

# Assignment 4: Deep learning and unsupervised learning

(passing 65%)

For this assignment you are allowed to use data augmentation

## Task 1

Pick any image based dataset from the list, implement the preprocessing and justify the preprocessing steps, extract features and justify the methods used, select features and justify the methods used. Some of this is done already in one of the previous assignments. You can reuse things.

Implement (using the selected features) one basic machine learning algorithm for classification and justify your choice 20 (without justification 10).

Implement (using the selected features) one advanced machine learning algorithm for classification and justify your choice 20 (without justification 10).

Implement a CNN with hyperparameter tuning (for this you can directly use the data after the preprocessing) (30)

Compare and Explain the results in terms of both the computation time and the performance of the classification algorithms. (30)

## Task 2

Pick any dataset from the list, implement the preprocessing and justify the preprocessing steps, extract features and justify the methods used, select features and justify the methods used. Some of this is done already in one of the previous assignments. You can reuse things.

Implement three clustering methods out of the following and justify your choices (30)

K-means

Hierarchical Clustering

Fuzzy-C-means

DBSCAN

Gaussian mixture models

Self-organizing maps

Compare and Explain the results (30).