

CNSCE2014

2014 International Conference on Computer, Network
Security and Communication Engineering

February 22-23, 2014 Shenzhen, China



DEStech Publications, Inc.

**2014 International Conference on Computer, Network Security and
Communication Engineering**

DEStech Publications, Inc.
439 North Duke Street
Lancaster, Pennsylvania 17602 U.S.A.

Copyright © 2013 by DEStech Publications, Inc.

No part of this publication may be reproduced, stored in a
retrieval system, or transmitted, in any form or by any means,
electronic, mechanical, photo copying, recording, or otherwise,
without the prior written permission of the publisher.

Manufactured in the U.S.A.

Main entry under title:

2014 International Conference on Computer, Network Security and Communication Engineering
(CNSCE 2014)

ISBN: 978-1-60595-167-6

Permission for publication outside of this Conference Proceeding
must be given by the Publisher.

Table of Contents

Table of Contents

Preface

Committees

SESSION 1: APPLIED COMPUTER SCIENCE AND TECHNOLOGY

**An Improved Differential Evolution Algorithm for Solving
Unconstrained Optimization Problems 1**
XUE-MEI YOU and ZHI-YUAN LIU

**A Self-Adaptive Model of Multi-Source Information Services for
Cloud ITS. 8**
SHAN XUE, LI XIONG, BING FANG and XIONG-YI LI

**An Improved Differential Evolution Algorithm for Solving
Constrained Optimization Problems 14**
XUE-MEI YOU and ZHI-YUAN LIU

**A Malware Threat Decision Model Based on Dynamic Multi-Source
Data Acquisition 21**
DI SUN, JIAN-MIN PANG and CHAO DAI

**A New Windows Malware and Rootkit Identifying and Detecting
Software Based on System Routine Redirecting 30**
YU-XUN LU, DUO LIU, XU-DONG CHEN and HUA-CONG XU

**Research of the Grain Situation Monitoring System Based on
Embedded Linux 35**
FENG WANG, KE WANG, FANG ZHANG, MENG ZHANG
and YAN-NA WANG

**Design and Implementation of a NoC Simulator for Multiple
Topologies Exploration 40**
HAN GAO, DUO-LI ZHANG, BIN QI, YU-KUN SONG and GAO-MING DU

Shot-Segmentation-Based Video Watermarking Algorithm Using Motion Vector	223
DENG-YIN ZHANG and MIN YANG	
Explore Server Virtualization Technology Use in the Construction of Campus Informatization.....	229
LIANG WANG	
Study on the Change Detection from High Resolution Remote-Sensing Image	234
ZI-HENG ZHANG, YAN TIAN and KUI SHAO	
Research and Design of Wireless Medical Monitoring System Based on Zigbee.....	241
LIN ZHOU and HOU-WANG ZHANG	
Protocol Intrusion Detection Architecture.....	246
LIBERIOS VOKOROKOS, ANTON BALÁŽ, JANA TRELOVÁ, IVAN ŠESTINA and ALEXANDRA TURINSKÁ	
Generating Signature for Application Inference Using Trie Data Structure.....	251
JIAN-ZHEN LUO, SHUN-ZHENG YU and MAN LI	
Digital System Design of Electro-Thermal Acupuncture Treatment Instrument.....	256
YU-ZI LIN, BIN YANG and YONG-XIAN LI	
Simple Multiple-Attribute Rating Technique for Optimal Decision-Making Model on Selecting Best Spiker of World Grand Prix	261
CHIH-CHENG CHEN, I-CHENG CHEN, YUNG-TAN LEE, CHIN-HUNG YU and TIAN-SHAING KUO	
Research on the Evaluation of University Homepage Website Usability Based on Eye Tracking Technology	264
XIN YU, CONG-SHUANG LI, PENG LIU, HAN CHEN, HANG ZHAO, LAN HE and YU-TONG ZHOU	
Study on Population Comprehensive Information Sharing Platform	269
JIAN-HUA ZENG and XUE-PING LIANG	
Water Quality Index Prediction Using Falsity Input and Duo Output Neural Networks.....	273
PAWALAI KRAIPEERAPUN and SOMKID AMORNSAMANKUL	
Online Surgery Scheduling with Tight Due Dates.....	278
TAI-BO LUO, YIN-FENG XU and LI LUO	

Simple Multiple-Attribute Rating Technique for Optimal Decision-Making Model on Selecting Best Spiker of World Grand Prix

Chih-cheng CHEN^{1,a}, I-cheng CHEN^{2,b,*}, Yung-tan LEE^{3,c}, Chin-hung YU^{4,d}
and Tian-shaing KUO^{5,e}

¹Department of Sport Management, Aletheia University, No. 32, Chen-Li St., Tamsui Dist., New Taipei City, 25103 Taiwan.

²Office of Physical Education, Tamkang University, No. 151, Ying-Chuan Road, Tamsui Dist., New Taipei City, 25137 Taiwan.

³Department of Tourism, Aletheia University, No. 32, Chen-Li St., Tamsui Dist., New Taipei City, 25103 Taiwan.

⁴Department of Kinesiology, Texas Woman's University, 1500 West. Oak St. apt.40, Denton, Texas, 76201.

⁵Bachelor's Degree Program of Dynamic Recreation and Health Management, Tainan University of Technology, No. 529, Zhongzheng Rd., YongKang Dist., Tainan City 71002, Taiwan.

^aau1692@au.edu.tw, ^bmasa@mail.tku.edu.tw, ^cau4300@mail.au.edu.tw,

^dkenny_yu@rocketmail.com, ^et00073@mail.tut.edu.tw

*Corresponding author

Keywords: Simple Multiple-Attribute Rating Technique (SMART), World Grand Prix, Best spike player.

Abstract. The purpose of this study is to construct a model for best spike player selection in a top volleyball tournament of the world. Data is records of 2013 World Grand Prix that declared by Federation Internationale de Volleyball (FIVB). Simple Multiple-Attribute Rating Technique (SMART) to use for optimal decision-making model on best spike player selection. The research results showed that the best spike player ranking by SMART is different ranking by FIVB. The results demonstrate the effectiveness and feasibility of the proposed model.

Introduction

Volleyball is now one of the big five international sports, and the Federation Internationale de Volleyball (FIVB), with its 220 affiliated national federations, is the largest international sporting federation in the world. FIVB holds varieties competitions include World League, World Grand Prix, World Championship, World Cup, Club World Championships, and Grand Champions Cup to promote volleyball. The Grand Prix made women's volleyball very popular in East Asia; the lack of interest on the part of the audience is nevertheless still significant throughout the world. Today, the competition is maintained mainly with the support of Asian investors. World Grand Prix was created in 1993 as part of the FIVB's marketing strategy to promote the sport of volleyball by establishing annual international competitions. It was modeled after the World League, a successful event for men that had been introduced three years before.

What skills of volleyball to get a score in volleyball game? The skills are spike, block and serve. Spike is most important skill for score, over 65 percent in a set [1]. World Grand Prix, like professional baseball and professional soccer, is entertainment. Each year, as the season progresses, all sport fans and sportswriters take great interest in predicting the winners of best player award [2-3], include best spike player award of World Grand Prix. Best spike player selection is multi-attributes problem. It must consider a few criteria. But FIVB rank best spike player just by percentage of spikes were score. According above this paper propose a model, it using Simple Multi-Attribute Ranking Technique, for best spike player ranking.

Methology

Simple Multiple-Attribute Rating Technique (SMART)

SMART originally sketched by Edwards in 1971, and more fully presented and first named in 1977[4]. The selection of SMART technique was due that it is a simple method to apply and understand by the decision centre; besides it is widely applied in the environment of make decisions[5]. For the application of this technique it is necessary to apply the procedure detailed as below [4]: 1. Purpose and decision makers. 2. Value tree. 3. Objects of evaluation. 4. Object-by-attributes matrix. 5. Dominated options. 6. Single-dimension utilities. 7. Do part 1 of swing weighting. 8. Do part 2 of swing weighting. 9. Decide.

Data

The data employed in this study were obtained from the official FIVB World Grand Prix website , a website that has collected and posted records of every player spike result during competition of FIVB Grand Prix in 2013 (<http://www.fivb.org/EN/volleyball/competitions/WorldLeague/2013/index.asp>).

Empirical Analysis

FIVB Announced the Best Spike Player

FIVB ranked best spike player by percentage of spike success. Result as table 1. shown.

Table 1. Fivb announced the best spike player in 2013 world grand prix.

Rank	Name	Spikes	Faults	Shots	Total Atts	Succ. %
1	Zhu Ting	65	13	50	128	50.78
2	Brakocevic Jovana	75	18	58	151	49.67
3	Castro Sheilla	42	7	42	91	46.15
4	Mihajlovic Brankica	61	20	52	133	45.86
5	Murphy Kelly	51	21	41	113	45.13
6	Hui Ruoqi	49	14	46	109	44.95
7	Diouf Valentina	91	32	83	206	44.17
8	Guimaraes Gabriela Braga	54	21	52	127	42.52
9	Rodrigues Fernanda	49	13	57	119	41.18
10	Ebata Yukiko	78	31	93	202	38.61

Zhu Ting was ranking first, she totally attempted 128 times to spike. She got 65 scores, 13 faults, 50 shots and 50.78% percentage of spike success. Diouf Valentina was ranking seventh because her percentage of spike success was 44.17%. But she spiked 91 scores more than the other players. In order to solve this problem, we propose a SMART model for best spike player ranking.

Weight for Criteria

This study applied SMART to determine the weight of each criteria performance measurement. Three professors were asked to contribute their professional experience to determine the score importance of five individual performance measures: spikes (C1), faults (C2), shots (C3), total attempts (C4) and percentage of spike success (C5). According to importance priority order were spikes, percentage of spike success, total attempts, shots and faults. Professors consider that faults were ranking last one, we given 10 to faults. Shots' importance was approximately 3 times than faults, we give 30 to shots. Total attempts' importance was 5 times than faults, we gave 50 to total attempts. Spike success percentage's importance was 8 times than faults, we gave 80. Finally, importance of spikes was 10 times than faults, we gave 100. Therefore, scores of criteria were $C1 : C5 : C4 : C3 : C2 = 100 : 80 : 50 : 30 : 10$. Weights of each criterion were $w = \{w_1, w_2, w_3, w_4, w_5\} = \{100/270, 80/270, 50/270, 30/270, 10/270\} = \{0.37, 0.29, 0.18, 0.11, 0.03\}$.

Best Spike Player Ranking by SMART

Table 2. The best spike player ranking by smart

Rank	Name	Spikes	Faults	Shots	Total Atts	Succ. %	Total
	Weight	0.37	0.04	0.11	0.19	0.30	
4	Zhu Ting	71	54	54	62	100	75.56
3	Brakocevic Jovana	82	39	62	73	98	81.45
10	Castro Sheilla	46	100	45	44	91	60.92
5	Mihajlovic Brankica	67	35	56	65	90	71.05
8	Murphy Kelly	56	33	44	55	89	63.38
9	Hui Ruoqi	54	50	49	53	89	63.32
1	Diouf Valentina	100	22	89	100	87	92.05
6	Guimaraes Gabriela Braga	59	33	56	62	84	65.65
7	Rodrigues Fernanda	54	54	61	58	81	63.47
2	Ebata Yukiko	86	23	100	98	76	84.38

Result of FIVB best spike player ranked by SMART as table 2 shown. Diouf Valentina ranked first place by we proposed SMART model. However, Zhu Ting was FIVB announced best spike player, but her position fell from first place to fourth place. Using we proposed model, there were severe variation in best spike player ranking. Because we proposed model considered multi criteria, weights of every criterion were different. For example, Zhu Ting was ranking first place on percentage of spike success, it weights 0.30. But her performance on the other criteria not good enough, so she ranked fourth place finally. In contrast with Zhu Ting, Diouf Valentina just ranked seventh place by FIVB announced, but her performance of spikes and total attempts were ranking first place. In other words, ranking system of FIVB was simple and insufficient.

Conclusions

FIVB in order to satisfy needs of worldwide fans to hold varieties international competitions. Selection super star is a good way to enhance fans and spectators impression. Super star is a player who had comprehensive on skills and characters. In volleyball game, good spike players usually were super star. So evaluation super star is multi-criteria problem. Therefore, cautious rules of selection are very important. Ranking result of this study proposed model was different FIVB announced. Because we proposed a model using multi-criteria concept that was differ concept of FIVB. Model of SMART was we proposed that can select comprehensive skills player.

References

- [1] Palao, J. M., J. Santos, and A. Ürena. 2004. "Effect of setter's position on the spike in volleyball," *Journal of Human Movement Studies.*, 48(1): 25-40.
- [2] Sparks, R. L. and D. L. Abrahamson. 2005. "A Mathematical Model to Predict Award Winners," *Math Horizons*, April: 5-13.
- [3] Chen, C. C., M. L. Lin, Y. T. Lee, T. T. Chen, and C. Y. Tseng. 2010. "Best Starting Pitcher of the Chinese Professional Baseball League in 2009," *Proceeding of World Academy of Science, Engineering and Technology*, 48: 322-324.
- [4] Edwards, W. and F. H. Barron. 1994. "SMARTS and SMARTER: Improved Simple Methods for Multiattribute Utility Measurement," *ORGANIZATIONAL BEHAVIOR AND HUMAN DECISION PROCESSES*, 60: 306-325.
- [5] Carnero, C. and S. Delgado. 2008. "Maintenance audit by means of value analysis technique and decision rules: A case study in a bank," *Journal of Quality in Maintenance Engineering*, 14(4): 329 – 342.



ISBN: 978-1-60595-167-6