Computer Visual Measurement Technology and Algorithm Simulation for the Assembly of Large Aircraft Parts

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This research aims to solve the issues of limited measuring range and great accumulative error in the digital assembly of aircraft parts. In this paper, we propose the use of array visual measurement technology for the assembly of large aircraft parts. First, the visual measurement space for large aircraft parts assembly is determined. Second, the visual measurement model for large aircraft parts is constructed. Then, the differences that occur in real-time to the global coordinates can be calculated by using the pre-assembly feature points of large parts and the measurement tools of an array visual system. Finally, the real-time simulation of the aircraft assembly process is conducted in ADAMS by the secondary development of the software. In addition, errors between the real-time assembly and the design model are solved, and then transmitted to the mechanical actuators, which in turn adjust their attitude to complete the assembly of the large aircraft parts. The results show that array visual measurement technology for the assembly of large aircraft parts is feasible and efficient.

Keywords: Aircraft Digital Assembly, Vision Measuring, Spatial Transformation, ADAMS, Motion Simulation

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