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Designing probabilistic predictors for multiple decision makers

We consider the problem of constructing probabilistic predictions that lead to accurate decisions when employed by downstream users to inform actions. For a single decision maker, designing an optimal predictor is equivalent to minimizing a proper loss function corresponding to the negative utility of that individual. For multiple decision makers, our problem can be viewed as a variant of omniprediction in which the goal is to design a single predictor that simultaneously minimizes multiple losses. We will discuss two strategies for designing sample-efficient algorithms for this problem. The first is a two-player game based approach in which the two players alternate between estimating and responding to the worst-case loss. The second is a more direct procedure that exploits structural properties of the set of proper losses. Empirical evaluations show that both of these methods perform well in practice.