

# A Review on Improved Approach for Online Adaptive and Fast Project Management System

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**Abstract:** As the companies are handling numerous projects with enhanced frequencies. In order to meet ever increasing demand with timely and high quality outcome, an effective approach of project supervision, with adaptive project planning, scheduling and controlling, is essential. In this scenario a fast feedback, tracking and controlling mechanism becomes handy when uncertainty factors arise at any stage. More importantly, the last stage of project life cycle, the uncertainties and their effects are the high due to the cumulative effect of all other stages, leading to limitations in following mandatory procedures. To handle all above limitations and to strengthen the existing Quality Assurance Procedures and Mechanisms for our systems we proposed the Bayesian network methodology at every phase cycle of project to remove uncertainty.

**Keyword:** Planning, Scheduling, Tracking, Controlling, Bayesian Network, Uncertainty factor

## Introduction

Development of complex software is fraught with uncertainties. Here when we have more than two cycle or stages where involvement of data is there uncertainty Management has become an important part of Project Management. Although a variety of writers have proposed a range of processes and techniques, handling uncertainty in complex projects still remains a challenge. Traditionally project scheduling under uncertainty has attracted more research and attention in the project management community.

As working on any complex software is fraught with uncertainties. These uncertainties successively result in various software symptoms of the software crisis," and sometimes to harmful failures. Significant efforts in software engineering research are aimed at relieving and minimizing uncertainties, though removing them entirely is generally impossible.

Despite such research efforts, many software development activities, including requirements specification, Planning, task Scheduling and Controlling, are typically carried out in a Critical Path Method fashion, especially when restricted by development budgets, available resources, and time duration constraints.

The aspects of software uncertainty deemed most pertinent to this paper, namely categories of applying uncertainty Planning, requirements analysis uncertainty, and lack of delay uncertainty. The delay of data or information to appropriate user at a pre planned duration of time, will get the next delay at the next performing operation. Likewise the transmission of the data to all the resources will get delay and will be the cause of uncertainty in the project.

Although, Critical Path Method (CPM) is a best known technique to support project scheduling but it is purely deterministic. It makes no attempt to handle or quantify uncertainty of the project, which is the main focus of our proposal.

## Literature Review

As per "Hadar Ziv and Debra J. Richardson" [6] During straight and reverse of seeming endless programming, essential requirement are identified and displayed, formation and code space are made, every details are carefully planned, and code is endeavour usually. While existing vulnerabilities are mitigated or when new vulnerabilities are experienced. Variances in designers' consolidates May thus influence process activities or choices, for example deciding the effect of progress. So creator [6] present a methodology that takes into account designers' gathers or "beliefs" in regards to programming parts to be demonstrated and refreshed straightforwardly. This methodology is a piece of a general procedure that calls for unequivocal displaying of programming designing vulnerabilities utilizing a set up strategy for Uncertainty demonstrating called

Bayesian conviction systems and how they might be utilized to either affirm, assess or foresee programming vulnerabilities.

According to author 'Philip S. Barry and Kathryn Blackmond Laskey' [9] said that the association between system necessity through a domain are frequently shaped as a Bayesian Network. In particular, pieces of Bayesian Networks are created to show unmistakable parts of the area. For a specific requirements elicitation problem, an appropriate set of network fragments is combined to make a drag specific Bayesian network.

By observing the propagation of data through the network an assessment are often made on what system requirements are implied by a given user requirement. This approach has the potential of more completely modelling the systemic implication of users' needs resulting in better system specifications and more accurate designs. To style such a mechanism, we first consider the question of the way to represent the connection of system requirements to every other and to the user requirements that engender them. We define an intellectual composition of connected system necessity called a system requirement web (SRW). A SRW could also be a directed graph during which the nodes represent system requirements and thus the sides represent relationships between requirements that we call weak implication. We are saying that one node weakly implies another node if it's more likely that the need represented by the second node is required if the primary one, Good results were achieved after minimal tuning.

As per author 'Ronald Kibuuka ssempebwa' [1] Many significant wellsprings of Uncertainty that should be overseen in projects are related with the key nonexclusive administration forms that make up the undertaking life cycle. A reasonable number of sources are verifiably recognized in arrangements of task the board 'key achievement variables', for example, those offered by Gallagher. We don't intend to suggest that activities can be described as a basic straight procedure, or basically as far as the stages recorded, yet the extent of stages and level of detail is sufficient for present purposes. [Gallagher, 1995] All Uncertainty the executive's issues are best tended to from the get-go in an undertaking life and all through the project life cycle and ought to be educated by an expansive valuation for the hidden 'root' vulnerabilities. Chapman and Ward

offer a six Ws system for this reason dependent on the accompanying six inquiries regarding a task: Who are the gatherings eventually included? What would the gatherings like to accomplish?, What is it that each gathering is keen on?, Which way (how) is each gathering's work to be done?, What assets are required? What's more, when does it need to be finished? Utilization of the six Ws structure from the most punctual phases of the project life cycle can conveniently educate advancement regarding project plan and coordination's by explaining key wellsprings of Uncertainty.

According to author 'Ifechukwu C. Nduka<sup>1</sup>, J. René van Dorp' [7] A continuous BN approach towards building statistical dependence among activities is presented, which allows one to obtain updated project completion time distribution results while addressing computational complexity by relying on the BN model's inference procedure implemented in Agena Risk (a specialized software tool for risk modelling and decision analysis with Bayesian Networks). Statistical dependence in discrete BNs is customarily indicated using Conditional Probability Tables (CPTs) between likelihood hubs. The off-the-shelf software, Agena Risk, requires parametric inter-nodal relationships for the specification of statistical dependence in a continuous BN. While computationally convenient, this expediency of dependence specification through these parametric inter-nodal relationships has the disadvantage of a lesser transparency on how to specify the degree of dependence between hubs in the consistent BN than in a discrete BN utilizing CPTs.

"Vahid Khodakarami, Norman Fenton and Martin Neil" [12] Here the issue by which the Uncertainty us emerge are been depict. The clearest zone of Uncertainty here is in evaluating term for a specific action. Trouble in this estimation emerges from an absence of information on what is included as opposed to from the unsure outcomes of potential dangers or openings. The most popular strategy to help project booking is the Critical Path Method (CPM). The principle segments of CPM systems are exercises. Exercises are connected together to speak to conditions. So as to delineate CPM system to a BN we first need to outline single action. Every one of the action parameters distinguished are spoken to as a variable (nodes) in the BN.

BNs conceivably address a large number of the 'Uncertainty' issues. Specifically, fusing CPM-style booking into a BN structure makes it conceivable to

appropriately deal with Uncertainty in project planning. Another conceivable examination in this model is the Level of accessible and required asset, exchange off investigation among 'Length' and 'Assets' when there is a period limitation for action term and we are intrigued to think about the degree of required assets. This procedure, which is adjusted by the most broadly utilized project the board programming instruments, is simply deterministic. Bayesian Networks give choice help to a wide scope of issues including Uncertainty and probabilistic thinking.

As per "Fernando Acebes, Javier Pajares, Jose Manuel Galan and Adolfo Lopez Paredes" [4] Here we propose a strategy for project control under Uncertainty. Specifically, we incorporate Earned Value Methodology (EVM) with project risk examination. The technique causes project chiefs to know whether the undertaking deviations from arranged qualities are inside the "normal" deviations got from movement arranged fluctuation. In spite of the fact that the approach is new and inventive, we just return to the essentials of undertaking reproduction to produce the "universe" of potential projects, as indicated by the expected inconstancy of task exercises. At that point we sort out and accumulate the data so as to make the information reasonable with EVM.

As indicated by creator "Constanta Nicoleta, Ileana Ruxandra and Augustin Purnus" [21] Many occasions' ventures neglect to succeed, so there is a lot of interest for better undertaking arranging and booking draws near. Time constrained and resource constrained issues are distinctively differentiated using mathematical models to prove that each of them lies in different dimension. Similarly, complex project scheduling can be done by multi agent methods where agents refer to resource-leveler etc. having diversity characteristics like tagging-entity identification, internal model-adaptation and building blocks. Also focus is on project scheduling stochastic methods which play a pivotal role and management decision making.

As per "Nino, K., Mejia, G., and Amode, L." [14] This paper, be that as it may, separates even the lower level of sub-projects into nearby strings and commits its work on neighbourhood look strategy for the multi target asset compelled project planning issue by minimization of the expansion culmination time of the undertaking and the all-out weighted beginning occasions considered at first. Along these lines, we center around understanding different strategies talked about for decreasing absolute

finishing time beyond what many would consider possible in the task by causing an undertaking to experience two stages, in particular, the age of an underlying arrangement and afterward the age of non-commanded arrangements from the yield acquired in first stage. These strategies and approach discover part of consideration particularly in project the executive's issues emerging in Animation.

### Proposed Methodology

The most entrenched way to deal with taking care of uncertainty in these conditions is Bayesian methodology. Where complex causal relationship are included, the Bayesian methodology is reached out by utilizing of Bayesian Networks. The test is to join the CPM approach into Bayesian Networks.

CPM is a deterministic strategy that, by utilization of a networks of conditions among tasks and given deterministic qualities for task spans, ascertains the longest way in the network called the 'critical path'. The length of the 'critical path' is the earliest time for project fulfilment. The critical way can be recognized by deciding the accompanying parameters for every movement:

D - Duration

ES - earliest start time

EF - earliest finish time

LF - latest finish time

LS - latest start time

The earliest beginning and finish times of every movement are controlled by working forward through the network and deciding the earliest time at which an activity can begin and finish up its predecessor activities. For each activity j:

$$ES_j = \text{Max} [ES_i + D_i]; \text{ over predecessor activities } i]$$

$$EF_j = [ES_j + D_j]$$

The most recent beginning and finish times are the latest times that an activity can begin and finish without postponing the undertaking and are found by working in reverse through the network. For each activity i:

$$LF_i = \text{Min} [LF_j - D_j]; \text{ over successor activities } j]$$

$$LS_i = [LF_i - D_i]$$

The activity's 'Total Float' (TF) (for example the sum that the activity's duration can be expanded without

expanding the general undertaking consummation time) is the distinction in the latest and earlier finish of every activity. A critical movement is unified with no TF and ought to get exceptional consideration.

Again to remove this TF we proposed the Bayesian Network Solution. Bayesian Networks (BNs) are perceived as a develop formalism for taking care of causality and uncertainty. Bayesian Networks provide decision-support for a decent range of problems involving uncertainty and probabilistic reasoning.

**Bayesian Network for Activity Duration**

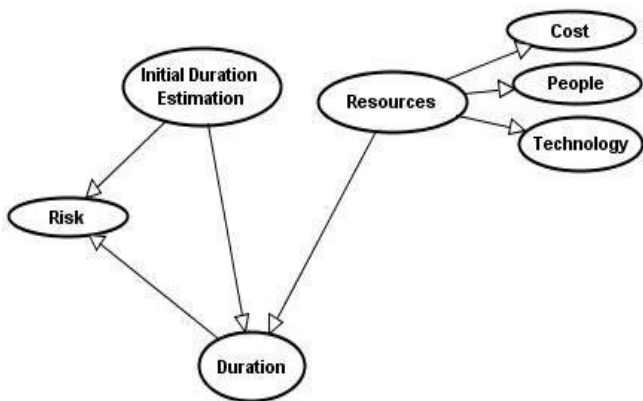


Figure 1: Bayesian Network for Activity Duration

A prototype BN that we have built to model uncertainty sources and their effects on duration of a particular activity. 'Initial Duration Estimation' is the main estimation of the activity's duration; it is assessed dependent on recorded information, past experience or basically master judgment. 'Resources' fuses any influencing factor that can increment or abatement the activity duration. The degree of resources can be derived from alleged "indicator" nodes. Hence, the causal link is from the 'resources' to directly observable indicator values like the 'cost', and the level of available 'technology'.

**Mapping of Critical Path Method to Bayesian Network**

The main components of CPM networks are activities. Activities are linked together to represent dependencies. So as to delineate CPM network to a BN we first need to outline single activity. Every one of the action parameters recognized are spoken to as a variable (hub) in the BN

Figure 2 shows a schematic model of the BN fragment associated with an activity. It unmistakably shows the relation between the activity parameters and furthermore the relation with predecessor and successor activities.

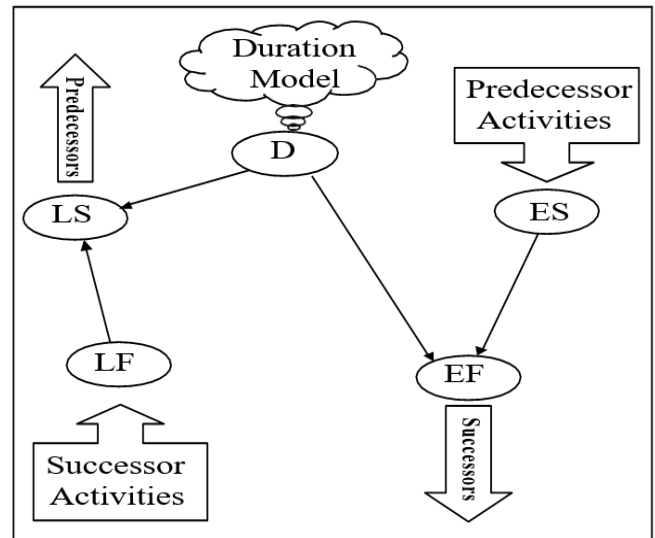


Figure 2: Schematic of Bayesian Network for an activity

The subsequent stage is to characterize the interfacing join between dependent activities. The passing strategy in CPM is mapped as a connection between EF of each movement to ES of the successor activities. The backward pass technique in CPM is mapped as a connection between LS of each activity to LF of the predecessor activities. Here every stage entry is taken into account as an individual activity as a node and time as an arc for this network.

**Conclusion**

Taking care of risk and Uncertainty is progressively observed as a vital part of project management and planning. One great issue is the way to consolidate uncertainty in project scheduling. Notwithstanding the accessibility of various methodologies and tools, the dilemma is still challenging. Most present procedures for taking care of risk and uncertainty in project scheduling are frequently occasion situated and attempt to show the effect of potential 'dangers' on project execution. Further developed strategies are required to catch various parts of uncertainty in projects development.

This paper has proposed a methodology that makes it conceivable to consolidate risk, uncertainty and causality in project planning and scheduling to remove

uncertainty. In particular, we have indicated how a Bayesian Network model can be produced from a project's CPM organize.

The methodology brings the full weight and intensity of BN examination to hold up under on the issue of task management. This makes it conceivable because of Model the 'exchange off' among 'time' and 'resource' in project exercises and Use of 'imagine a scenario where?' Analysis for finding the degree of required resources given limitations like finishing time.

Since to expel the uncertainty totally from any product is a difficult errand for everybody except by this procedure we will get a decent outcome.

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