



Intelligent Multi State Markov Assumption Model for Discovering Cognitive Learning Traits in E-Learning System

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Abstract

In the e-learning arena, the facilitators and learners are struggling to acclimatize themselves into the learning management system in correspondence to their teaching and learning styles. This paper is prepared to put forward a probabilistic and statistical approach which can enable the creation of a model to reveal the forthcoming of numerous learning techniques for the learners and to endow with the requisite learning methodology according to the learners' quench and learning capability. We, in this paper have envisaged the Kolb Learning taxonomy for building the prediction model (LSM-Latent Learning Style Markov Model) using multi-stage markov assumption model. The LSM Multi-stage markov model puts forth numerous strategies of learning technique and its migration from one technique to the other during the advancement of the learning strategy. The evaluation of this model is analyzed with niche outcome and the manifestations are also analyzed with the requisite charts and plots. New learning methodologies are encapsulated taking into review various key facts and findings as the composites of cognitive, effective, and psychological stable metrics that the learners are capable of in the adaptive learning management system during the navigation process in their learning path in the corresponding mode. The progress of the methodology is made viable for the learners by providing the curriculum and its technique that fit the learning methodology. The challenging aspect of such adaptive methodology is the derivation of the capability of the learner's modeling technique. The learning methodology is identified with the help of cognitive traits of the learners. We develop a multi-stage learning module for formatting the dynamics of learning methodology based on the learner's activity log data analysis.

Keywords: e-learning learning style, e-learning, hidden markov, Kolb learning model.

References

- L. Nguyen, "A New Approach for Modeling and Discovering Learning Styles by Using Hidden Markov Model", *Global Journal of Human-Social Science Research*, vol. 13, no. 4, 2013.
- S. Eryilmaz, "Assessment of a multi-state system under a shock model", *Applied Mathematics and Computation*, vol. 269, pp. 1-8, 2015.
- S. Eryilmaz, "Dynamic assessment of multi-state systems using phase-type modeling", *Reliability Engineering and System Safety*, vol. 140, pp. 71-77, 2015.
- S.H. Sheu, C.C. Chang, Y.L. Chen and Z.G. Zhang, "Optimal preventive maintenance and repair policies for multi-state systems", *Reliability Engineering and System Safety*, vol. 140, pp. 78-87, 2015.
- J. Hou, "Grey relational analysis method for multiple attribute decision making in intuitionistic fuzzy setting", *Journal of Convergence Information Technology*, vol. 5, no. 10, pp. 194-199, 2010.
- S. Farid, R. Ahmad, I.A. Niaz, M. Arif, S. Shamshirband, and M.D. Khattak, "Identification and prioritization of critical issues for the promotion of e-learning in Pakistan", *Computers in Human Behavior*, vol. 51, pp. 161-171, 2015.
- A. Tsitsika, M. Janikian, S. Wójcik, K. Makaruk, E. Tzavela, C. Tzavara, D. Greydanus, J. Merrick, and C. Richardson, "Cyberbullying victimization prevalence and associations with internalizing and externalizing problems among adolescents in six European countries", *Computers in Human Behavior*, vol. 51, pp. 1-7, 2015.
- A. Kapenieks, B. Zuga, A. Gorbunovs, M. Jirgensons, J. Kapenieks, I. Vitolina, G. Majore, G. Jakobsonē Sņepste, I. Kudina, K. Kapenieks and Z. Timsans, "User Behavior in Multi-screen eLearning", *Procedia Computer Science*, vol. 65, pp. 761-767, 2015.
- M. Dečman, "Modeling the acceptance of e-learning in mandatory environments of higher education: The influence of previous education and gender", *Computers in Human Behavior*, vol. 49, pp. 272-281, 2015.
- S. Mohammadyari and H. Singh, "Understanding the effect of e-learning on individual performance: The role of digital literacy", *Computers and Education*, vol. 82, pp. 11-25, 2015.
- M.L. Hung and C. Chou, "Students perceptions of instructor's roles in blended and online learning environments: A comparative study", *Computers and Education*, vol. 81, pp. 315-325, 2015.
- K. Aesaert, J. Van Braak, D. Van Nijlen, and R. Vanderlinde, "Primary school pupils ICT competences: Extensive model and scale development", *Computers and Education*, vol. 81, pp. 326-344, 2015.
- R. Vanderlinde, K. Aesaert, and J. Van Braak, "Institutionalized ICT use in primary education: A multilevel analysis", *Computers and Education*, vol. 72, pp. 1-10, 2014.
- A. Konak, T. K. Clark and M. Nasereddin, "Using Kolb's Experiential Learning Cycle to improve student learning in virtual computer laboratories", *Computers and Education*, vol. 72, pp. 11-22, 2014.

- P. Moule, "Challenging the five-stage model for e-learning: a new approach", *Research in Learning Technology*, vol. 15, no. 1, 2007.
- K. Aesaert, J. Van Braak, D. Van Nijlen, and R. Vanderlinde, "Primary school pupils ICT competences: Extensive model and scale development", *Computers and Education*, vol. 81, pp. 326-344, 2015.
- S. Du, R. Xu, D. Huang and X. Yao, "Markov modeling and analysis of multi-stage manufacturing systems with remote quality information feedback", *Computers and Industrial Engineering*, vol. 88, pp. 13-25, 2015.
- I. Maleki, S. Resa, "Applications of Hidden Markov model in question answering system", *International journal of Computer Sciences and Applications*, vol. 3, no. 5, 2013.
- K. Javed, S. Maruf, and H.A. Babri, "A two-stage Markov blanket based feature selection algorithm for text classification", *Neuro computing*, vol. 157, pp. 91-104, 2015.
- W. Zhang, X. Tang, and T. Yoshida, "TESC: An approach to text classification using semi-supervised clustering Knowledge-Based Systems", vol. 75, pp. 152-160, 2015.
- S. Graf and T.C. Liu, "Supporting teachers in identifying students learning styles in learning management systems: an automatic student modeling approach", *Journal of Educational Technology and Society*, vol. 12, no. 4, pp. 3, 2009.
- S. Graf, and S. Viola, "Automatic student modeling for detecting learning style preferences in learning management systems", In *Proc. international conference on cognition and exploratory learning in digital age*, pp. 172-179, 2009.
- S. Graf, "Learner modelling through analyzing cognitive skills and learning styles", In *Handbook on Information Technologies for Education and Training*, Springer Berlin Heidelberg, pp. 179-194, 2008.
- H.C. Chen, M. Goldberg, M. Magdon Ismail and W.A. Wallace, "Reverse engineering an agent-based hidden markov model for complex social systems", In *Intelligent Data Engineering and Automated Learning*, Springer Berlin Heidelberg, pp. 940-949, 2007.
- J. Breckler, C.S. Teoh and K. Role, "Academic Performance and Learning Style Self-Predictions by Second Language Students in an Introductory Biology Course", *Journal of the Scholarship of Teaching and Learning*, vol. 11, no. 4, pp. 26-43, 2011.
- B.A. Rogowsky, B.M. Calhoun, and P. Tallal, "Matching learning style to instructional method: Effects on comprehension", *Journal of Educational Psychology*, vol. 107, no. 1, pp. 64, 2015.
- E. Mwamikazi, P. Fournier-Viger, C. Moghrabi, A. Barhoumi, and R. Baudouin, "An Adaptive Questionnaire for Automatic Identification of Learning Styles", In *Modern Advances in Applied Intelligence*, Springer International Publishing, pp. 399-409, 2014.
- A.Y. Kolb and D.A. Kolb, "The Kolb Learning Style Inventory Version 3.1 Technical Specifications", LSI Technical Manual, 2005.