Deep Learning-enabled Computational Imaging and Sensing

Aydogan Ozcan
UCLA, Los Angeles, CA, USA
ozcan@ucla.edu

Deep learning is a class of machine learning techniques that uses multi-layered artificial neural networks for automated analysis of signals or data. The name comes from the general structure of deep neural networks, which consist of several layers of artificial neurons, each performing a nonlinear operation, stacked over each other. Beyond its main stream applications such as the recognition and labelling of specific features in images, deep learning holds numerous opportunities for revolutionizing image formation, reconstruction and sensing fields. In this presentation, I will provide an overview of some of our recent work [1-5] on the use of deep neural networks in advancing computational microscopy and biomedical sensing systems.
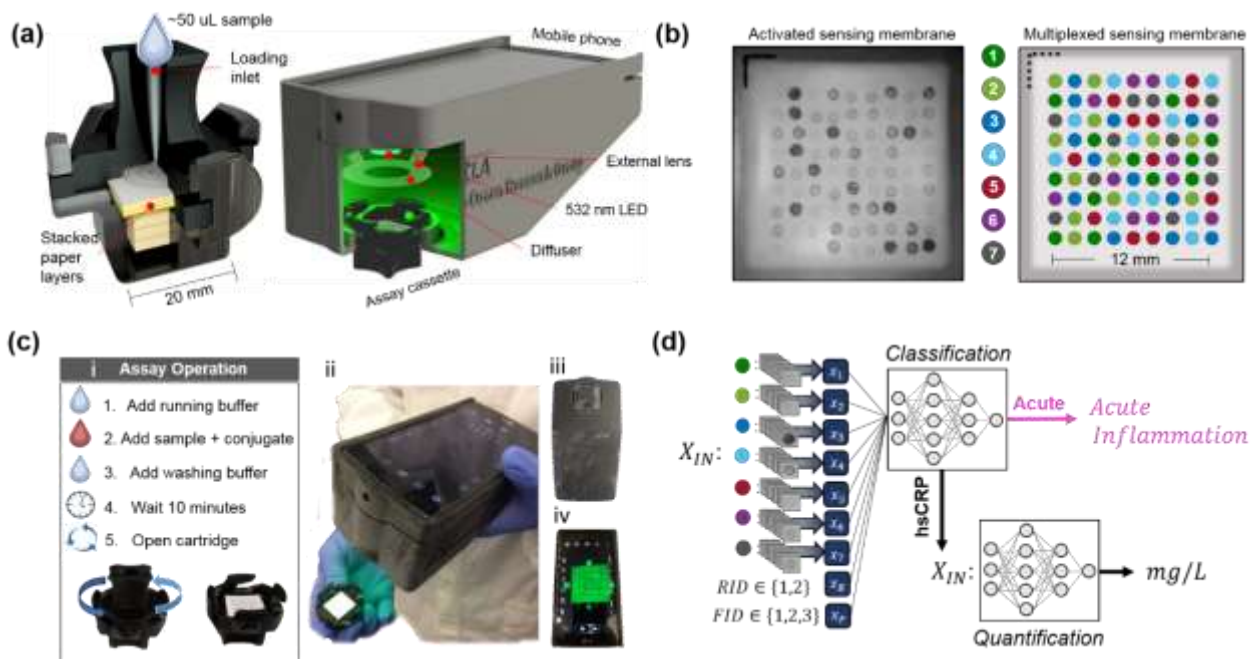

Figure 1: Deep learning-enabled point-of-care sensing using multiplexed paper-based sensors, *npj Digital Medicine* DOI: 10.1038/s41746-020-0274-y (2020)

References:
1. *npj Digital Medicine* DOI: 10.1038/s41746-020-0274-y (2020)
2. *Nature Methods* DOI: 10.1038/s41592-019-0622-5 (2019)
3. *Nature Biomedical Engineering* DOI: 10.1038/s41551-019-0362-y (2019)
4. *ACS Nano* DOI: 10.1021/acsnano.9b08151 (2019)
5. *Nature Methods* DOI: 10.1038/s41592-018-0239-0 (2018)