## KDGs Bockground Reading

- · What are Polytopes? a geometric object with flat sides.
- · Kernel Density Estimation (KDE)
  - a non-parametric way to estimate the PDF of a random variable.
  - Let  $(\alpha_1, \alpha_2, ..., \alpha_n)$  be i.i.d. sampled drawn from a known distribution f at a given point  $\alpha$ . We are inherested in estimating the shape of the function f.

$$f_h(\alpha) = \frac{1}{h} \sum_{i=1}^{h} K_h(n-\alpha_i) = \frac{1}{hh} \sum_{i=1}^{h} K\left(\frac{\alpha-\alpha_i}{h}\right)$$

where  $K_n \rightarrow \text{Kernel (a non-negative } f^h)$  $h \rightarrow \text{Bandwith (a smoothing parameter)}$ 

- · Performance Metrics
  - 1 Expected Caliberation Error CECE)

Measures the expected difference between accuracy and confrdence by grouping all samples (Size N) in to K bins & calculating

## $ECE = \sum_{i=1}^{k} \frac{|B_i|}{N} |acc_i - conf_i|$

acci and confi are accuracy & average confidence in the i-th bin & |Bil is the number of samples in bin Bo

- The pseudo-probabilities are class probabilities we get from the final layer of a NN.

  The pseudo-probability of the predicted class generally over-estimates the actual probability of getting a correct answer.
- It can be used to caliberate the NN such that it's pseudo-probabilities would match the achial probability of the classes.

## 2 Cohen's Kappa

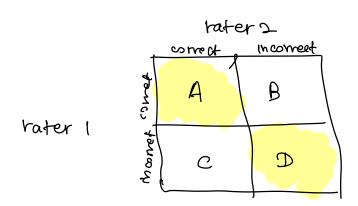
$$\mathcal{K} = \frac{P_0 - Pe}{1 - Pe}$$

Po to relative observed agreement among raters

Pe to hypothetical probability of chance agreement.

of Measures the agreement between 2 raters who each classify N Hmes in to C mutually exclusive categories.

for 2 raters that are rating the same thing, corrected for how often that the raters may agree by chance.



In A & D, the two raters are in agreement.

Expected Probability that both would say correct  $\Rightarrow$   $P(correct) = \frac{A+B}{A+B+C+D} \times \frac{A+C}{A+B+C+D}$ 

Expeched probability that both would say horret=>

$$PCinorrect) = \frac{C+D}{A+B+C+D} \times \frac{B+D}{A+B+C+D}$$

Pe = overall random agreement probability that they agreed on either yes or no.

Then 
$$K = \frac{Po - Pe}{1 - Pe}$$