UPGRADING THE PARADIGM: VISUAL REGIMES, DIGITAL SYSTEMS AND THE ARCHITECTURAL SURFACE

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PhD, 2015
CERTIFICATE OF ORIGINAL AUTHORSHIP

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

Linda Matthews

Date: 19/04/2015
ACKNOWLEDGEMENTS

I offer my thanks to my supervisor, Professor Charles Rice, who has constantly given incisive reviews and invaluable, constructive advice to me throughout the writing of this thesis. His extensive contextual knowledge of this area of research has been a profound benefit to its outcome.

My thanks go as well to my co-supervisor, Professor Desley Luscombe, for her remarkable capacity to provide great literary guidance and, at all times, perspicacious advice. The several occasions when a collective, interim progress review took place between the three of us were not only incredibly exhilarating, but a great reminder of the rewards of collaborative scholarship and debate.

I would also like to acknowledge and thank my colleague, Gavin Perin. The conversations and collaboration that have taken place over a number of years have made an incalculable and ongoing contribution to the trajectory of this research.

For media that allows the effect of the research to be comprehensively visualised I am indebted to Matthew Austin for the development of software, and to Z-Space whose daunting professional skills with 3D animation allow the research outcomes to come to life. Both worked within an incredibly short delivery timeframe.

I am grateful to Dr Chris Ireland, whose comprehensive reviews contributed to the organisation and structure of this work. My thanks go as well to Dr Campbell Aitken of *Express Editing Writing and Research* whose excellent professional editing services in accordance with the Institute of Professional Editors’ *Guidelines for editing research theses* have been invaluable.

Finally, I gratefully acknowledge the award of an Australian Postgraduate Award by The University of Technology, Sydney. This funding source made my research work possible.

Linda Matthews

*The University of Technology, Sydney*

April 2015
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<tr>
<td>CCD</td>
<td>couple charged device</td>
</tr>
<tr>
<td>CFA</td>
<td>colour filter array</td>
</tr>
<tr>
<td>CMOS</td>
<td>complementary metal-oxide semiconductor</td>
</tr>
<tr>
<td>CMYK</td>
<td>cyan, magenta, yellow, black</td>
</tr>
<tr>
<td>FT</td>
<td>frame-transfer</td>
</tr>
<tr>
<td>HDR</td>
<td>high dynamic range</td>
</tr>
<tr>
<td>HVS</td>
<td>human visual system</td>
</tr>
<tr>
<td>IP</td>
<td>internet protocol</td>
</tr>
<tr>
<td>IT</td>
<td>interline-transfer</td>
</tr>
<tr>
<td>PTZ</td>
<td>pan-tilt-zoom</td>
</tr>
<tr>
<td>RGB</td>
<td>red, blue, green</td>
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ABSTRACT

The thesis argues that the contemporary representation of the city is a variable digital matrix propagated by ubiquitous camera technologies in association with Internet Protocol (IP) networks. In a radical departure from traditional linear perspective representation, the principal organisational unit of the digital image, the pixel, draws upon the operation of three principal perceptual properties of the human visual system (HVS): colour, brightness and shape, to assemble the image. As a consequence, the thesis proposes that the replacement of the image’s traditional linear coordinates by a numerical pixel grid instigates a perception and experience of urban space that offers a new series of concepts and tools to the architectural discipline.

The first part of the thesis situates the digital image in the historical and theoretical context of traditional analogue imaging processes: linear perspective representation, photography and film. This not only demonstrates the long-standing link between image-making techniques and architectural innovation, but it establishes an investigative platform and a procedural mode that isolates the unique properties and generative potential of the digital.

The second part of the thesis comprises two areas of investigation. The first of these documents a series of new approaches to architectural documentation based upon the webcam’s delineation of urban space and time. This is achieved using a combination of proprietary and non-proprietary scientific image-analysis software to extrapolate and reassemble image data in relation to the viewed architectural surface. The other area of investigation is undertaken by means of a series of practical tests that exploit the webcam’s technical capabilities. By referring to digital camera protocols associated with colour, brightness and shape, the tests seek to identify a range of new image-based design procedures that draw directly upon the structural geometry and data of the digital image and its numerical link with the city’s architectural surfaces.

As a practical demonstration of these procedures, the third and final section of the thesis is a video-based design investigation that intervenes in three different ways within the architectural surfaces of the city. Based upon an existing proprietary IP webcam in Times Square, New York, this proposal uses procedures that adapt webcam protocols in...
a way that directs the viewer’s attention to both the constructed nature of the webcam image and the presentation of the city as an iconic and utopian space.

The thesis therefore reveals how the pixel grid’s capacity to act as a generative tool marks a pronounced break from the type of influence previously had by earlier image-making techniques upon the perception and construction of urban form. It reveals how the departure from linear-dominant techniques of image-making in favour of associative groupings of qualitative content not only offers the architect new possibilities for the design and assembly of the material surfaces of architecture, but by invoking a different language of form, it establishes new terms by which intervention could be understood and evaluated. In this respect, it is proposed that the establishment of a series of new architectural tools redistributes the trajectory of disciplinary knowledge and techniques.