Grooming individual talent to improve team problem-solving

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Abstract

This paper considers teams of agents with different problem-solving abilities. We can devote resource to groom only one of the agents and we are interested in which one should be chosen in order to maximize team performance.

The team is engaged in a knowledge-intensive task, such as searching the solution to a problem over a large space. Agents are ranked according to their cognitive capacity, that roughly measures the average number of solutions they can envisage. Agents can view and compare different solutions, so even agents with low cognitive capacity may generate the correct solution. This setup is similar to LiCalzi and Surucu (2011, forthcoming on Management Science).

We consider teams of three agents that are formed by assembling agents with randomly generated cognitive capacities. We make three different assumptions about the degree of interaction that leads to the discovery of a solution. The first case is when the solution is demonstrable: if one agent finds it, he can show it to the team who will accept it. This feature, known as “truth-wins” in social psychology, is usually associated with purely intellective tasks in frictionless environments. The second case assumes that a tentative solution is accepted only if it is recognized and accepted by two agents. This “truth-supported” feature applies in situations where the solutions are only partially demonstrable and acceptance require some degree of vouching. The third case requires unanimity to accept a solution.

We use both a simple analytical model and extensive simulations to demonstrate a simple heuristics for grooming individual talent. Under “truth-wins”, it is preferable to groom the most talented agent. By analogy with the Matthew Principle in sociology, we dub this the Matthew Principle: “give more talent to the most talented”. This heuristics extends naturally to the other two cases: under “truth-supported”, we should favor the second most talented agent and, under unanimity, the least talented agent.

Keywords: group problem solving, Matthew principle, superstars.

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