Compositing Spaces

The Transferring of Space Relevant Film Elements into Computer-Generated Architecture-Related Animation

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The representation of architecture is to an increasing extent expressed by means of computer-generated animation. The medium of architectural animation thus gets closer to the film without taking into consideration its specific design possibilities. Here the research project “Compositing Spaces” starts. It reveals in which fields architectural animation can get an impact from filmic design instruments. On behalf of film analysis precise stage directions to the virtual camera could be developed. In collaboration with visualizers, film professionals and psychologists the project has taken an unexpected turn and led to a form of expression that involves compositing technique. The project takes with the animation of high-resolution visualizations a most promising and low-priced approach.

Keywords: architectural animation; film; spatial perception; rendering; compositing

Questions and Research Objectives

This research project investigates the potential of computer-generated architectural animation. Current practice suggests this mode of representation to resemble closely that of cinematography, while making no use of the latter’s specific means of expression. Which begs the question whether the reworking of architectural animations with the benefit of cinematic know-how, i.e. its specific techniques, might be able to create an effect upon receptive behaviour of the viewer and to shift architectural animation close to conventional viewing patterns.

Along with theoretical exploration of the intersection between these two media, the investigation is about working elements of cinematical expression into architectural animation. The research objective, then, is to ascertain whether architectural animation can by these means be made to approximate conventional visual experience and, indeed, whether a new spatial language may eventually develop.

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**Starting Point**

The way architectural animation is actually practised suggests that something ought to be done about it. Computer animations are the work of architects. When it comes to the applying of motion, they fall back upon their familiar, well-tried representational vocabulary; this, however, is an outgrowth of architectural plan design. As standardized, abstract and accurate two-dimensional representation has evolved towards tri-dimensional projection, CAAD software increasingly came equipped with visualizing tools, such as camera tools and rendering engines, giving the architect access to a completely new media – cinematography. The extent and manner of implementation of this new communicational media into architecture is largely defined by software development. The technical learning curve for animated design might seem quite flat, the more so if film is perceived as just a simple lining up of stills. In architectural animation work these perceptions show up as shortcomings. While CAAD has graduated to producing moving pictures, it takes hardly any advantage of the possibilities that distinguish cinematography as a medium and are the result of a long visual tradition. The visualizers, a highly specialized, self-taught group, in their films conjure up spatiality through apparent objectivity and as specific reality.

These premises call for research that, in analogy to the "iconic turn" in pictorial research (Maar/Burda, 2004), takes a transdisciplinary approach to visual representation of space, with a view to integrating cinematic specificities into architectural animation. Film production looks back upon a tradition of more than 100 years of dealing with visual expression, with lasting effects upon receptive habits of the viewers. Whereas film composes the image along classical patterns, on the diachronic level it has implemented new techniques, such as cutting, and narrator’s perspective, that took some time conquering the visual habits of the viewers at large. Thus, cinematographic evolution appears as a learning process. Its vocabulary, in continuous development and seeking for each period and each genre its own new visual idiom, is not be ignored by architectural animation. The use of cuts and montage in managing scenic space, e.g., has become established practice and is widely responsible for our way of apprehending space in an immersive frame of mind.

Yet, these very elements are largely ignored by architectural animation, either due to software limitations or to a lack of cinematic or receptive competence.

This is where the present research project comes in. It proposes to borrow from the tool-box that cinematography commands so effectively and strategically for rousing intended moods and emotions in the viewer, and to bring it to bear upon architectural animation.

**Methodology**

The job spans the trans-disciplinary junction between the differing research fields of film – or rather cinematographic production process and space-related theories – and of visual perceptual theory, which both contribute to the areas of computer-generated modelling, visualization and animation in architecture.

This is an applied research project. So, along with theory formation, the involvement of private

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**Figure 1**
Manipulation of a cutting sequence of „Il deserto rosso“ (Antonioni 1964). Single shots are being cut, spatially arranged in a modeling program, looped and rendered as a long take. Part of the research project is the analysis of film sequences methodologically following the concept of „research through design and art“. It can be shown that composing software programs for film editing, post production and 3D-modelling are getting closer to each other and that the borders between film and modeling are shifting.
business partners seemed indicated. We were successful in bringing together a team of firms from the fields of architectural visualization, software development, film production, and corporate identity. In a joint effort with these partners, a body of animations was put together that exemplify the evolution in architectural animation and lend themselves to further working over. Subsequent to cinematographic analyses, we established a framework of criteria for systematic re-working. Together with visualizers, and under the expert guidance of film specialists, we tested new ways of visual representation and optimization.

Results and Conclusions

In contrasting architectural animation with spatial representation in feature films, one is looking at two distinct media, each with its media-specific form of expression. However, in either of them we discover the same phenomenon, i.e. the long take. In cinematography, a long take means a long, single sequence without any cuts, most often with travels, replacing multiple shots. Without changing the shooting angle, the camera traverses the room in one continuous motion. Long takes extend over a much longer time than normal shots. For film directors, long takes in feature films are often a means of demonstrating their mastery.

Architectural animation lives in close phenomenological neighbourhood to the long take, inasmuch as it comes generally in sequences with no cuts, i.e. long takes. However, while long takes in cinematography reflect a director's free creative intent, in architectural animation they are mostly prompted by software bias.

Within the means of cinematographic direction, the cutting sequence is the opposite of the long take. It is subject to cutting rules, which both regulate the viewers visual orientation and secure spatial consistency. Cuts and re-cuts, long shots and close-ups are part of narrative techniques that are comprehended visually by the viewer. They seem, however, to be absent from computer animation (Emele, 1997, p. 192).

On the premise that space perception is not a continuous process but is made up of individual visual impressions that are cognitively combined into a coherent view of space, we wondered what the architectural equivalent of a cutting sequence might be.

Thus we began cutting architectural animations following cinematographic rules. It was important to understand how such alterations were perceived by the viewer and in what form a qualitative change might be taking place. We therefore teamed up with a research group of psychologists, for investigating this question through empirical methods. In a second, related project we sought to find the visual momentum (Hochberg/Brooks, 1978; Kraft, 1986) for cutting.

The financial requirements of visualizing caught up with our project and forced a change of direction. We discovered that only rarely did visualizers land orders for animation, because the jobs were beyond the financial means of the prospective clients. This realization led to a new vista with promising potential. We took another look at the composition of film scenes and added fixed camera position as an extra link to the chain.

This turned up another analogy to architectural animation – the equivalence of both fixed camera position in cinematography and visualization. This then opens up a new, economical and efficient approach to producing architectural animation. Film

![Figure 2. Schematic representation of our method.](image-url)
sentences are often made up of static-camera shots, a process which we undertook porting to animation work. Through compositing – while observing the cinematographic cutting rules – we assembled single visualizations into films.

It turned out that it is thereby possible to generate a new visual language that comes close to the visual conventions of the viewer, by dropping redundant information, and by bringing a narrative structure and its dramatic potential into play. Starting from extant material, mood and emotions may thus be called up in the viewer, and his yearning for sensual experiences may be satisfied, which up to now had been neglected on the strength of synthetic aesthetics being merely predicated on technical feasibility.

**References**


