DATE: NO:

KNN Formalization (For binary class & 2 features)

- Input: $\vec{x} \in \mathcal{X}$ where $\vec{x} \in \mathbb{R}^2$. Thus $\vec{x}$ has 2 features x_1, x_2.
- Output: $\vec{y} \in \mathcal{Y}$ where $\vec{y} \in \{0,1\} = \mathbb{R}$ $\vec{y}$ is 0 or 1.
- Unknown Ground truth function: $f: \mathcal{X} \to \mathcal{Y}$ where $\vec{x} \mapsto \vec{y}$
- Data: $\mathcal{D} = \{(\vec{x}^{(1)}, \vec{y}^{(1)}), (\vec{x}^{(2)}, \vec{y}^{(2)}) \dots (\vec{x}^{(m)}, \vec{y}^{(m)})\}$
- Hypothesis set: $\mathcal{H} = \{h_1, h_2, \dots h_m\}$ if and only if our KNN has a fixed distance metric d and dataset.
- Hypothesis function: $h \in \mathcal{H}$ i.e. any one in $\mathcal{H}$.
- Learning Algorithm & best hypothesis function.

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From $\mathcal{H}$, perform our learning A on $\mathcal{D}$ & find best $h \in \mathcal{H}$, call the best h to be g.

best is based on your evaluating metric.

Now our h should take the form of $h(x;\theta)$ where $\theta = k$ and

Then the decision boundary is the set of $\vec{x} = (x_1, x_2)$ such that $h(\vec{x};\theta) = ???$ not sure.

see Voronoi diagram