

Assignment 2 – NN and SVM

Objective

Build classification model using different ML algorithms

1. Neural Network
2. Support Vector Machine

Instructions

1. The **maximum** number of students in a team is **4** and the minimum is 3
2. **No late submission** is allowed
3. **Cheating students will take ZERO** and no excuses will be accepted
4. **You can use python ML libraries e.g sklearn, keras, etc..**

Dataset

The dataset you will use is a Coronavirus chest x-ray images collected from different Kaggle datasets. You can find 20 images for positive COVID cases and 20 for Normal -negative- cases. The objective of this dataset is to predict whether a patient's x-ray is suspected to COVID19 or not. Data is subset from the following resources. The given images are 100x100 grey scaled images.

<https://www.kaggle.com/bachrr/covid-chest-xray>

<https://www.kaggle.com/paultimothymooney/chest-xray-pneumonia>

Requirements

1. Binarize the input dataset with a suitable threshold value (Try different threshold values and test accuracies)

```
import numpy as np
from PIL import Image

im_gray = np.array(Image.open('2.jpg').convert('L'))
thresh = 120
maxval = 255
im_bin = (im_gray > thresh) * maxval
Image.fromarray(np.uint8(im_bin)).save('bin.jpg')
```

2. Resize images into suitable size (optional)
3. Separate data into training and testing datasets
4. Implement 2 different classification models
 - 4.1. Neural Network
 - 4.2. Support Vector Machine

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5. You can use sklearn and keras for building models and measuring accuracy
 - 5.1. Keras is not included in the anaconda distribution so you will need to install the library using the command **conda install keras**
 - 5.2. Try different **neural network** architectures (different in terms of layers/number of hidden neurons) and compare the results
 - 5.3. Try different **SVM** kernel functions
6. You will need to test different hyper-parameters by yourself to try to get good results