

# MULTIPLE DIGITAL MEDIA IN REALIZING FUTURE SPACES

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**Abstract.** Innovative media made a varied representation of urban and architectural spaces. However, the interaction between human and the space requires other new media to present. In this research, based on experts' opinions about future space and lifestyle, we create a creative scenario and produce a video through video camera, digital image process, computer animation. In addition, virtual studio, camera matching and motion capture are added to simulate how people would interact with the spaces in the city life.

## 1. Introduction

Architectural spaces or urban spaces can be realized and represented through different digital media. Earlier researchers utilized a great amount of many computer visual imaging technologies to simulate urban spaces. Wang et al. (1998) evaluated and studied an urban space of a historical city by recreating the city using this visual imaging technology. Other than static simulation, computerized 3D modelling and multimedia animations have also been frequently used (Bai & Liu, 1998; Day & Radford, 1998; Wang et al., 1998). Bai and Liu (1998) utilized technologies of visual imaging, computerized 3D modelling and multimedia animation to represent an urban space for visual impact analysis. As well as these technologies, Virtual Reality was further utilized to enhance the dynamic features and interactive relationships between human bodies and environments of different attributes, which became a new media for urban space representation (Fukuda and Nagahama, 2002; Tang, et al., 2002). We carried on a research project—"Project 2050" in year 2003, is mainly to present a futuristic coexistence of virtual and physical features in an urban space by integrating the above media (Lee et al.).

However, cultural activity and interaction between people and spaces are also major elements in representing a city spaces besides the facilities such as the main building, street and plaza. To comprehend the interaction between people and space, Liu et al. (2002) utilized various digital media to simulate the disappeared ancient city of the Chang-An Dynasty based on archaeological documents, and vividly

demonstrates the city space and cultural life at that time. Additionally, with the progress of science and technology, the space and life in the future will inevitably change. Some researchers deliberate on the new thinking of the integration between technology and culture, and try to imagine future life. For instance, Vodafone describes its vision of mobile communication integrate in future life on an interactive website. DoCoMo (2003) of Japan also simulates the scientific and technological life of Japan in 2010.

## 2. Problem and Objective

In Project 2050, various digital media were successfully integrated and a 10-minute animation was created representing a vision of city spaces in the future (Lee et al., 2003). However, this project merely represents the concrete spaces of the coexisting virtual and physical environments. It does not express the cultural life of the city space in the future. Besides the concrete spaces, cultural activities will also reflect the appearance of the city. Therefore, to represent the integration between people and city space more deeply, this study continues Project 2050, pondering over the urban space and life in the future further, and simulates future urban space closely to reality with the aid of the diversified and advanced new digital media.

## 3. Methodology and Steps

In this study also we carried out a research project called “Creative Taiwan 2050”. The design team initially proposed the creative scenes to the future Taiwan city of 2050. This process had three steps as follows:

### 3.1. INTERVIEW

Twenty-four main leaders in the cultural domain included music, art, dance, traditional opera, modern drama, literature, craft, photography, cinema, architecture, museum, 4 major ethnic peoples, religions, life style and food were interviewed to discuss the past and future of culture life in the city.

### 3.2. CONCEPT OF CREATIVE SCENARIO

Based on the viewpoints addressed by the interviewers, the situation and scenes of the future city were conceived. We create 6 scenarios about the future life. The 6 scenarios included 6 topics: (a) religions and 4 major ethnic people, (b) ecology, architecture and city culture, (c) museum and art, (d) photography, cinema and

culture industry, (e) traditional opera, modern drama, music and dance, (f) food, literature and life style.

### 3.3. VIRTUAL CREATIVE WORKS

Various advanced digital media were integrated to represent the future spaces of virtual and physical coexisting environment and future city life. Seven different themes of creative scenes are represented: literature and diet, photography and film, fine arts and craft, buildings and religion, art and acting, culture city and ocean culture.

The application of the various digital media is divided into 3 major parts:

1. The initial interview work is used mainly as a comment and basic reference material, so merely adopting image technology media (photography and video recording) and 2D editing.
2. In representing the architectural spaces and urban spaces, the digital media which familiar to designers, such as static simulation, computerized 3D modelling and multimedia animations, were used.
3. Using the following advanced digital media and new technology to simulate the interaction between human and spaces:

*3.1.1. Virtual Studio:* to enhance the reality between the interaction of people and the future space, we applied TV/movies most-frequent-used virtual studio. In a green screen studio as background, from the story-teller, the actress pretends doing her social activities in the future world. Meantime, post-production splits the captured image and the green screen; then synthesizes with the future scenario. The lighting projected on the actress will also be adjusted in order to match the scenario. Figure 1 (a) shows the final synthesized result, from a real scenic spot in Taipei city (c) adding imagination towards future scenario (d), through the green screen technique we synthesize the actress (b) in the future city life.



Figure 1. Virtual studio.

3.1.2. *Motion Capture:* Dancer is stuck on a marker which can reflect infrared light. Dancer's actions are captured by the video camera and the instant image directly transmits to PC as motion-animation. In Figure 2, to demonstrate dancing in the future art street, (a) a real dancer performs her actions in the stage (b) instantly transmits her plays to the virtual dancer (c), through 3D display techniques, the virtual dancer is dancing in the future street.



Figure 2. Motion capture.

3.1.3. *Camera Matching:* We captured a video image from the real world. Post-production, we synthesized the virtual object to the video image. As shown in Figure 2 (a), a couple in the living room watching a digital artwork showed by a 3D displayer. The digital artwork is designed from 3D software Maya, then used Maya's "live" function to synthesize 3D digital model (c) with the video image taken from the beta cam (b).

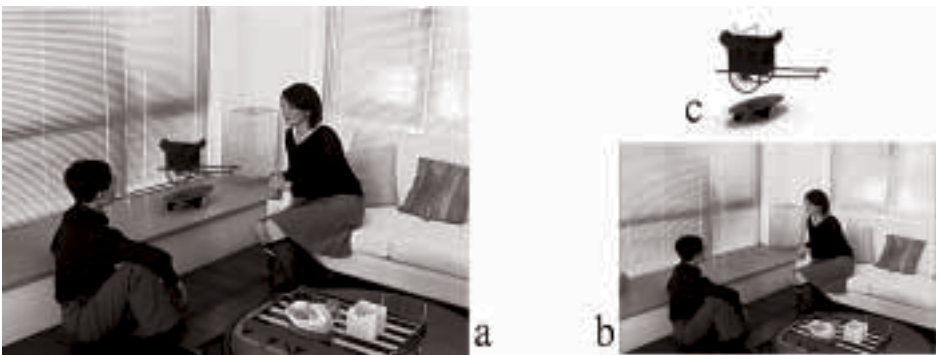


Figure 3. Camera matching.

These advanced media have advantages in integrating the conditions of physical and virtual. Therefore, the real people's activities could be integrated into the virtual

environment, and vice versa. In applying advanced media, a more realistic simulation of city life in the future urban space can be achieved.

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#### 4. Conclusion, Significance and Future Studies

Consequently, using the above methods, the design team successfully synthesized digital models, dynamic films, real scenes and films of interactions between people



Figure 4. Final video clip.

and spaces into virtual and physical coexisting environmental animations. A 10-minute animation (Figure 4) vividly illustrating the future urban spaces and life was produced. Additionally, this project also linked up with internet technology, setting up an interactive website (<http://www.arch.nctu.edu.tw/2050>) and publishing. This study presented new media in representing a city's current and future views, and city life using advanced digital technologies to effectively observe the relationships between designs and their environments. In this project, the advantages of each medium were maximized and fully used to produce higher quality simulation animations than before. Future research could explore space cognitive behaviour for various media representations and further study of the relationships between usage of new media and the audiences.

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