

Media Façades and the Immersive Environments

Connections and Interactions Between the Real and Virtual World to Create Immersive Environments

Since the 1980's, there has been a massive use of electronic and information technology for the development and management of the architectural envelope. This new design approach has produced an ambiguous use of the word “medium” when referring to architecture. Many scientists, planners, architects and philosophers (Virilio, Tschumi, Venturi, Foucault, Flusser, etc.) have described the birth of a new function for architecture; today, architecture has become a support of print and electronic media. It begins to take on a more recognized communicative function and commercial use; this tends to be most apparent in major metropolitan areas. This new communicative function increases the commercial value of the buildings — sometimes at the expense of functionality. This evolution has produced a new design trend: contemporary architecture becoming a place of experimentation and application of advanced technologies encouraging the evolution, and sometimes the abuse, of the meaning of media-architecture.

This has led to the adoption of technologies and construction techniques that are different from the traditional ones and have produced building systems, processes, and products that are beyond the current construction sector.

The architects in the design of media architecture approach the concept of light, color, and perception. Using computer and optical technologies, the architect designs the changing of the surface of the building through time. This is possible by using mechanically changing elements or perceptual (luminous, non-mechanical elements) of the façade components. In mechanical media-façades, the movements of the envelope can be achieved with kinetic systems and components—such as the facade of the Arab World Institute (in Paris) — or by hydraulic or pneumatic components.

This mechanical media-façade project from the end of the twentieth century marked a turning point for the perception of architecture due to the

initial application of LED technology on building facades. The use of LED technology up to that point had been limited to advertising panels, expensive to build and small in size.

The study of recent projects that are labeled ‘media-architecture’ requires knowledge of technologies and techniques very different from each other; they cannot be classified into predetermined categories. This new construction technology requires the use of terms that are dedicated to media architecture and derived from the fields of electronics, computer science, chemistry, and physics of nano-materials. In the analysis of media-architecture projects made during the last quarter of the twentieth century, there shows a gradual change from the use of building technologies to the use of electronic technologies (used for the realization of architectural projections), continuing towards an integration of embedded systems.¹

¹ This is clearly seen in electronic displays made up of LEDs throughout Asian and American cities in different sizes and formats. Beginning small and soon taking over the entire façades of projects, examples can be seen in historic projects like Whitehall Ferry Terminal by Venturi, Scott Brown and Associates to the most recent big semicircle screen on eight plans in the Condé Nast building in New York City facing Times Square.

New Interactive Relationships Established by the Media Façades

On this premise, the paper will present an analysis of the new interactive and communicative relationship that media-architecture establishes with the environment (natural and built) and with the user. Media-Architecture has changed the role of the user through the use of digital and mobile systems (smartphones, for example), he/she becomes an actor of the mutations of architectural surfaces—suggesting a launch of the immersive environment. There are also changes in the interaction of media-architecture with the landscape: now buildings are becoming a *digital* landmark in the natural and urban landscape.

How do these relationships change, and how do they evolve? What will the results and future impacts be as regards to the architectural design, the image of the city, and the urban planning? These are some of the questions that we will try to answer after the analysis of three fields of influence of the media-architecture: the landscape, the city, and the user.

1. *The interaction of media facades with the landscape: the landmark.* The spread of tall buildings in the urban landscape has certainly influenced the boundary of the city skyline. The use of innovative and digital technologies for the cladding of these buildings has caused them to become new urban landmarks, which add to the historical ones. This has had an impact on the design and urban planning. What is the purpose of these media landmarks? Are they marketing tools, self-referential constructions, or can we talk about technological innovation for contemporary architecture? Is it an innovative project or just an experimentation of the potential of the technology?

2. The interaction with the city: projections, bright display, and large billboards. As Charles Landry says, “cities are now part of the spectacle of fashion” (Landry 2006, 176) . The principle of fashion is its versatility, its ability of always transforming itself and being always on the move. Only a few urban fashionistas are able to keep up. Even cities follow the trends of the tourism market, they become “fashionable” and out of fashion in-part to the development and application of digital technologies on the architecture. The cities work to rebuild their image monthly or weekly according to the law of supply and demand. The surfaces change color, images and messages through urban screens, and interactivity is being more and more widespread.

What are the technologies and facade systems most widely used to achieve this goal? What is their role in the design of buildings?

3. *The interaction with human beings*: immersive environment experimentation.

The next step of this analysis leads to immersive environments. The evolution of the digital façade, has allowed for response to human interaction, the passer-by becomes an active part of the new urban performance. As Simone Arcagni wrote “The cinema re-locates in town” and “thanks to the cooperation of the media, the real world is transformed into a permanent show in which all the boundaries between actor and spectator, between simulation and reality, history and charm fall down.” (Arcagni 2010, 40).

The interaction with the landscape: the landmark

The development of lighting systems, the increasingly evolved performance of lighting components, and the project evolution of contemporary architecture towards a greater mediator have had a great influence on the perception of the contemporary city. Today, the appearance of large cities and European cities is often characterized by large bright pixels, totem poles, and urban sized signs perceptible from every corner of the city. They have been defined: landmark, further, digital landmark.

The word landmark originally identified a place or a point of reference. Literally meaning “geographical feature,” the landmarks were used by explorers and travelers to find their way back. In the contemporary language, a reference point includes anything that is easily recognizable as a monument, a building, or more generally a structure. In Anglo-American culture, landmark is the term used to refer to places of physical-morphological or historical significance—maybe of some interest for tourists. In contemporary architecture and media architecture, the buildings become a place of experimentation with lighting and electronic systems. They become signals or landmarks.

From research on contemporary landmark led at the University IUAV of Venice, two types of landmark have been identified: *environmental landmark* and *lighting installations* similar to landmark. The environmental landmark is architecture or, generally speaking, buildings that are designed as a media-architecture whose targets are visibility, mediaticity, and innovation. In this case, the envelope of the buildings is either built or clad with innovative technologies of a digital type, or, in any case, bright. It is almost always about tall buildings like the Agbar Tower in Barcelona or the Uniqa Tower in Vienna. These hyper-technology landmarks have become more flamboyant than historical landmarks with regards to height, visibility and communication.

You just need to think about the case of Barcelona. Until 2004 the skyline of Barcelona was identified by the Sagrada Família—a symbolic building for the city and for the Spanish people—which was distinguished by height in the urban landscape. Since 2004, the Agbar Tower has been competing with the Sagrada Família in terms of height and visibility (fig. 1)—thus creating a competition between the two works, a competition of history versus high-tech. Over the following years other tall buildings have been built, making it even more difficult to identify the symbolic ‘place’ of the city.²

2 The visibility of the Agbar Tower still exists and, thanks to electronics technology, it locates a water jet (bright at night, coloured during the day) that comes out strongly from the ground.

Fig. 1 Agbar Tower and Sagrada Família, the two landmark in the Barcelona’s skyline, photo ©K.Gasparini



Digital landmarks are different from pure hyper-technology landmarks, they are more similar to lighting installations. In this case, it is not about buildings with a media-facade such as those already mentioned. It regards installations with features of self-reference. These are often artworks or it has only to do with pure technological experimentation of any electronic or dynamic technology. Among these installations, there are some interesting prototypes like: “HouseSwarming” of 2007, with temporary installation of Jenna Didier and Oliver Hess Marcos Lutyens. The installation was commissioned by Art Center School of Design, Pasadena. It is composed by copper wire, PETG, strobes, lamps, steel frame and anchors, electronics, and environmental sensors. Dimensions: 15 ‘x 40’ x 30 ‘.³

3 As an alternative, there is an interesting project, not realized, of one tire floral lining: DAISY.WORLD by Thomas Nicolai, 2007 (fig. 2).

However, the most controversial, but equally digital visible landmark is represented by Indemann project. The Indemann project designed by Maurer United Architects built at Inden, Germany is an example of a digital landmark (lighting installation). In the town of Inden, there is an open coal mine. It is an area where there were several villages to accommodate the necessary manpower to extract the mineral.

The mine has an area of 4,500 hectares (over 17 square miles), a territorial extension in which the excavation has created an unusual landscape. This scenario will change again after 2030, the year when operations of excavation will cease and the site will be developed into a major sport and recreational area.

The municipality of Inden wanted to raise a landmark, a sort of guard tower visible from great distances, which should identify this lunar landscape. For the project, the architects were inspired by the shape of a huge robot 36 meters high. The design of Indemann is characterized by an external massive aspect. The real surprise is in the inside. The project was conceived as a composition of architectural experiments, with huge cantilevered shiny and bright metal grid floors accessible on the outstretched arm of the robot at about 18 meters above the ground. The surface is covered by 40,000 LEDs, the first LED façade of this size built in Europe.

It works like a screen on which animations can be projected. In this way, the landmark structure performs the function of a real lighthouse at dusk. Since it has been built, this structure has become a visual landmark in the Mosa-Rhine Region: it is visible from the A4 motorway between Aachen and Cologne. The opening attracted 10,000 visitors.

The media technology used to cover the surface is the Illumesh® system, a translucent skin built with stainless steel mesh and woven with LED bars. The fabric was produced by the German brand GKD - Gebrüder Kufferath AG. During the day the metal surface shines and reflects the light, at night the area comes to life and becomes a spectacle in computerized management. The media system has been patented worldwide, it is produced by the cooperation between GKD and AG4 Media Facade GmbH, Cologne. Indemann is the first public project in Germany to adopt the Illumesh® system.

To sum up, in order to give an answer to the questions made at the beginning regarding the aim of contemporary landmark: is this a marketing operation or an architectural project? Do they do innovation or experimentation? It is possible to argue that the contemporary landmarks are usually the result of marketing operations. They may find a company that owns the building (Bayer or Agbar Towers), or experiment with a new technology (eg. DAISY.WORLD). The mediated in such cases is functional to the visibility and trade, not to the architecture. Other buildings with media

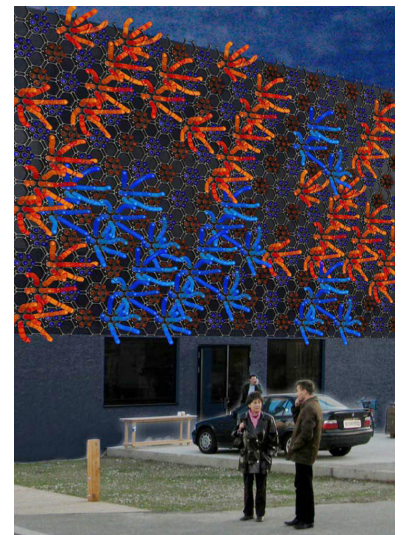


Fig. 2 DAISY.WORLD project, photo ©T.Nicolai

façades are not visible in height or equal to the average of the landmarks that we have described.

The Interaction with the City: Architectural Projections, Light Displays, and Large Billboards

It seems that architecture and landscape are increasingly taking a temporary configuration, one for communicative and commercial function. The use of dedicated software and digital displays applied to the buildings façades (façades covered with glass, plastic or metal) is radically changing the image and meaning of architecture.

In contemporary architecture, information and commercial factors tend to dominate the project. Now new players, different from the architect, are emerging and influencing the design of the urban face. Among these players are the advertising agencies and producers of communication systems who replace the architect in the field of façade design. Lighting designers or multi-vision specialists are involved in the design of the urban image. This change deserves a consideration because now the city's project is being developed beyond and outside of the architects' and urbanists' skills.

If these are the new design perspectives, how will the look of the cities, buildings, and homes develop? What will be the new faces, the new materials, or the new colors that will identify the architectural surfaces in the next future? Above all, what are the most appropriate tools and systems (or the most common ones) to achieve these results?

Light projections are a simple tool to create media facades, but to great effect. Unlike the tools available in the first era of enlightenment, today's light sources are electronic, interactive, and controlled by computer systems. As a matter of fact, it is possible to transmit movies on a huge vertical surface by means of a series of projectors.

The use of high-definition projectors connected in series and controlled by a computer allows the realization of large-format images and videos where the projection surface —if it is a glass façade—seems to represent the boundary between the real world and the virtual one. The real picture behind the glass melts with the projections in the foreground, giving rise to what Virilio calls “stereo-reality.” The technology of urban projections has evolved at the beginning on the outside of the buildings, in conjunction with specific events and exploiting the surfaces of historic buildings. This way, an interaction between the projected images and the architectural elements has been realized.

You can carry out projections of fixed images using photo or graphic contents, with the use of mechanical and electronic projection systems. The

images to be projected are engraved with laser on glass slides. With the integration of appropriate digital accessories, you can project up to 6 images at once or perform simple dynamic effects such as, for example, snow falling simulation. To create this system, different types of projectors, up to 2500 watts of power, are used and placed at a distance of even 1500 meters from the wall. According to the extension of the projection surface multiple, projectors can be set in series and the lens of projectors are interchangeable depending on the distance to be covered.

With projectors, a video image larger than those of a monitor or TV can be viewed. The brightness of the projected video image largely depends on the environment light (i.e. a better picture is produced in a darkened environment). The light systems employed for the realization of media façades and urban screens are typically composed of panels made with digital LED technology. Surfaces can be lit with different sources (fluorescent lamps, neon lamps, etc.), but the choice of the technology leads to a fundamentally different perception of the media surface.

LED technology enables the creation of high-resolution screens, in which the perception of the image is immediate even if the viewer is close to it. In this case, small screens exclusively made of LEDs can be produced, or active systems in blocks can be carried out such as those used for the realization of the Crown Fontaine in Chicago by Krueck + Sexton Architects (fig. 3) or the embedded systems such as in the case of Mediamesh®, Illumesh® Lamellae® systems of the German company Ag4 (the Mediamesh® has been installed for a long time in Milan's Piazza Duomo in front of the building of the Twentieth Century Museum).

Setting-up luminous surfaces with lamps enables the creation of low-resolution screens, where the perception and definition of the image is possible only at great distances. In this case, one can speak of images in black and white because they are made via the on/off of the lamps. Usually these systems are used to make large surfaces, real media façades.

For large billboards we have advertising claddings mounted on the scaffolding on construction sites or facilities specially constructed and calculated. The types of fabric used for the realization of these decorated membranes must be already prepared for printing in the production phase and they have a coating on one or on both sides a spreading and a subsequent lacquering of the surface to make it able to hold the print colors.

In conclusion, contemporary cities become an ephemeral stage, where every surface seems to be functional to a theatrical performance aimed to astonish, communicate, and above all conceal. This way, the surface of the old buildings as well as their historicity are hidden, standardizing everything in a way that essentially makes space and time arbitrary; one may think of Las Vegas. The casinos in Las Vegas, according to George Ritzer,

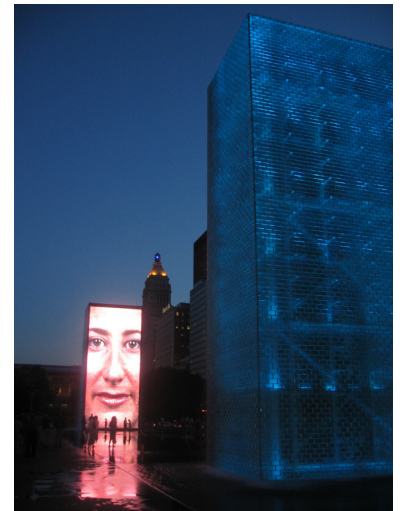


Fig. 3 Crown Fontaine, Chicago, photo ©K.Gasparini

work following a strategy characterized by the following aspects: the uninterrupted functioning, the elimination of all possible references to the natural world at the time (sunlight, darkness, etc..), the abolition of doors and windows open to the outside, the removal of the watches, the elimination of the architecture age signs through continuous maintenance, the repetitiveness of actions that individuals are induced to make and the offer spectacular attractions (Ritzer 2000, 177-178).

The Interaction with Human Beings: Immersive Environment Experimentation

In contemporary architecture, bright and illuminated surfaces, electronic screens, video projections, and interactive media are increasingly common, mixing together and overlapping the physical surface of the traditional city. It is quite similar to an interaction between real and virtual world. The evolution of the digital applications to architecture makes a necessary improvement on man's connection with the architecture. There are many experiments of digital application to architecture, but Toyo Ito must be recognized as one of the precursors to the movement.

With regard to this, two of Toyo Ito's installations were very compelling: *Dreams of the Vision* in Japan exhibition and *Health Futures* for the *Expo 2000* in Hannover. Ito's interest in electronic phenomena began with the Tower of Winds in 1986, it became then the engine construction of the Egg of Winds in 1991 and its many versions, then it reached the top in the Mediatheque of Sendai in 2001. In Ito's projects the fictional attempt to seek a *blurring architecture* and an architecture that is both fixed and enduring is clearly visible. He makes this by coating the building with a temporary mask which gives a temporary appearance thanks to the play of fiction and artificiality created by the illuminated surfaces or transparencies. Actually, in his projects Ito tries to give life to a form of architecture integrated with the landscape by hiding the volume of the buildings under bright or transparent claddings (dematerialized) and transforming the urban space in a "sound" through the use of new electronic technologies. This way, he tends to create a blend of the primitive space, which goes back to nature, and the virtual space, connecting it to the real world through the electronic network. According to Ito, architecture has always served as a means of adaptation to the natural environment; contemporary architecture must work as a means of adaptation to the computer environment. Architecture today needs to be a 'medial dress.'

In the exhibition *Vision in Japan* organized by Arata Isozaki in London in 1991, Toyo Ito created the installation titled *Dreams*. Ito's exhibition project was meant to show, in the form of clouds or haze, particles of information that various media emit into the air of the city. So, through the use of liquid crystals, life-sized "visions" of Japan were created on the walls

and on the floor by transmission devices suspended to act as a guide to visitors. A wavy screen created a medial wall whose degree of transparency was controlled electronically. Particles of light were transmitted from the projector to the screen, and as the light gradually permeated the medial wall, the images were projected onto the reflective panel opposite or on the clothing of the visitors. When the light of the neon lamp from under the floor increased, the room was transformed into a fluffy white space in which all the substances seemed to melt away and disappear.

Five terminals floating on the surface were installed. They were connected with Tokyo city, allowing people to communicate interactively. The images of Tokyo constantly changing, projected on the walls and on the floor, were meant to tell the electronic flow of the Japanese metropolis and make, with the use of analog images, the idea of a simulate and ever changing city. The effect on the visitors was thought to simulate the sensation of walking in a neighborhood of Tokyo at night, as if you were immersed in the human and vehicular traffic in the images, in the lights and sounds of an incessant and flat space, composed of layers of lights, catapulted into a virtual reality.

In *Health Futures* installation for the Expo 2000 in Hannover (Germany 1998-2000), into the pavilion of Expo 2000 a “Theater of Water” was carried out, where visitors can enjoy a physical experience by stimulating their sensory apparatus on human body parts. Visitors could relax by lying on one of the 150 massage chairs arranged along a large and semicircular water pool and they could gradually perceive the importance of water, of natural light, of air, and finally of the human body. At the same time the pavilion offered to visitors another multi-sensory experience: an immersion in a virtual aquatic world recreated by a flow of images and sounds. Sounds and images were projected by 168 projectors on different surfaces, filling the space and also holding the visitors and spurring the feeling of being immersed in an automatically flow. These images, however, did not transmit articulated information, but feelings, like being inside a human body and exploring the organs it was to create, meant territories to be discovered. Here again, Ito uses the “electronic fiction,” and as in other previous work, he exploited virtual reality to allude to universal spaces inserted into a non-temporal, infinite and ever-changing dimension.

Conclusions

As Charles Landry stated, the contemporary city is under the limelight (Landry 2006, 185-187). Today the city is a media event and the city branding is the process by which media attention is ensured. Today the city is regarded as a mere supermarket product, like a car, a computer or breakfast cereal. We apply to architecture the same techniques of marketing, which has evolved into neuro-marketing. We have witnessed the development of the ‘digital landmark’ started by the Agbar Tower on the quiet until

the Bayer Tower. Therefore it looks like a competition to establish who reaches the top, who gets greater visibility, who is more surprising. An architectural project doesn't exist anymore because it has been replaced by advertising urban sheer. Now the architecture is like a support, where the marketing function has supplanted the living function.

As in the places of consumption described by George Ritzer, even in the digital and media city the aim is getting the disorientation effect of the user, who loses the sense of time and every link with the social reality; he becomes vulnerable and at the end he can be managed commercially.

This new built structure is concentrated in the suburbs, giving rise to the so-called "edge city." That is the city formed on the edge of the metropolis. There cities are built like appendages to urban areas, where the terrain cost is lower and without constraints to builders.

Consequently, the traditional "city form" of traditional European culture, rationally designed from the center which contains the monuments that symbolize power, culture, and religion goes through a crisis. This way the city center weakens its role, becoming a nostalgic spectacle, which puts on the periphery and electronic media.

The interaction with human beings closes the circle of this reasoning. As claimed by Giandomenico Amendola, the reference model is no longer horizontal or Cartesian, organic or natural, it is the "dream" that is a world of dreams, desires, myths and memories. In the new town, there is everything: a return to the past, control the present and the future, utopia and realism (Amendola 1997, 31-53). Thanks to the cooperation of the media, the real world has been transformed into a permanent show in which boundaries between actor and spectator, between reality and simulation fall down. It's like living in a parallel universe.

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<http://katiagaspariniblog.wordpress.com/about/>

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