

Mathematical practice, crowdsourcing, and social machines

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Mathematical practice is an emerging interdisciplinary field which draws on philosophy, social science and ethnography, and the input of mathematicians themselves, to understand how mathematics is produced. Online mathematical activity provides a rich source of data for empirical investigation of mathematical practice - for example the community question answering system mathoverflow contains around 40,000 mathematical conversations, and polymath collaborations provide transcripts of the process of discovering proofs. Such investigations show the importance of "soft" aspects such as analogy and creativity, alongside formal deduction, in the production of mathematics, and give us new ways to think about the possible complementary roles of people and machines in creating new mathematical knowledge.

Social machines are new paradigm, identified by Berners-Lee, for viewing a combination of people and computers as a single problem-solving entity, and the subject of major international research endeavours. I present progress on a research agenda for mathematics social machines, a combination of people, computers, and mathematical archives to create and apply mathematics, which is being pursued at Oxford under an EPSRC Fellowship.