

Software Engineering and Estimation for Decision Architectures (SEEDA)

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Abstract:

Software sizing, schedule, cost, and risk assessment is a discipline that very few have mastered. This can be gleaned from the large percent of large software intensive developmental programs that encounter schedule and cost overruns. A current emerging trend in system development is the use of Decision Architectures, using decision theory and knowledge management engineering. Current estimation models do not address system development using these new paradigms, such as Decision Architectures. During Phase I, FORELL demonstrated the feasibility of utilizing operational decisions as the bases for software sizing, schedule, cost and risk assessment. For Phase II, FORELL proposes to prototype this decision-based software estimation capability and extend the initial capability to include continuous dynamic validation of the underlying parameters that were used in the initial software estimation, e.g., validate actual software productivity, resources, schedules and cost. We will evaluate the actual software development progress on a continuous basis to provide an early warning capability and provide recommended corrective actions. To support the evaluation, we will use decision-based simulations, generating AI rules using FORELL's KBArchitecting®. KBArchitecting® is a new engineering paradigm for Decision Architectures.

Anticipated Benefits/Commercial Applications: This capability provides software development and program acquisition managers the tools to effectively “manage” programs, ensuring that schedule and cost constraints are satisfied. We will provide the capability to accurately perform software estimation based on the number of decisions in the operational processes, as provided by operational domain experts, i.e., the end user. This essentially provides non-engineering personnel with the ability to assess software size without having to know the intricacies of systems and software engineering. Continuous measurement and

evaluation of the actual software development provides the means for managers to accurately assess software development progress. Actual development parameters are compared against those that are used during the initial software estimation, schedule, cost, and risk evaluation, thereby validating the basic premises that were used to establish the program. The continuous software development program statusing capability provides early warning indicators. It is well known in the engineering community, that the earlier a problem is detected and corrected, the less costly. The automatic evaluation capability will identify the underlying reasons of the software development issues so that proper corrective actions can be taken to avoid or minimize impact on program schedules and cost.

Keywords: Software sizing, software schedule, software costing, risk assessment, software productivity, risk management, software development metrics, program evaluation

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