Machine Learning Enercises _ Chapter 9 Mohammad Javad Abbas Rour

9.1 Show the cast ERM problem of linear regression with respect to the absolute value loss function, $l(h, (n_{1}y)) = |h(h)-y|$ min $\sum_{i=1}^{n} |\langle w, n_{i} \rangle - y_{i}|$

Solution: Icl is the lower bound of a so we have: Icl=min a s.t. cca

So min \(\subseteq \left| \circ \text{minimize} \subseteq \aigma_i \)

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Subject to \(\circ \in \aigma_i \)

At last the obj is: $\sum_{i=1}^{\infty} a_i = [00 - 0...11...1] [w_i - w_d a_i - a_d]^T$

9.3 we assume that R=man || nill=man || eill=1 so we have

Yi E[m] s.t. <wan; >= Kw, ei>= wi (wan, >= 1) || wk || 2, 7wk, was , E12 m

Tr(PP) 2 my Know this and 12 m

T&(RB)2, we know this and B & Tm so we have.
T & (BR)2 & m

We run the perceptren of stept ($w^{(0)}=[0,...0]^T$); $w^{(+)}=w^{(+)}+e_t=\xi e_i$ so: $\forall i \langle v^{(+)}, a_i \rangle = \langle w^{(+)}, e_i \rangle = 1$ $\downarrow \xi t$

hence at step m the algorithm stops.

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Solution; Icl is the lower bound of a so we have: ICI=min a s.t. cca So min & |Cil: minimize & a; subject to Ci &a; C>-0 And the linear program for absolute loss function regression 15: min & ai subject to <womis-ai{ji

At last the obj is: Ea; = [00-0-11-1] [w, -wda, -ad]

9.3 We assume that R=man | nill=man | lill= 1 so we have

TE(RB)2, we know this and B & Tm so we have. TS(BR)25m

We run the perceptren of stept (w(0)=10,...01T). w(+) = w(+-1) + et = \(\xi \) so. Vi <v(+), a, > = <w(+), e +> = 1 → i ≤ +

hence at step m the algorithm stops.