CONSTRAIN-BASED PARTICLE SWARM OPTIMIZATION (CBPSO) FOR CALL CENTER SCHEDULING

Chaochang Chiu[1], Michael Jien-Jarn Wu[1], Yaow-Tsarn Tsai[1]
Nan-Hsing Chiu[2], Michael Shan-Hui Ho[3] and Horng-Jeng Shyu[4,5,*]

[1]Department of Information Management
Yuan Ze University
135 Yuan-Tung Road, Chung-Li, Taiwan
{ imchiu; michael.wu; s946217 }@saturn.yzu.edu.tw

[2]Department of Information Management
Ching Yun University
229, Chien-Hsin Rd., Jung-Li, Taiwan
nhchiu@cyu.edu.tw

[3]Computer Center & Institute of Electrical Engineering
National Taipei University
151, University Rd., San Shia 237, Taipei County, Taiwan
mhoincerritos@yahoo.com

[4]Department of Healthcare Administration
Asia University
Taichung County, Taiwan
[5]Department of Rehabilitation
Lin Shin Hospital
36, Sec 3, Hueijhong Rd., Taichung, Taiwan
*Correspongding author: shyuhorn@ms3.hinet.net

Abstract. *Achieving efficient and optimized call center scheduling is a critical issue to corporate customer services when considering limited resources and complex constraints. This study combines constraint-based reasoning (CBR) mechanisms and particle swarm optimization (PSO) (CBPSO) to solve timetables scheduling problems for customer-service department. When PSO searches for solution space, CBR mechanism can be used to reduce invalid solution space of particle search, and to improve solving efficiency. The experimental results showed that CBPSO is able to overcome the efficiency and flexibly concern under constraints in developing workforce timetables. The produced scheduling timetables can also address the labor cost minimization and fairness maximization.*
Keywords: Particle swarm optimization (PSO), Constraint-based reasoning, Call center scheduling

1. **Introduction.** Scheduling has become a key research area for the optimization problem. Since 1970s, many researchers have studied problems related to the work force planning and scheduling of staff [1,3]. The common goals of past research focused on helping employers to meet employee needs and comply with various scheduling policies, and used specific scheduling methods to achieve minimal staff employed or minimal costs. Under such complex constraints, scheduling optimization required extremely long evolution durations.

Optimization problems are issues of cross-disciplinary science, and exist in all fields of business. Kennedy & Eberhart (1995) proposed a new heuristic algorithm or particle