عنوان مقاله:

Modeling Opponent Strategy in Multi-Issue Bilateral Automated Negotiation Using Machine Learning

محل انتشار:

فصلنامه بین المللی وب پژوهی, دوره 3, شماره 2 (سال: 1399)

تعداد صفحات اصل مقاله: 10

نویسندگان:

Fatemeh Mohammadi-Ashnani - *MSc Graduate in Information Technology Engineering, Department of Computer Engineering, Faculty of Engineering, College of Farabi, University of Tehran, Iran*

Zahra Movahedi - *Department of Computer Engineering, Faculty of Engineering, College of Farabi, University of Tehran, Iran*

Kazim Fouladi - *Department of Computer Engineering, Faculty of Engineering, College of Farabi, University of Tehran, Iran*

خلاصه مقاله:

With the emergence of the World Wide Web, Electronic Commerce (E-commerce) has been growing rapidly in the past two decades. Intelligent agents play the main role in making the negotiation between different entities automatically. Automated negotiation allows resolving opponent agents' mutual concerns to reach an agreement without the risk of losing individual profits. However, due to the unknown information about the opponent's strategies, automated negotiation is difficult. The main challenge is how to reveal the optimal information about the opponent's strategy during the negotiation process to propose the best counter-offer. In this paper, we design a buyer agent which can automatically negotiate with the opponent using artificial intelligence techniques and machine learning methods. The proposed buyer agent is designed to learn the opponent's strategies during the negotiation process using four methods: "Bayesian Learning", "Kernel Density Estimation", "Multilayer Perceptron Neural Network", and "Nonlinear Regression". Experimental results show that the use of machine learning methods increases the negotiation efficiency, which is measured and evaluated by parameters such as the rate agreement (RA), average buyer utility (ABU), average seller utility (ASU), average rounds (AR). Rate agreement and average buyer utility have increased from ۵۸% to ۷۴% and ۹۰% to ۹۴%, respectively, and average rounds have decreased from ۱۰% to ۰.۰۴%.

کلمات کلیدی:

Multiagent System, Automatic Negotiation, Machine Learning, Opponent Strategy Learning, Opponent's Modeling, e-commerce, Bayesian Learning, Kernel density estimation, Artificial Neural Network