**Johnny Nguyen**

**Student ID: 801119047**

**Homework #4**

**GitHub:** https://github.com/Norumai01/Intro\_Machine\_Learning/tree/main/HW\_4

**Problem #1:**

* Importing the breast cancer dataset from sklearns’ library, PCA feature extraction and standardization scaling was used for the following training model. The graph is plotted with the measurement of the precision, recall and accuracy over the different numbers of components using PCA extraction. There are three graphs that uses three different kernels (Linear, Polynomial and Radial Basis Function) in the hyperparameters.
* For the highest classification accuracy of the three different kernels, the linear model highest accuracy was 0.93 when reduced to 22 principal components. For the polynomial model, the highest accuracy was 0.78 when reduced to 1 component. Lastly, the radial basis function model highest accuracy was 0.97 when reduced to 21 components.
* When looking at the different kernels that was used, the linear and radial basis function model gave the more optimal precision, recall and accuracy over the different number of components. Overall, the linear model seems more stabilize than other kernels.