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Optimal partitioning of groups in selecting the best choice

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Abstract

This article deals with the group interview problem, in which each group contains several alternatives and each group of alternatives is presented and evaluated sequentially over time. We derive the optimal selection strategy for the group interview problem with a general utility function. Among the various types of utility function, we focus on the best choice problem, in which our utility is one if we successfully select the best choice and zero otherwise. We derive a simple selection rule called the optimal partitioning strategy in which the decision-maker divides the entire groups into two disjoint sets and, after evaluating the choices in the first set, chooses the relatively best choice available for the first time in the second set. Because the selected choice is not necessarily the absolutely best choice, we also consider the probability distribution of the actual rank of the choice selected under the partitioning strategy.

Scope and purpose

In many managerial decision situations such as buying a car, selling a house, or searching for a job, several alternatives are presented sequentially and an accept-or-reject decision is made immediately after evaluating each alternative. The classical secretary problem and its extensions have been successfully applied to such a sequential search and selection problem. This article deals with a more generalized version of the secretary problem, called *the group interview problem*, in which several groups of alternatives are presented and evaluated sequentially over time. Based on a stochastic dynamic programming approach, we propose the optimal selection strategy for the group interview problem with various types of the decision-maker's utility function. There are many potential applications of the group interview problem, including consumer search and purchase process, job search problem, sequential assignment of batch jobs, and so on.

Keywords: Decision analysis; Sequential decision-making; Applied probability; Optimal stopping rule; Dynamic programming; Stochastic model applications

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