🏠

INFONA AI

Learning Architectural Design from Artificial Intelligence: 🤖🤖🤖

Towards a Future where Architects Create with Buttons, Not Lines

April 13, 2024.

INFONAIA Team 👨‍👨‍👨

We aim to develop an innovative artificial intelligence system called (SREI).

This system will be trained to identify and visualize perimeters, regardless of the given perimeter (a perimeter equals an infinity of possible shapes). Based on distribution rules (which vary by country), SREI will provide a single optimal distribution response to that perimeter, facilitating the direct modeling of spatial arrangement and furniture placement.

From infinity, we move to finitude.

Background: 🏘️

The architecture industry has undergone significant transformation with the integration of advanced technologies, starting with the advent of Computer-Aided Design (CAD). CAD marked a revolutionary era, enabling architects and designers to produce plans with unprecedented precision and speed. Later, the implementation of Building Information Modeling (BIM) deepened these capabilities, providing a more holistic approach that includes everything from visualization to project management, structural analysis, and building performance simulation.

However, despite these advances, the construction industry (where the architecture industry is located), which represents about 14% of the global GDP, only receives 1.06% of the total venture capital funding, according to the

2024 Cemex Ventures report. This imbalance highlights a significant opportunity for investment and innovation, especially with the arrival of emerging technologies such as artificial intelligence (AI).

AI is poised to be the next major breakthrough in the technological evolution of architecture. Its ability to process and learn from large volumes of data allows for the optimization of design processes, from initial conception to project execution.

"In INFONA.IA, we strive to understand the impact of AI in architecture, enabling the creation of spaces we could never have imagined before."

Why an AI that distributes spaces?

Designing each new house individually is a challenge as the process retains a significant artisanal character. Each project requires adjustments and customizations that, although facilitated by tools, do not completely eliminate the need for manual intervention.

This dependence on manual labor not only consumes essential time but also introduces possibilities for inconsistencies and errors, which can prolong delivery times and increase costs.

In this context, adopting more automated and AI-based techniques could represent a fundamental shift, optimizing the design process and freeing up valuable resources to focus on more innovative and strategic aspects of architectural development.

How would it work? (SREI). 🔧🔧🔧

The software would implement an approach based on semantic tagging and structured analysis of extensive repositories of architectural plans. Each plan is digitized and tagged with detailed metadata describing specific features, such as furniture, zoning, and functionality, facilitating advanced processing and efficient searching within the database.

Our artificial intelligence, to be called the Intelligent Spatial Reorganization System (SREI), focuses on interpreting coordinates within an XY plane, operating under a rigorous framework defined by pre-established rules that guide space distribution. Using advanced computational geometry algorithms, the AI would analyze and assign XY coordinates to efficiently map the elements within the designated space. This approach allows the AI to visualize and

manipulate spatial data as a series of points on a plane, each represented by its specific coordinates corresponding to the precise location of architectural components.

These algorithms not only calculate the best positions for each element based on maximizing space use and adherence to requirements. By treating the design as a problem of optimizing points in a two-dimensional space, the AI can execute complex design solutions quickly and accurately, significantly reducing project development time and increasing the precision in the implementation of architectural plans.

These rules are adaptive and can be configured to meet the specifications of any project, ensuring that the proposed distribution maximizes space utilization while conforming to regulatory and functional requirements of the client.

After the 2D configuration is approved, the design is automatically exported to Autodesk Revit for the transition to a three-dimensional model. The software would automate the construction of structural elements, installations, and finishes.

The Future 🔮🔮🔮

Our Vision.

Our long-term vision for implementing the Intelligent Spatial Reorganization System (SREI) in the architectural field goes beyond the simple design of spaces and furniture. We aspire to expand this technology to encompass all aspects of executive projects, including specific details such as essential structural systems.

In the long run, we are also committed to making our AI solutions accessible to everyone, regardless of their technical experience. This involves simplifying the AI training process so that anyone, from small architectural studios to large corporations, can adapt and employ this technology with ease. We want to democratize access to advanced design and planning tools, making innovation in architecture and construction more inclusive and widely distributed.

To achieve this vision, ongoing collaboration with architects is essential. We clearly understand that artificial intelligence, advanced as it may be, is not intended to replace the architect. Instead, we conceive it as an additional tool that complements and enhances human capabilities.

We ensure that the technology is sensitive to the complexities of architectural design and respects the aesthetic and functional principles that only an experienced professional can provide.

This vision not only redefines how architectural projects are conceptualized

THANKS. 🤍🤍🤍🤍