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Automated methodology for scenario generation and its feasibility testing

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Abstract

The main purpose of this study is to devise a novel methodology for automated scenario generation, which simultaneously checks the feasibility and the correctness of scenarios in terms of event sequence, logical propagation, and violation of constraints. Modern day warfare is highly fluidic, fast moving, and unpredictable. Such situation stipulates the fast decision making and rapid deployment of fighting forces. Management of combat assets and utilization of battlefield information, therefore, become the key factors that deice the outcome of engagement. In this context, the Korean Armed Forces are building a framework, in which commanders can rapidly and efficiently evaluate every conceivable engagement scenario before committing real assets. The methodology is derived from the Conflict Table, event transition probabilities, DEVS formalism, and DFS algorithm. The presented example illustrates an one-on-one combat engagement scenario with two submarines, of which results validate the effectiveness of the proposed methodology. © INTERNATIONAL JOURNAL OF INDUSTRIAL ENGINEERING.

Author keywords

Automated scenario generation; Conflict tables; Defense m&s; Devs; Dfs; Event transition probabilities

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References (33)

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1 Ahmed, D.M., Sundaram, D., Piramuthu, S.
Knowledge-based scenario management - Process and support
(2010) *Decision Support Systems*, 49 (4), pp. 507-520. Cited 8 times.
doi: 10.1016/j.dss.2010.06.004
Get it! View at Publisher

2 Aho, A., Ullman, J., Hopcroft, J.
(1983) *Data Structures and Algorithms*. Cited 733 times.
Addison Wesley Boston, MA, USA
Get it!

3 Anggreeni, I., Voort, M.
(2007) *Journal of Design Principles and Practices*, 2 (4), pp. 123-136. Cited 2 times.
Get it!

(2010) *DEVS*

4 Wikipedia
http://en.wikipedia.org/wiki/DEVS
Get it!

Evanczuk, S.
5
(1990) *High Performance Systems*, pp. 16-17. Cited 8 times.
April Issue
Get it!

Kim, K.H., Seong, Y.R., Kim, T.G., Park, K.H.
6 **Ordering of simultaneous events in distributed DEVS simulation**
(1997) *Simulation Practice and Theory*, 5 (3), pp. 253-265. Cited 5 times.
Get it! View at Publisher

Kim, T.
7 (2009) *DEVSIM++ v3.0 User's Manual*
Department of Electrical Engineering, KAIST, Korea
Get it!

Lee, K., Wang, J.
8
(2008) *Defense Science and Technology Plus*, 63, pp. 4-8. Cited 3 times.
Get it! View at Publisher

Lee, J.
9
(2005) *Journal of the Korean Society of Broadcast Engineers*, 10 (1), pp. 37-48.
Get it! View at Publisher

Piplani, L.K., Mercer, G.J., Roop, O.R.
10 (1994) *System Acquisition Manager'S Guide for the Use of Models and Simulations: Report of the DSMC 1993-1994 Military Research Fellows*. Cited 6 times.
Defense Systems Management College Press, Fort Belvoir, VA, USA
Get it!

Prasad, B.
11
(1995) *Journal of Concurrent Engineering: Research and Applications*, 3 (2), pp. 78-80. Cited 14 times.
Get it! View at Publisher

Prasad, B.
12 (1996) *Concurrent Engineering Fundamentals*, 1. Cited 503 times.
Prentice Hall, Upper Saddle River, NJ, USA
Get it!

Prasad, B.
13 (1997) *Concurrent Engineering Fundamentals*, 2. Cited 503 times.
Prentice Hall, Upper Saddle River, NJ, USA
Get it!

Prasad, B.
14
(1998) *Journal of Concurrent Engineering: Research and Applications*, 6 (1), pp. 2-6. Cited 9 times.
Get it! View at Publisher

Prasad, B.
15 **Enabling principles of concurrency and simultaneity in concurrent engineering**
(1999) *Artificial Intelligence for Engineering Design, Analysis and Manufacturing:*

AIEDAM, 13 (3), pp. 185-204. Cited 27 times.
doi: 10.1017/S0890060499133055

Get it! View at Publisher

16 Priest, J.W., Sánchez, J.M.
(2001) *Product Development and Design for Manufacturing*. Cited 34 times.
Marcel Dekker, Inc., New York, USA

Get it!

17 Martin, G., Hughes, C.
(2010) *A Scenario Generation Framework for Automating Instructional Support in Scenario-based Training*
Proceedings of the 2010 Spring Simulation Multi-conference, New York, NY, USA

Get it!

18 McDowell, P.
(2006) *JDMS*, 3 (3), pp. 143-154. Cited 13 times.

Get it! View at Publisher

19 Minchev, Z., Shalamanov, V.
(2010) *Scenario Generation and Assessment Framework Solution in Support of the Comprehensive Approach*
Systems Analysis and Studies Panel (SAS) Symposium, Sofia, Bulgaria, 26-28 April

Get it!

20 Park, S.C., Kwon, Y., Seong, K., Pyun, J.
Simulation framework for small scale engagement
(2010) *Computers and Industrial Engineering*, 59 (3), pp. 463-472. Cited 4 times.
doi: 10.1016/j.cie.2010.06.003

Get it! View at Publisher

21 Park, S., Shin, H., Lee, T., Choi, B.
(2010) *Design of the Agent-Based Network-Centric Warfare Modeling System*, 19 (4), pp. 271-280. Cited 2 times.
Korean Simulation Association

Get it!

22 Reynols, D.
(2001) *ALGO Rearch Quarterly*, 4 (3), pp. 15-36. Cited 4 times.

Get it!

23 Sabrina, S., Doman, J.
(1996) *Description and Worked Example of STAGE*
Department of Defense, Defense Science and Technology Organization, Aeronautical and Maritime Research Laboratory

Get it!

24 Shin, J.E., Sutcliffe, A.G., Gregoriades, A.
Scenario advisor tool for requirements engineering
(2005) *Requirements Engineering*, 10 (2), pp. 132-145. Cited 10 times.
doi: 10.1007/s00766-004-0207-3

Get it! View at Publisher

25 Shin, J.
(2007) *The Federation Development for Underwater Warfare Simulation*, 16 (3), pp. 11-18. Cited 2 times.
Korean Simulation Association

Get it!

Song, H., Rhee, D.

26

(2009) *Journal of Korea Game Society*, 9 (2), pp. 29-39.

Get it!

Son, M.-J., Cho, D.-Y., Kim, T.-w., Lee, K.-Y., Nah, Y.-I.

27 **Modeling and simulation of target motion analysis for a submarine using a script-based tactics manager**

(2010) *Advances in Engineering Software*, 41 (3), pp. 506-516. Cited 6 times.

doi: 10.1016/j.advengsoft.2009.10.009

Get it! View at Publisher

Temizer, S.

28

(2007) *Journal of Aeronautics and Space Technologies*, 3 (1), pp. 41-50. Cited 2 times.

Get it!

(2011) *VR-Forces Users Guide*. Cited 2 times.

29 VT MAK Company, VRF-4.0-20-110120, Cambridge, MA, USA

Get it!

Wainer, G., Madhoun, R.

30

(2005) *JDMS*, 2 (3), pp. 121-143.

Get it! View at Publisher

Yoon, S.

31

(2004) *Study of Korean Defense Policy o4*, (63). Cited 3 times.

Get it!

Zeigler, B.P.

32 (1976) *Theory of Modeling and Simulation*. Cited 1460 times.

Wiley Inter-Science Publication, John Wiley & Sons, New York, NY, USA

Get it!

Zeigler, B.P.

33

(1990) *Modular Models*. Cited 8 times.

Academic Press, Boston, MA, USA

Get it!

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