

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

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## **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

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## ACRONYMS AND ABBREVIATIONS

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

## **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.