

ECGR 4105 Homework 5

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GitHub Link

<https://github.com/oopCole/IntroToMachineLearning/tree/main/HW6>

Problem 1.

Imported libraries:

```
import time
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.metrics import accuracy_score, precision_score, recall_score, f1_score, confusion_matrix
from sklearn.linear_model import LogisticRegression
from sklearn.svm import SVC
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras import layers, models
from tensorflow.keras.callbacks import EarlyStopping
from sklearn.datasets import load_diabetes, load_breast_cancer
```

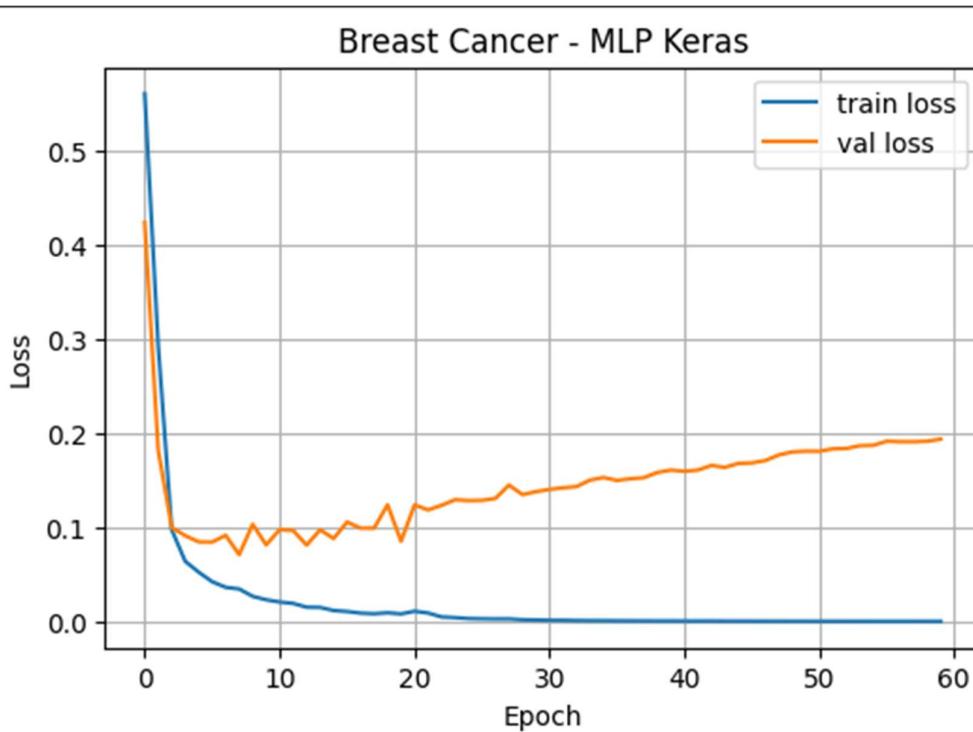
This has hidden Layers of 64, 32, 16, 8 neurons. The train split is 80/20. Uses the diabetes dataset.

Layer (type)	Output Shape	Param #
dense_14 (Dense)	(None, 64)	576
dropout_6 (Dropout)	(None, 64)	0
dense_15 (Dense)	(None, 32)	2,080
dropout_7 (Dropout)	(None, 32)	0
dense_16 (Dense)	(None, 16)	528
dropout_8 (Dropout)	(None, 16)	0
dense_17 (Dense)	(None, 8)	136
dense_18 (Dense)	(None, 1)	9



Problem 2.

The learning rate is at 0.1. The hidden Layers are 128, 64, 32, 16, 8 neurons. Has a train split of 80/20. Uses the cancer dataset.



Problem 3.

CIFAR-10 classification with 10 classes. Uses the diabetes and cancer datasets.

Not much over-fitting with 10 epochs from part a with one hidden layer.

A lot of over-fitting with 300 epochs from part b with three hidden layers.

Layer (type)	Output Shape	Param #
dense (Dense)	(None, 512)	1,573,376
dense_1 (Dense)	(None, 256)	131,328
dense_2 (Dense)	(None, 128)	32,896
dense_3 (Dense)	(None, 10)	1,290

