PhD

THESIS SERIES

ZHENYU GU

Towards Capturing Aesthetic Intent of Design in an Interactive Evolutionary System Using Neural Networks

2006

PhD

1999–2020 THESIS SHOWCASE

This thesis reports an interactive system that uses an evolutionary algorithm, incorporating an artificial neural network for improving the aesthetic appeals of design. Evolutionary algorithms have been used in computer-aided design systems for generating desirable images or 3D forms. These systems use human subjective evaluations and selections instead of objective fitness functions to control the evolution, referred to as the Interactive Evolutionary Systems (IES). However, the IES approach involves a process that may become unendurable and exhaustive for several reasons. The thesis proposes an approach to use a neural network in conjunction with an IES to obtain a smoother evaluation function to address these problems. Furthermore, the proposed framework uses an artificial neural network to learn from the designer's preferences to produce designs that the designer most likely prefers. A learning mechanism in an evolutionary design process contributes to the formulation of the aesthetic intent of a designer in terms of an approximated fitness function for shortening the tedious and lengthy process of human evaluation and selection involved in an IES.