Applying IRT to Estimate Learning Ability and K-means Clustering in Web based Learning

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Abstract

E-learning provides a convenient and efficient way for learning and enriching people's lives. But there is no appropriate way to estimate and diagnose people when they learning with e-learning environment/system. For learning ability estimation issue, Item Response Theory which plays an important role in modern mental test theory is applied. Besides, K-means clustering method is also applied to cluster learner's ability for remedying courses or enhancing courses. We integrate these two theories and propose a combination methodology to solve the estimation and diagnostic issues in e-learning environment. A web-based assist system is provided as well. Experimental data is collected with forty sophomore students studying "Business Data Communication" class at Dept. of Information Management in Chung Hua University in Taiwan. We illustrated the method to observe and estimate the variation of learner's ability. This methodology and system could make some valuable contribution in e-learning related study and society.

Keyword：E-learning, K-means cluster, Item Response Theory, Learner Ability, Assessment