**A linear Bayesian stochastic approximation to update project duration estimates**

* [Sungbin Cho](http://www.sciencedirect.com.turing.library.northwestern.edu/science/article/pii/S0377221708003792),
* School of Business, Sogang University, #1, Sinsu-dong, Mapo-gu, Seoul 121-742, Republic of Korea

**Abstract**

By relaxing the unrealistic assumption of probabilistic independence on activity durations in a project, this paper develops a hierarchical linear Bayesian estimation model. Statistical dependence is established between activity duration and the amount of resource, as well as between the amount of resource and the risk factor. Upon observation or assessment of the amount of resource required for an activity in near completion, the posterior expectation and variance of the risk factor can be directly obtained in the Bayesian scheme. Then, the expected amount of resources required for and the expected duration of upcoming activities can be predicted. We simulate an application project in which the proposed model tracks the varying critical path activities on a real time basis, and updates the expected project duration throughout the entire project. In the analysis, the proposed model improves the prediction accuracy by 38.36% compared to the basic PERT approach.