

Tanya + Mamas

(Juss
late)

① 6/16/21

How pick a threshold for
→ propose test
main: histogram of distances.

Bayes: if likelihood
uninformative
then return the prior.
(posterior)

\bar{x} signal

$\bar{x} - \bar{a} \sim N(0, 1)$ if no signal

Fry te Rickgauer: picking threshold.

& diff
methods: $\|\bar{x} - \bar{a}\|$
 $\bar{a}^T \bar{x}$
etc.

"distances" or auto
detection



LDA recap:

$p_a = 1/2$ (equal prior)

$\bar{x} \in \mathbb{R}^n$

Bayesian: joint pdf =

$p_l(\bar{x}) = \pi_l N(\bar{x} | \mu_l, \Sigma_l)$

J cost: class 2

True $\begin{matrix} 0 & 1 \\ 1 & 0 \end{matrix}$

FP FN

min

min

R decision rules

$E[J]$

LDA recap
 $\bar{x} \in \mathbb{R}^n$
 \bar{a} or \bar{a}'
 π_1 $\pi_2 = 1 - \pi_1$
rate of occurrence

FPR = α : true = 1: output $l=2$ w/ prob. α

FNR = β : true = 2: w/ prob. $1 - \beta$

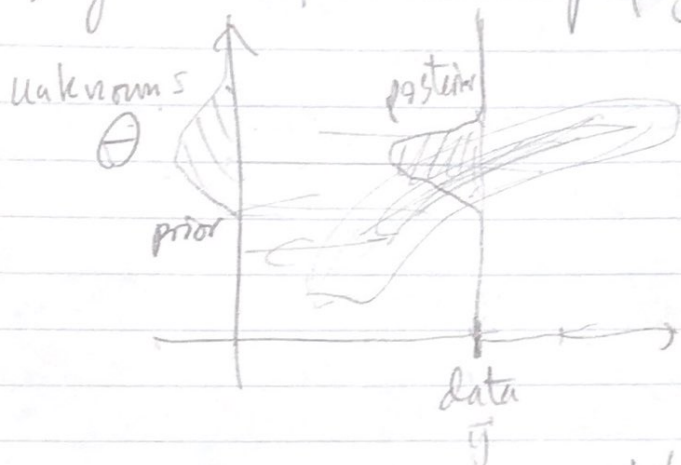
$$E(J) = 0 + \pi_1 \alpha F + (1 - \pi_1) \beta M + 0$$

Fixing π_1, F : min $E(J)$
decision bdy $b \in \mathbb{R}$

$\bar{a}^T \bar{x} \geq b$

$\alpha = 1 - \exp\left(-\frac{b^2}{2\sigma^2}\right)$
using: $\bar{x}(b)$, $\beta(b)$

Bayesian inference: $p(y, \theta)$ joint = model



$$\theta = \mathbb{L} \in \{1, 2\}$$

likelihood: $p(\bar{y} | \theta)$

prior $p(\theta) := \int p(y, \theta) dy$

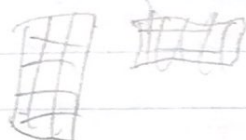
$$p(y, \theta) = p(y | \theta) p(\theta)$$

Meas \bar{y} : what's $p(\theta | y)$? posterior (conditioned on data)

$$p_{\text{post}}(\mathbb{L}) = \int_{\mathbb{L}=1}^{\mathbb{L}=2} p(y, \theta) d\theta$$

$$\sigma \rightarrow \infty \Rightarrow p_{\text{post}}(\mathbb{L}) = \pi_{\mathbb{L}} \quad \forall \mathbb{L}$$

Run expts w/ no ind. & ind. } since spatially separated



for σ noise level
gen histogram of
detection frame.

$$f_m(\bar{x}) = a^T \bar{x}$$

$$\|a - \bar{x}\|$$

for samples of \bar{x} .

FPR per area -
indep of space.
Poisson var.
 $\lambda = \epsilon n$.
 $L \propto \text{area of detection}$

Rot 0:

$\pi/2$:

