Information Aggregation and Classification Under Anchoring Bias: An Application to Judgments Based on Breast Imaging

Mehmet E. Ahsen\textsuperscript{1}, Mehmet U.S. Ayvaci\textsuperscript{2}, and Srinivasan Raghunathan\textsuperscript{2}

\textsuperscript{1}IBM Thomas J. Watson Research Center,\\ \textsuperscript{2}Informations Systems and Operations Management, Jindal School of Management, University of Texas at Dallas

In classification decisions involving multiple sources of information, decision makers often suffer from anchoring bias in which the initial information influences the interpretation of information obtained subsequently. We study the problem of how to aggregate information and classify instances in the presence of anchoring bias. We consider the aggregation of two information sources using a linear convex function where the interpretation of one source of information is biased by the other. We examine the relationship between bias, weight assigned to each information source, and the decision threshold when either the expected utility or the discriminative ability is used as the performance measure. We quantify the benefits that can be gained by using our aggregation and classification model in a breast cancer diagnostic decision context where the radiologist’s interpretation of a mammogram is biased by the patient’s profile information. Furthermore, we derive insights regarding when it is sub-optimal to provide radiologists with patient profile information and the how the impact of bias is affected by the relative discriminative ability of mammography and profile information.