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 weather 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