

Combining Human Expertise with Artificial Intelligence:

Experimental Evidence from Radiology*

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Abstract

Artificial intelligence (AI) algorithms have matched or surpassed the performance of human experts in a number of predictive tasks, although human experts have access to contextual information that may not be available for machine predictions. We investigate how best to combine machine predictions with human input in the presence of such contextual information and potential biases in how humans use machine predictions in forming their assessments. Our experiment varies the availability of AI support and contextual information. We find that that contextual information improves diagnostic accuracy on average, but providing AI predictions does not always increase accuracy although there are large potential gains from having radiologists make decisions using AI support. These gains are not realized because radiologists partially neglect the AI's information and do not account for the redundancy between their own information and the AI's information. An implication of our results is that, unless these mistakes can be corrected, the design of an optimal collaborative system has radiologists work alongside as opposed to with AI.