Machine Learning and Pattern Recognition Report

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Lab 01

The project task consists of a binary classification problem. The goal is to perform fingerprint spoofing detection, i.e. to identify genuine vs counterfeit fingerprint images. The dataset consists of labeled samples corresponding to the genuine (True, label 1) class and the fake (False, label 0) class. The samples are computed by a feature extractor that summarizes high-level characteristics of a fingerprint image. The data is 6-dimensional.

1. Yes the class overlap, Features 1: for x axis in [-2.665, 2.237], for y axes in [0, 0.315] Features 2: for x axis in [-2.670, 3.000],for y axes in [0, 0.325]. The features has a similar mean infact, for the first features the mean is 0.00170711, instead for features 2 is 0.00503903. The variance has a similar value, for feature 1 = 1.00134304, for feature 2 = 0.9983527 The main peaks in features 1 is 0.541 for false data with x in [-0.213, 0.276]. For features 2 is 0.516 for true data wtih x in [-0.402, 0.165]

2. Yes the class overlap, Features 3: for x axis in [-2.009, 1.910], that corresponds to y axis in [0, 0.309] Features 4: for x axis in [-1.684, 1.816], that corresonds to y axis in [0, 0.371] The features have a similar mean, for the features 3 is -0.00560753 instead feature 4 is 0.00109537 Variance has a similar value, for feature 3 = 1.0024818 and for feature 4 = 0.99029389 The main peaks for feature 3 is 0.517 for false data with x in [-1.063, -0.568] For features 4 is 0.525 for false data with x in [0.290, 0.783]

3. Yes the class overlap, Feature 5: for x axis in [-2.066, 2.004], that corresponds to y axis in[0, 0.282] Feature 6: for x axis in [-2.000, 2.180], that corresponds to y axis in [0, 0.301] The features have a similar mean, for the features 5 is -0.00700025 instead feature 6 is 0.00910515 The main peaks for feature 5 is 0.572 for true data with x in [-1.211, -0.783] for features 6 is 0.553 for true data with x in [-1.273, -0.817]