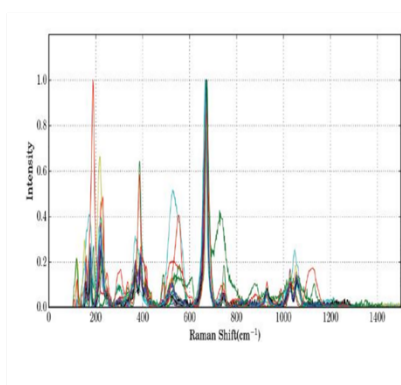


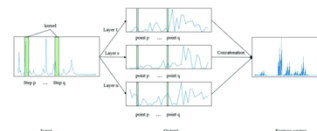
AI Skunks Computational Biology – Deep Learning based Analysis of Raman Signatures

As part of our computational biology group AI Skunkworks is looking for student volunteers to develop and publish deep learning-based approaches to analyze complex Raman spectroscopy signatures. This project will extend work done by Skunks Matin Ardakani and Naveen Jami who have implemented a couple of deep learning-based approaches to analyze complex Raman spectra.

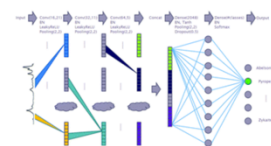


Component Identification – Using ML

- Determining chemical composition of components in multi-component mixtures requires intensive computational analysis.
- Recent studies show that Deep Neural Networks (especially CNNs) can perform these tasks with high accuracies.



https://pubs.rsc.org/image/article/2019/AN/c8an02212g/c8an02212g_F2.tif-res.gif (3)



https://pubs.rsc.org/image/article/2019/AN/c8an02212g/c8an02212g_F2.tif-res.gif (3)

If you want to join the project we asked that you look at and implement on your own one of the two Github repositories below and implement a notebook that explains what the code is doing.

1) Detecting Raman Components using Siamese CNN

<https://github.com/matinraayai/raman-siamese>

and <https://arxiv.org/abs/1806.09981>

2) Detecting Raman Components using Deep CID

<https://github.com/matinraayai/DeepCID>

<https://pubs.rsc.org/en/content/articlehtml/2019/an/c8an02212g>



This project is a collaboration with Arrow Dx. Arrow Dx, a Boston based start-up, has developed inexpensive, sensitive proprietary surface-enhanced Raman scattering (SERS) substrates that significantly and reproducibly enhance the Raman signals of chemicals, biomarkers, etc. Initial proof of concept has been done with compounds such as arsenic, benzenethiol, lysozyme, etc. The company working with medical and academic collaborators is currently focusing its efforts in creating an inexpensive, sensitive, user friendly diagnostic for the early detection of non-alcoholic fatty liver disease (NAFLD) as well as other applications.

Questions please e-mail ni.brown@neu.edu or ask on the #raman channel of the AI Skunkworks slack.

If this you're interested in joining the Skunks, check out our Projects: <https://github.com/neuaiskunkworks>