Combining computational and social effort for collaborative problem solving

Rather than replacing human labor, there is growing evidence that networked computers create opportunities for teams of people and algorithms to solve problems beyond either of them. Studies have demonstrated that through interaction with software deployed on the Web, human workers can cooperate to solve complex problems without regard to their physical location or technical expertise. These studies make clear that humans can play an important part in human-computer problem solving, but an understanding of why and in what ways this collaboration can be successful is still under-explored. In this study we demonstrate the conditions under which such synergy can arise. We show that, for a design task, three elements are necessary: humans must be able to apply intuitions to the problem, algorithms must be able to automatically determine the quality of designs, and humans must be able to observe and innovate on others’ designs in order to focus creative and computational effort on good designs. This study suggests how such teams should be composed for other domains, as well as how social and computational dynamics mutually influence one another during collaborative problem solving.