A Bibliographic Review of Cellular Automaton Publications in the Last 50 Years

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A bibliometric analysis based on Science Citation Index-Expanded (SCIE) database was performed to evaluate global cellular automata (CA) research from different perspectives during 1965–2014. CA research experienced notable growth in the last 50 years. "Physics" and "Computer Science" were the two major subjects. Major research regions were located in North America, Western Europe, and Eastern and Southern Asia. USA was a leading contributor and China was the fastest-growing country in CA research. University of Tokyo, University of Notre Dame, and University of Science & Technology of China were the three most productive institutions. Independent research was dominant at country level, and inter-institutional cooperation decreased gradually. A keyword analysis demonstrated keen interest of CA in modeling various complex systems. New technologies and methodologies have greatly accelerated the CA application in different fields. The application and improvement of model will continue to be one of hotspots in CA research.

Keywords: Cellular automata (CA); computer simulation; modeling; bibliometrics; research trends

1 INTRODUCTION

Cellular Automata (CA) is an open and flexible dynamic model in which time, space, and state are all discrete [1]. Comparing with the traditional exact mathematic models, CA has proven to be more effective for simulating and predicting the spatio-temporal evolution progress of complex system [2, 3]. CA

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