An approach to combine compressed sensing and neuronal networks in single-molecule localization microscopy.

The resolution of classical fluorescent microscopy is limited by the Abbe criterion. In the past decades several techniques surpassing this limit arose. One of them is the single molecule localization microscopy. This method requires to precisely localize the position of a fluorescent dye by its photon distribution. While this problem was quickly solved for perfect samples reality is often more difficult. Overlapping or varying photon distributions as well as high signal to noise ratios still pose a challenge. Algorithms, using compressed sensing or neuronal networks have proven to deliver outstanding results for these problems. Our aim is to combine the advantages of both algorithm classes and create a fast, user friendly and precise reconstruction algorithm.