Chapter 1
Employing Intelligent Decision Systems to Aid in Information Technology Project Status Decisions

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ABSTRACT

When a firm initiates and invests into an information technology (IT) project, it is usually with the intention of realizing benefits in the informational, strategic, transactional, and infrastructure objective areas of its IT portfolio (Weill & Broadbent, 1998). From the project management perspective, it is critical to know how the project is performing from the viewpoint of scope, schedule, cost, and other constraints. Lewis (2008) reports that 70% of IT-related projects do not meet their objective. This chapter examines the use of a case-based reasoning decision support architecture that provides a collaborative intelligent agent system to aid in recommending the status of a project using color indicators (Red, Yellow, Green) derived from the progress and condition of the project-related constraints.

INTRODUCTION

When a firm makes the decision to invest into an information technology project, the purpose may be to gain a competitive advantage, improve its position in the industry, or evolve its business strategy. Before the project is initiated, it is important for the firm to discuss risks, qualitative benefits, implementation costs, completion dates, and the staff required to successfully complete the project. It is advantageous of the firm to employ tools and techniques to help ensure the successful completion of the project. (Applegate, Austin & McFarlan, 2003)

Project management is the discipline that provides skills, tools, and techniques to guide the execution of a project (PMI, 2004). The definitive advantage that a firm gains through implementing project management techniques is a higher probability to have a customer (or the firm itself if it is
Employing Intelligent Decision Systems to Aid in Information Technology Project Status Decisions

performing an internal project) who is satisfied with the project’s result (Gido & Clements, 2006). A project is defined as a temporary endeavor with the objective to produce a unique product, service, or result (Gido & Clements, 2006; PMI, 2004). The project objective is defined through its constraints of scope – the amount of work that will be completed to satisfy the customer; schedule – the amount of time needed to complete the scope through planned start and finish dates for project activities; and cost – the amount of money that the customer has budgeted for the completion and acceptance of project deliverables. (Gido & Clements, 2006; PMI, 2004)

A Project Manager assumes the lead role in planning, organizing, and controlling the tasks and resources that embody the project. Performing these duties includes defining the project objective; developing a plan to accomplish project objectives; securing proper resources to perform the project; assigning responsibility and delegating authority to project team members; and tracking actual and planned progress of the project. (Gido & Clements, 2006)

During the execution of a project, the status of completion of its tasks is pivotal in understanding if the project is progressing as planned. If a task is not completed on time, the impact could be a slippage in the project schedule, which can result in the need to obtain more resources to set the project back on the planned schedule. Acquiring more resources to complete a project may not only affect the schedule of the project (training time of newly acquired human resources), but also the scope (how much work can actually be completed before the delivery date) and cost (the amount of money needed to acquire more human resources and equipment). In all cases, the firm may inherit unplanned overhead that can have a negative impact on the strength of its information technology investment portfolio. (Weill, 1998)

Although there have been advancements in technology and modern processes, the ability to manage a large project has been problematic due to complexity. The intricacy associated with managing the complexity of information technology projects has led to reports that 70% of all IT-related projects do not meet their objectives (Lewis, 2008).

Therefore, it is important to correctly diagnose and maintain visibility of the status for large, complex projects (Burgess, 2003). Proper diagnosis of the project is a decision that requires input from other sources besides the project manager. In the natural project management environment, determining the status of a project also involves input from various lines of service and stakeholders -- the project team. Each of these lines of services and stakeholders serve as experts that possess knowledge and experiences that allow them to view the context of the project from a different point of view and give their own assessment of the project status. The input from these experts is invaluable due to their knowledge and experience in certain situational contexts. The decision of the project status is determined by a project manager that takes into account all of the available assessments. When a large number of decision variables are present, it becomes difficult for the human mind, in this case the project manager, to perform a successful decision analysis (Felsen, 1976).

To assist in the decision-making process, the project manager can employ decision support system (DSS) technology. In addition to DSS, the incorporation of intelligent agents can be a useful asset to aid in the goal of project status decision-making by providing the capability for knowledge to be applied to the problem without the imposition of human emotion. As a means to providing this capability, we will use an intelligent decision system called Recognition-primed Decision-making enabled Collaborative Agents for Simulating Teamwork (R-CAST) that was developed at the Pennsylvania State University (Fan 2005a).

In this work, we are concerned with using the R-CAST architecture to develop a collaborative agent system that will recommend the status of a
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