DEEP LEARNING FOR MICROSCOPY, OPTICAL TWEEZERS, AND ACTIVE MATTER

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After a brief overview of artificial intelligence, machine learning and deep learning, I will present a series of recent works in which we have employed deep learning for applications in microscopy, optical tweezers, and active matter. In particular, I will explain how we employed deep learning to enhance digital video microscopy [1,2], to perform virtual staining of [3], to estimate the properties of anomalous diffusion [4,5,6], to characterize microscopic force fields [7], to improve the calculation of optical forces [8], and to characterize nanoparticles [9]. Finally, I will provide an outlook on the future for the application of deep learning in these fields.

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