Recent advances in harnessing and exploiting human perceptual abilities as part of an algorithmic process have yielded many exciting new strategies for approaching traditionally challenging computational problems such as image labeling and protein folding. As a direct result of these early successes, there has been an explosion of interest in leveraging human computational approaches in other domains as well. While these techniques have been applied with considerable success to previously intractable problems, the development of real-world implementations has far outpaced the development of theoretical measures.

In the absence of a rigorous theory in which to ground new algorithms, researchers must rely on intuition and deeply-rooted assumptions about the differences between human and machine computation. Existing complexity models classify computational problems by evaluating the time and space required to solve the problem using a computer.

In this work, we explore the extension of traditional complexity models to encompass both human and machine computation. We posit that this critical extension can enable us to better understand the structure of existing problems and illuminate the computational space they inhabit.

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