Abstract. This paper proposes a novel approach to decision analysis with uncertainty based on integrated case-based inference and approximate reasoning. The strength of case-based inference is utilized for building a situation dependent decision model without complete domain knowledge. This is achieved by deriving states probabilities and general utility estimates from the subset of retrieved cases and the case library given a situation in query. In particular, the derivation of state probabilities is realized through an approximate reasoning process which comprises evidence (case) combination using the Dempster-Shafer theory and Bayesian probabilistic computation. The decision model learnt from previous cases is further exploited using decision theory to identify the most promising, secured, and rational choices. We have also studied the issue of imprecise representations of utility in individual cases and explained how fuzzy decision analysis can be conducted when case specific utilities are assigned with fuzzy data.

Keywords: decision analysis with uncertainty, case-based inference, decision model, basic probability assignment, approximate reasoning.