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**DECISION MAKING UNDER PARTIAL PROBABILITY INFORMATION USING
AHP'S JUDGMENT MATRIX**

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Abstract In certain realistic decision making situations, decision makers (DMs) have difficulty in specifying their perceived state probability values or even probability value ranges, but are able to tell how much more likely is the occurrence of a given state compared to others.

An approach is proposed to identify the efficient strategies in a decision making situation where the DMs involved declare their perceived relative likelihood of the occurrence of the states by pairwise comparisons. The pairwise comparisons of all the states are used to construct a judgment matrix similar to the one used in analytic hierarchy process (AHP). The judgment matrix is transformed into a probability matrix. The columns of the transformed matrix delineate a convex cone of the state probabilities.

Then, an efficiency linear program is formulated for each available strategy, whose optimum solution determines whether or not that strategy is efficient within the probability region defined by the cone. Only an efficient strategy can be optimum for a given set of state probability values. Inefficient strategies are never used irrespective of state probability values.

The application of the approach is demonstrated using examples where DMs offer differing views on the occurrences of the states.