Machine Learning

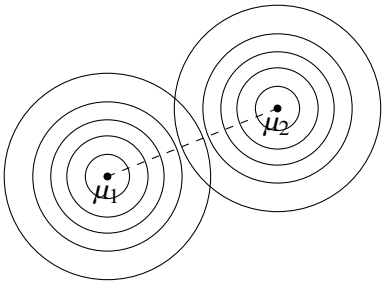
Quiz 5

Student Name: _____

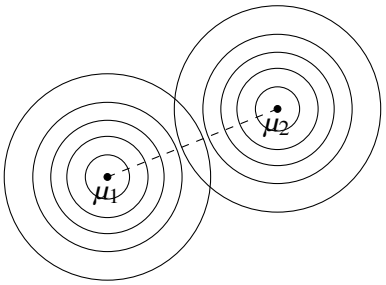
Consider a binary classification problem where the class-conditional distributions $p(x \mid C_k)$ are Gaussian with mean μ_1, μ_2, and shared covariance matrix Σ, and where the class priors are $p(C_1) = \pi$ and $p(C_2) = 1 - \pi$. Draw the decision boundary (reasonably accurate sketch) in the charts below.

Circles/ellipses show a level-set of the class-conditional distribution = iso-probability line.

1. (2 points) $\Sigma = \sigma^2 I_2$, $\pi = 0.5$:



2. (1 point) $\Sigma = \sigma^2 I_2$, $\pi \gg 0.5$:



3. (1 point) Σ non-isotropic, $\pi = 0.5$: