**Chapter 5: Dimension Reduction**

Theoretical part:

1. PCA

Read pages 559-570 in Bishop book – first part on PCA, and more in the internet ofcourse :)

1. Kernels:

Read about kernels in Bishop Chapter 6 up to 6.1 including

Solve exercise 6.3 in the end of the chapter

Now:

Read about KPCA in Bishop 586-590

Some intuition about kernels:

<https://sebastianraschka.com/Articles/2014_kernel_pca.html>

<https://arxiv.org/pdf/1207.3538.pdf>

1. Random Projection:

Read the following postblog :

<https://machinelearningmedium.com/2017/07/28/random-projection-in-dimensionality-reduction/>

Who reviews an article about reducing dimensions and comparing the performance of RP, PCA, and some additional methods that are named in the following section.

Further expand your knowledge by reading on the differences in computations contrary to RP1 (attached).

Further expand your knowledge with article RP2 (also attached).

1. More Non Linear Methods:

* Read about the next non linear methods from the following references:
* Introduction to dimension reduction: LLE and ISO-MAP <https://people.eecs.berkeley.edu/~efros/courses/AP06/presentations/ThompsonDimensionalityReduction.pdf>
* Fast passage over the main algorithms

<https://www.math.uwaterloo.ca/~aghodsib/courses/f06stat890/readings/tutorial_stat890.pdf>

* Focus on ISOMAP with specific details

<http://www.robots.ox.ac.uk/~az/lectures/ml/tenenbaum-isomap-Science2000.pdf>

* Focus on Laplacian Eigenmaps

<http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.9.5888&rep=rep1&type=pdf>

Practical part:

In this exercise we'll dive into a kaggle challenge with lots of features.

The next kaggle:<https://www.kaggle.com/c/MerckActivity/overview>

Describes the level of chemical activity of various molecules given approximately 10000 different picinists that describe them.

You must build a maximum accuracy of the DNA prediction.

In your businessyou must include the following steps:

* Aksploratia of the information.
* Production of new features that can help with the model's work.
* Models Testing
* Compare the models that were examined.
* Conclusions.