**Genetic Algorithm based Approach to Enhance Network Performance in Multi-rate WLANs**

**Qiang Ma, Abdullah Al-Dhelaan, Mznah Al-Rodhaan**
*Department of Computer Science,*

*College of Computer & Information Sciences*

*King Saud University,*

*Riyadh, Saudi Arabia*

Email: qiang.ma@student.ksu.edu.sa;{dhelaan,rodhaan@ksu.edu.sa}

Corresponding author: **Mznah Al-Rodhaan**

**Email:** **rodhaan@ksu.edu.sa**

**Phone +966112223221**

**Fax:** +966114681221

**ABSTRACT**

In a multi-rate 802.11 WLAN environment, the users’ fairness and network throughput is a trade-off problem. Although there are many valuable research papers related to this optimization problem, up to date, none of those researches could offer a rational, clearly designed mathematical model which can be easily and widely implemented using the well known AI algorithms. Thus our research aims to fill such gap. In this paper we define the problem as an informed search NP-hard problem in a practical scenario, and then we will propose a new intuitive simplified mathematical model called Simplified Coefficient of Variation (SCV), by using Genetic Algorithm to implement the SCV model, through controlling the power of Access Points to optimize and enhance the performance of the network. The simulation gives excellent results that indicate our model is efficient and superior to existing method. After the experiment analysis, we use software SAS to further reveal the relationships of three indicators to illustrate the essence of our algorithm and an existing algorithm.

**Keywords:** power control; SCV; genetic algorithm; optimization; cost function; coefficient of variation.