Title: A reliability estimation model using integrated tasks and resources

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Abstract: With the growing size of modern systems, the composition of a number of resources for a system is becoming increasingly more complex. Thus, a reliability analysis for that system is essential, especially during design time. The reliability estimation model is rapidly becoming a crucial part of the system development life cycle, and a new model is needed to enable an early analysis of reliability estimation, especially for the system under study. However, the existing approach neglects to address the correlation between resource and system task for estimation of system reliability. This subsequently restricts the accuracy of estimation results and thus, could misguide the reliability analysis in general. This paper proposes a reliability estimation model that enables the computation of the system reliability as a product of resource and system task. The system task reliability is treated as a transition probability that the resource may execute for subsequent resources. To validate the model, one real case study is used and the accuracy of the estimation result is compared with the actual reliability values. The result shows the estimation accuracy is considered at an acceptable level and some of the scenarios have recorded higher accuracy values than previous models. To evaluate our model, the result is compared with that of the existing model and shows our model providing a more accurate estimation for a more complex scenario.