Project Cost, Benefit and Risk Analysis using Bayesian Networks

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Abstract

Uncertainty and risks are common elements of all major projects. Yet such uncertainty is rarely effectively calculated when analysing project costs and benefits. This paper presents a Bayesian network (BN) modelling framework to calculate the costs, benefits, and return on investment of a project over a specified time period, allowing for changing circumstances and trade-offs. The framework uses hybrid and dynamic BNs containing both discrete and continuous variables over multiple time stages. The BN calculates costs and benefits based on multiple causal factors including the effects of individual risk factors, budget deficits, and time value discounting. The method is illustrated using a case study of an agricultural development project.

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