

ANFA Abstract 2012

Title: Simulating Mechanisms of Emotion Associated with Visual Perception of Urban Space: An Artificial Agent's Perspective

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Abstract:

This paper discusses why and how the visual characteristics of urban space have an impact on human emotions, and explores how some of the underlying neural mechanisms could be simulated. In this collaboration between Architecture, Computer Science and Neuroscience we evaluate a top-down approach (how to test and measure the impact of the surrounding architecture on the emotional system) in contrast to a bottom-up approach (how to design an artificial agent that expresses emotional responses similar to that of a human in the same environment).

Evidence that the quality of the architectural visual environment has an impact on human emotions can be obtained through an analysis of startle reflex modulation (Geiser and Walla, 2011). In contrast to explicitly expressed subjective preference, this method measures unbiased emotional impact and is thus an innovative approach to evaluate a person's emotional state while being exposed to an architectural environment.

In parallel, we developed software that uses fractal dimension, abstract facial expression patterns and other features for designing a basic artificial emotional brain in software (Chalup and Ostwald, 2009; Wong et al., 2011). An artificial agent based on this system could evaluate the visual environment in simulation (e.g. by moving through computer generated plans), or in the real world (through analysis of video). The software system is tuned using machine learning so that the artificial agent's emotional responses appear to be genuine. The system can help architects predict how humans (emotionally) experience new architectural products before they are actually realized.

References:


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**Speaker narrative:**

Stephan Chalup is an Associate Professor in Computer Science and Software Engineering at the University of Newcastle, Australia. He received his Ph.D. in Machine Learning from Queensland University of Technology in Brisbane. He is the leader of the Interdisciplinary Machine Learning Research Group (IMLRG) and is involved in interdisciplinary projects with architecture and neuroscience.