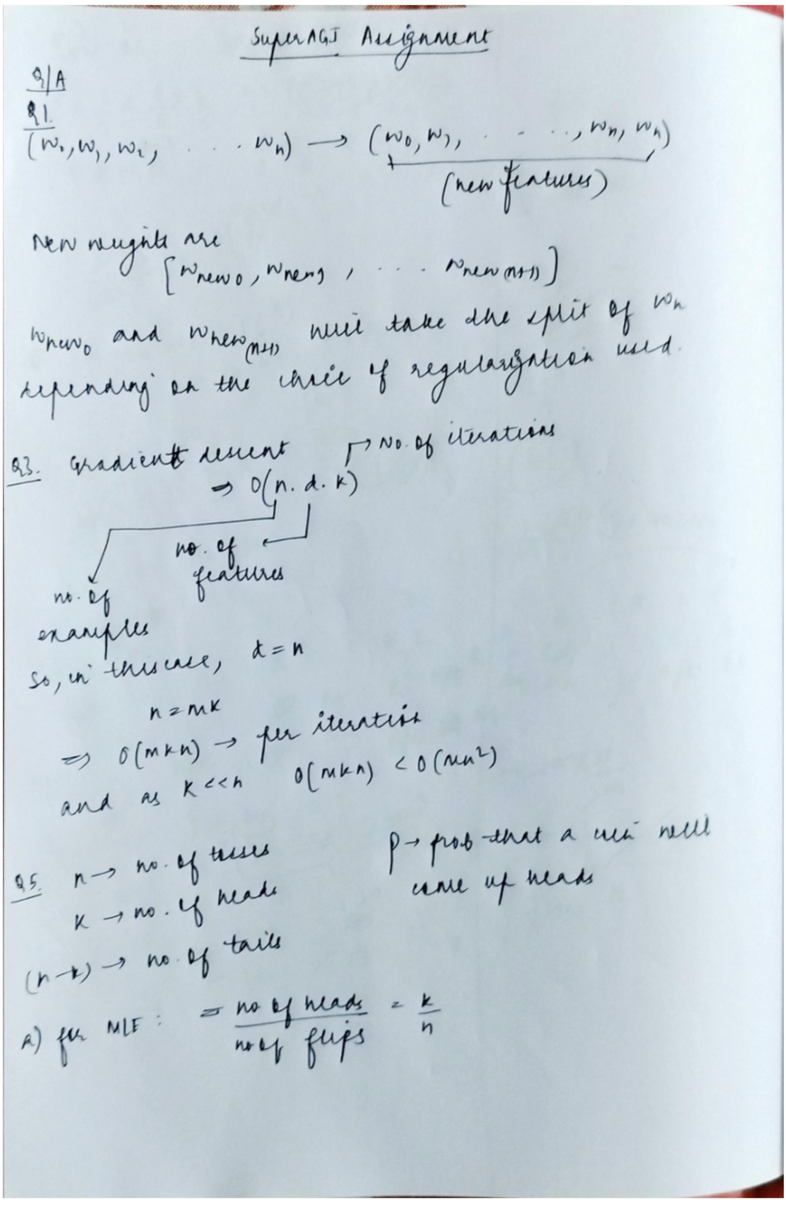
SuperAGI Assignment

Friday, December 1, 2023 10:57 PM



SuperAGI Assignment

Q/A

Q1.

$(w_0, w_1, w_2, \ldots w_n) \rightarrow (w_0, w_1, \ldots, w_n, w_n)$

(new features)

New weights are

$[w_{new0}, w_{new1}, \ldots w_{new(n+1)}]$

w_{new_0} and $w_{new_{(n+1)}}$ will take the split of w_n depending on the choice of regularization used.

Q3. Gradient descent → No. of iterations

$\Rightarrow O(n \cdot d \cdot k)$

no. of features

no. of examples

So, in this case, $d = n$

$n = mk$

$\Rightarrow O(mkn)$ → per iteration

and as $k << n$ $O(mkn) < O(mn^2)$

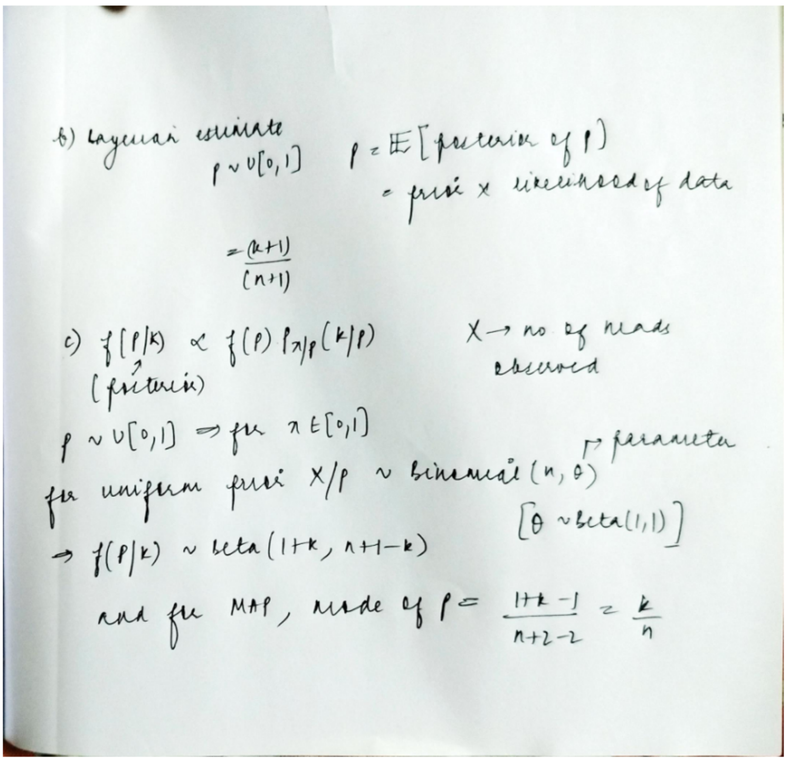
Q5 $n \rightarrow$ no. of times

$k \rightarrow$ no. of heads

$(n-k) \rightarrow$ no. of tails

$p \rightarrow$ prob that a coin will come up heads

A) for MLE: $= \frac{\text{no of heads}}{\text{no of flips}} = \frac{k}{n}$



b) Bayesian estimate

$p \sim U[0,1]$ $p = \mathbb{E}[\text{posterior of } p)$

$= \text{prior} \times \text{likelihood of data}$

$= \frac{(k+1)}{(n+1)}$

c) $f(p|k) \propto f(p)\, p_{x|p}(k|p)$ $X \rightarrow$ no of heads observed

(posterior)

$p \sim U[0,1] \Rightarrow$ for $x \in [0,1]$

for uniform prior $X/p \sim$ binomial (n, θ) ← parameter

$\rightarrow f(p|k) \sim$ beta $(1+k, n+1-k)$ $[\theta \sim \text{beta}(1,1)]$

and for MAP, mode of $p = \frac{1+k-1}{n+2-2} = \frac{k}{n}$