

UNIVERSITY OF MACAU
FACULTY OF SCIENCE AND TECHNOLOGY
DEPARTMENT of COMPUTER AND INFORMATION
SCIENCE

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**“From Text to Architecture Animation:
Automatically Constructing Chinese
Traditional Buildings”**

by

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Abstract

We propose the technology of full life-cycle automatic animation generation of Chinese traditional architecture and summarize a software system that implements this technology. Starting from a pseudo-natural language description of the architecture, until the generation of a 3D animation demonstrating the construction of this building, the whole process is performed automatically step by step, including reasoning of the construction sequence, computation of the size and position of each piece of wood, generation of a qualitative animation specification, and generation of a quantitative animation specification. As a result, the software system realizes more than 180 architectures in three main types of Chinese traditional timber structures, thirteen types of Dougong, and six types of Chinese pagodas. In addition to standard architectures, our technology can also be applied to generate animations for real-world buildings. Potential applications of such technology include demonstration systems in museums where the visitor describes what kind of building he wants to see and the system can accordingly construct the building in real time. We use artificial intelligence techniques including knowledge representation and reasoning for the Semantic Web to support the automation. More precisely, one ontology and four rule bases were built, where we used OWL DL, SWRL and Jess to capture the domain knowledge. Our experience in exploiting the current Semantic Web technologies in real-world application systems indicates their prominent advantages (such as the reasoning facilities and modeling tools) as well as the limitations (such as low efficiency).

Biography

Prof. Songmao Zhang received her Ph.D. in computer science from Chinese Academy of Sciences (CAS) in Beijing in 1992. She is currently a professor at the Institute of Mathematics and Systems Science, CAS. Prof. Zhang has been doing research in AI, and her research interests include ontology alignment, knowledge

representation and reasoning in the Semantic Web, and data mining. Particularly she has done very excellent research on AI-based automatic animation, and her book on Automatic Generation of Computer Animation: Using AI for movie Animation, was published by Springer in the volume 2160 of Lecture Notes in Artificial Intelligence (LNAI) in 2002. In addition, she was visiting scholars in research institutions and universities in the US, Australia, Germany, France and UK, including the US National Institutes of Health (NIH), Case Western Reserve University, Deakin University, Universitaet Bremen, Institut de Recherche en Informatique et Systemes Aleatoires (IRISA), and Queen's University Belfast.

ALL ARE WELCOME!