

Annexes

Context + ACE objectives

AI is expected to be a game-changer in many sectors, including architecture. On 24 November 2022, in Brussels, the Architects' Council of Europe has organised a public conference "Architects for innovation" to explore challenges, threats and opportunities raised by Artificial Intelligence in the sector and consider how it could change Architecture and the practice of the architectural profession. This conference has brought together AI experts, architects and researchers who explained how they perceive the AI impact on the practice of the profession; shared experiences, good practices and innovative solutions; presented their perspectives on the future of the profession; shared thoughts on the possible regulation of AI in the architectural sector.

This year, ACE continues to explore this topic with a European call to get an overview into work done at national level to assess the challenges, threats and opportunities raised by AI in the sector.

Knowing "the best task for research is the task undertaken by an engaged researcher" ACE only provides a brief outline of interest and is expecting innovative and original proposals. Most importantly the aim of the research is more to provide and discover new ways of working that are applicable in general use rather than in specific solutions.

The outcome of the research shall serve as open discussion material to enrich the current discussion, from BIM standards to a more visionary future of how digital design can sustain a cultural approach. It should also confront the current state and expectations of various stakeholders engaged in or impacting on our profession in terms of regulation.

AI and Urban Development

Urban planning mirrors the state of a society in every generation. It reflects how a society approaches life, aesthetics, political priorities, as well as its technical skills. The first common feature of all large and medium-sized cities is the high level of complexity of the operational processes that occur within the city. Current methods of urban planning are limited and determined by the way we receive information, the way we work with information and finally how we can adjust plans to new situations. The key question is whether we can think about urban planning differently.

- How can AI and digitalisation improve the way we collect data and provide new ways of designing urban spaces?
- Explore the adaptability to change with new way of predictions, faster assessments, and evaluations of new impacts
- What will be the consequences for cultural, social, and environmental aspects?

Creativity and practice

Creativity is still solely understood as the designer's work. Research shall focus on how advanced technologies can change the paradigm of creativity and the role of architects. Depending on society, the type of commissions, the technical skills, and the tools at their disposal, the architectural profession has continuously evolved over time. From past ages, when architects were often leaders of construction workshops, to current days, when architects are working individually in small studios or even at home. Every part of change over the past years can be taken as a benefit for the upcoming digitalisation.

The architectural profession is today at a crossroads. New technologies could confirm architects' leading role or they might be replaced by software specialists and managers.

- AI vs. Human Creativity? Where is the new balance?
- Best practices in terms of support for creativity but also overall project coordination and impact on the process of construction using 3d printing or new material designs
- Currently digital technologies are being used as a verification means of design. They help creativity. But design as itself is still solely understood as the designer's work.
- Could advance technologies like AI change that paradigm? Could the architects' creativity be replaced by AI or is human's creativity irreplaceable?
- Can AI extend and support creativity?
- What are experiences with evaluation of design?

AI and education of architecture

Architectural education: requirements for architects are constantly changing in relation to the role of architects, their responsibility and scope of work. The research shall focus on investigating how we will teach architecture in future. The study could present various case studies of approaches, not exclusively taken from Europe.

- Existing implementations and potential future strategies from different domains and areas of theory and practice that might be useful for the development of architectural education
- Learning algorithms and their impact in architectural pedagogy
- Machine learning or teaching machine?
- Importance of data acquisition and parsing for machine learning training, as well as identify potential issues of bias and its ethical implications
- Integrating 3D Printing Technologies into Architectural Education as Design Tool

AI and sustainable approach

Sustainability is currently one of the most important drivers of the design process. Sustainability becomes crucial for the evaluation of quality and AI tools could essentially move the frontiers of our knowledge. Starting with the collection of big data, through prediction and evaluation of a wide range of impacts, it can also change our perception what we recognise as a sustainable approach. The scope of the research could demonstrate the wide range of uses of AI. Emphasis should be given to case studies with potential for generic application and could encompass for example:

- Energy efficiency and real-world usability of AI methods in architecture and urban planning, predictive abilities of AI tools in design, construction and building use
- Confronting/adjusting design parameters through dataset statistics
- Model simulations and resilience testing of building design.

AI regulation & ethics

Society generally believes that AI is still far from their consciousness, therefore there is no rush to consider ethical rules. But AI, combined with other smart technologies, has already shown its potential in many domains, including architecture. There are not only problems like data bases, data security, data privacy and copyright issues, but the problem of how we are working and evaluating data is reaching political level. The algorithm behind the result is becoming more important than result itself. The scope of research should provide a deep look at the possible risks faced as an argumentation for possible regulation.