## Classification in the Presence of Anchoring Bias: A Model and an Application to Breast Cancer Diagnosis

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The anchoring bias has been observed in many classification contexts in business, medicine, and in everyday routine life. For instance, a financial adviser's estimate of the future performance of a stock is often influenced by the historical data, which is shown to resemble anchoring. In a supply chain, an inspection agent's assessment of quality is affected by the supplier's history and reputation. When hiring a job candidate, the interview assessment -- a significant input to the decision maker in addition to the candidate's resume -- is influenced by the candidate's academic pedigree such as the schools he attended. Radiologists' interpretation of images (e.g., CT scan and X-ray) is often biased by the clinical history of patients. The authors developed a new approach to optimal classification where the system suffers from input noise resulting from anchoring bias. In classification systems that exhibit such bias, the value of one input attribute -the anchor -- influences the value of another input attribute which is also used for classification. The authors derive the optimal aggregation of attributes and classification under anchoring bias for a linear classifier. They also analyze the impact of bias on the classifier design, its performance, and derive the conditions under which using the anchor attribute for classification is not beneficial. The authors apply their findings to breast cancer diagnostic decisions context where the radiologist's interpretation of a mammogram is biased by the patient's clinical profile information.