CS 479 – Pattern Recognition

Programming Assignment 1

Neal Ramaswamy

3/11/2024

Statement:

“I declare that all material in this assignment is my own work except where there is clear acknowledgment or reference to the work of others. I understand that both my report and code may be subjected to plagiarism detection software, and fully accept all consequences if found responsible for plagiarism, as explained in the syllabus, and described in UNR’s Academic Standards Policy: UAM 6,502.”

Theory:

Datasets used in this project:

Dataset A:

A group of mathematical equations

Description automatically generated

1. Problem 1 uses dataset A only, and seeks to test the understanding of a Case I discriminant function.

Case I is founded on a few assumptions:

* Independence of the features
* Equal variance of the features
* Diagonal Covariance matrix such that Σi = σ2I

This permits us to simplify the discriminant function to

gi(x) = witx + wi0

Such that wi = (1 / σ2) µi and wi0 = (−1 / 2σ2) µit µi + ln P(ωi).

What this is saying is that our line’s slope (wi) is only affected by the relationship between the mean and standard deviation in a given feature, and the bias / y-intercept / threshold (wi0) is determined largely by the mean and standard deviation again, but can also be altered by information around the Prior Probability of occurrence of a given feature (P(wi)).

For our purposes, we are trying to classify between two groups of data

**REMEMBER TO PUT THE FULL DATASET OF POINTS BEFORE SUBMISSION**