe them, the first type will be the one able to achieve your goals, the second type the one able to decide your goals and the third one able to find the motives for deciding your goals (Dignum, 2017).

So range of autonomy to be included in the design must be one of the main topics on the debate brief. Within the Architectonical design field, praxis has been focussed in developing small pavilions as theoretical samples for proving very focussed theoretical proposals.

4. Conclusions

A.I. and the possibility of the human empowerment are basic research to take into account. This possibility will increase in a way so powerful that, probably, it will need a regulation based on the new changing boundary between people and things.

On top of the main two pillars mentioned, it will be also needed to be considered the concept of well-being in all its dimensions so errors committed causing the already existing Digital Gap are not repeated.

Principle of Ontogeny non-discrimination on the other hand defends that if two beings have the same consciousness and functionality and they differ just in the way they came to existence, then it should be considered that they have the

Urban Design vs. Science of cities
Cocho-Bermejo, Ana; Navarro-Mateu, Diego

387

same moral status. That principle should apply between humans with different accesses to A.I. technology too.

"…we are unlikely to construct a coherent ethics such that it is ethical to afford A.I. moral subjectivity. We are therefore obliged not to build A.I. we are obliged to" (Bryson, 2016).

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Urban Design vs. Science of cities
Cocho-Bermejo, Ana; Navarro-Mateu, Diego

388

Biography

Ana Cocho-Bermejo. Academic Coordinator at UIC School of Architecture. Expert in Machine Learning and Adaptive Architecture she holds a PhD in Technology in Architecture & Urban Design (Barcelona Tech, 2012). She develops her research on multidisciplinary design with innovative technologies and theories and advanced algorithmic. Master in Adaptive Architecture & Computation at The Bartlett, UCL and Master in Design as Research at the Architectural Association of London. She currently teaches Design Studio, Doctoral Seminars and Postgraduate courses. She investigates design processes understood as new adaptable behaviours in Architecture based on Complex Systems with advanced AI algorithms such as Artificial Neural Network based learning performances and evolutionary computation as the base for environmental adaptability processes; She is the Principal at EmDeplo [Architects & Morphogenetic Reserachers] (www.emdeplo.com).

Diego Navarro-Mateu. Graduated as Architect and M.Arch in Biodigital Architecture from the Universitat Internacional de Catalunya (UIC School of Architecture), where he teaches as associate professor in several subjects related to computation and graphics since 2009. His PhD, Natural Processes applied to Architecture through Computation (2017), received the "Junior Faculty Fellowship" from l'Obra Social "la Caixa". Currently, his research involves topics as procedural design and evo-devo algorithms implementation. He also collaborates with architectural software company VisualArq to introduce visual programming into BIM. His work has been published and exposed in CCCB, COAC, and CEVISAMA among others.

Urban Design vs. Science of cities
Cocho-Bermejo, Ana; Navarro-Mateu, Diego

389