

FRET NOT, IT'S CURVE FITTING ALL THE WAY DOWN!

Eric J. Ma, Digility 2018

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<https://ericmjl.github.io/curve-fitting-talk>



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ABOUT MYSELF

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- Investigator, Scientific Data Analysis, NIBR

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- MIT Biological Engineering, ScD, 2017

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- Investigator, Scientific Data Analysis, NIBR
- MIT Biological Engineering, ScD, 2017
- Self-taught machine & deep learner, Bayesian Pythonista

GOALS

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1. Demystify Bayesian statistical inference.

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1. Demystify Bayesian statistical inference.
2. Illustrate the link between Bayesian statistics and deep learning.

AGENDA

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1. Bayes' rule.

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2. Bayesian estimation.

AGENDA

1. Bayes' rule.
2. Bayesian estimation.
3. Bayesian linear regression.

AGENDA

1. Bayes' rule.
2. Bayesian estimation.
3. Bayesian linear regression.
4. Bayesian logistic regression.

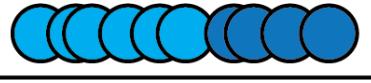
AGENDA

1. Bayes' rule.
2. Bayesian estimation.
3. Bayesian linear regression.
4. Bayesian logistic regression.
5. Arbitrary Bayesian curve fitting.

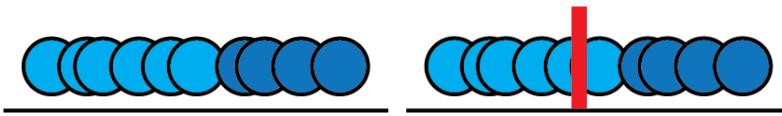
$$P(A|B) = \frac{P(B|A)P(A)}{P(B)}$$

ESTIMATION

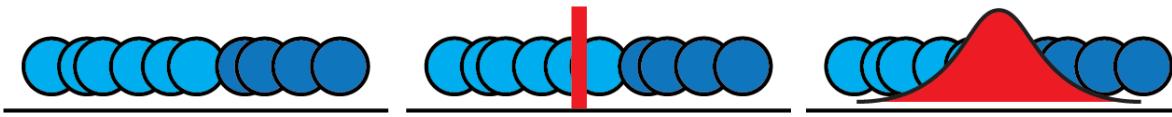
ESTIMATION



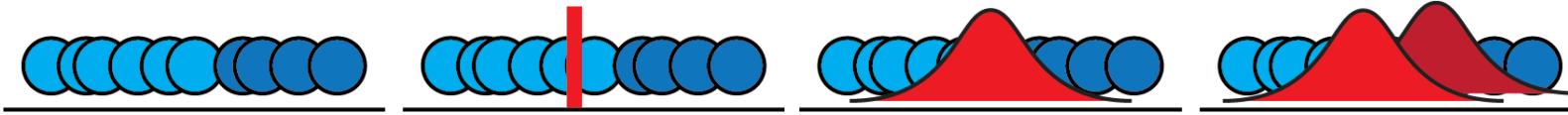
ESTIMATION



ESTIMATION

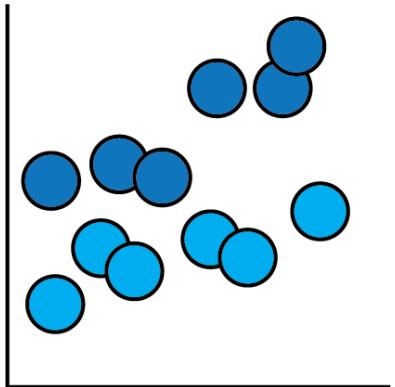


ESTIMATION

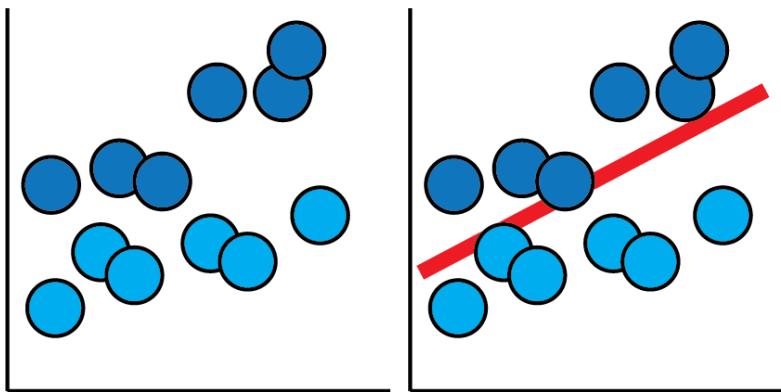


LINEAR REGRESSION

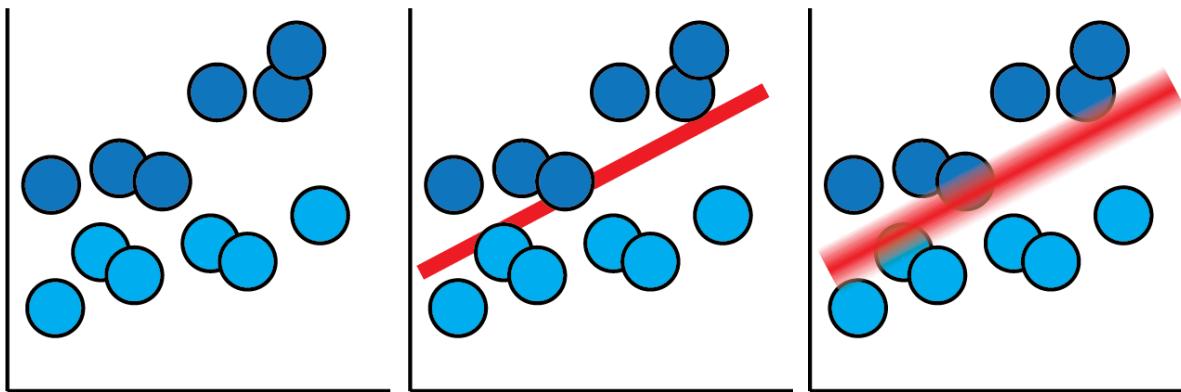
LINEAR REGRESSION



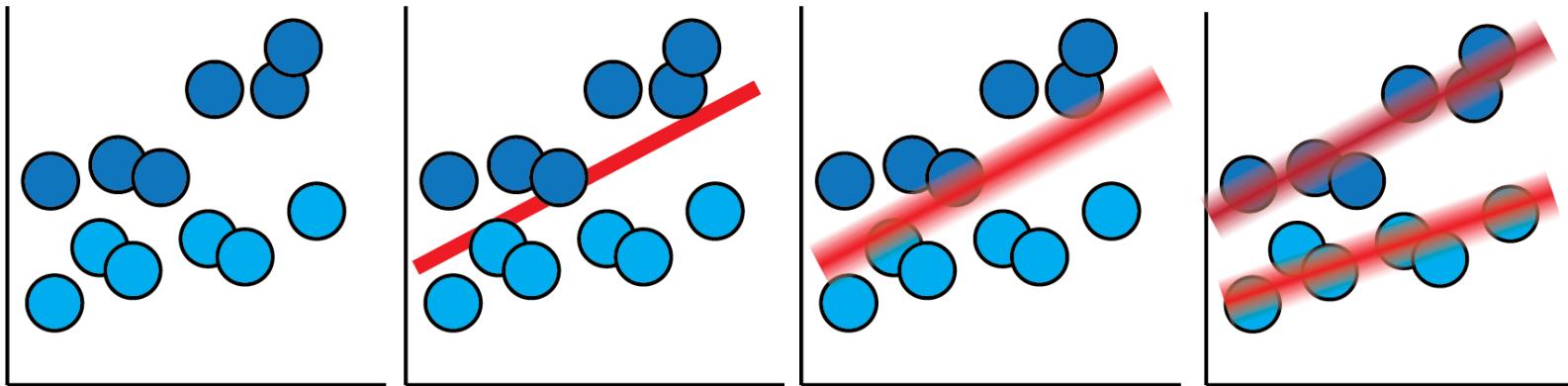
LINEAR REGRESSION



LINEAR REGRESSION

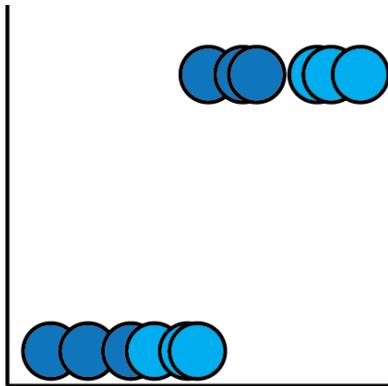


LINEAR REGRESSION

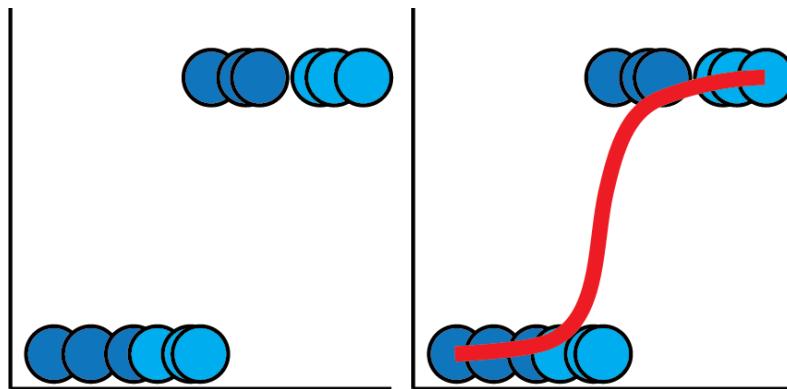


LOGISTIC REGRESSION

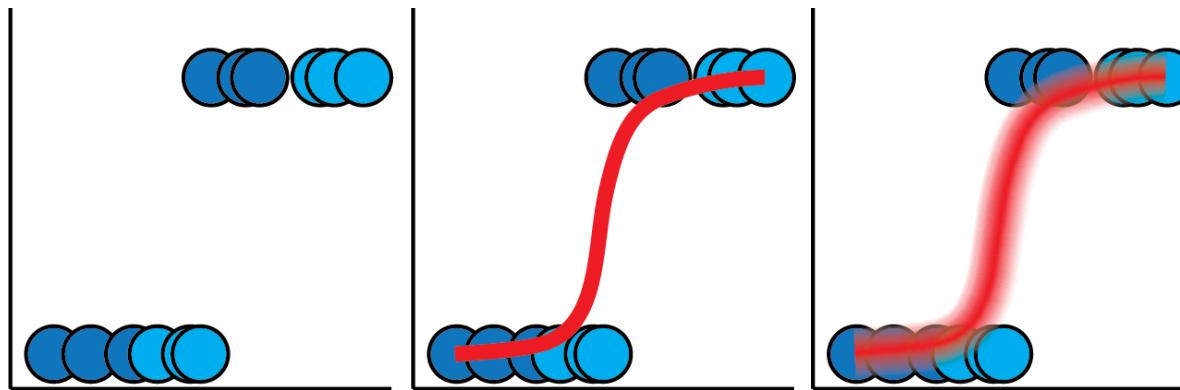
LOGISTIC REGRESSION



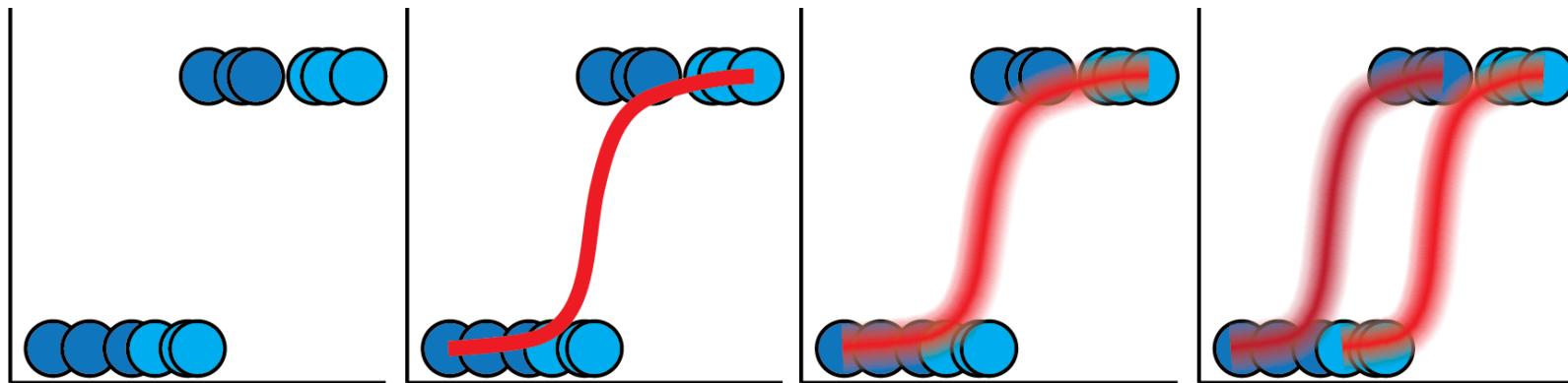
LOGISTIC REGRESSION



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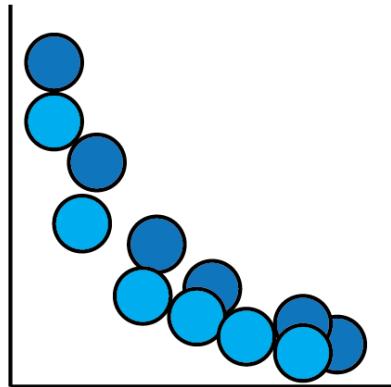


LOGISTIC REGRESSION

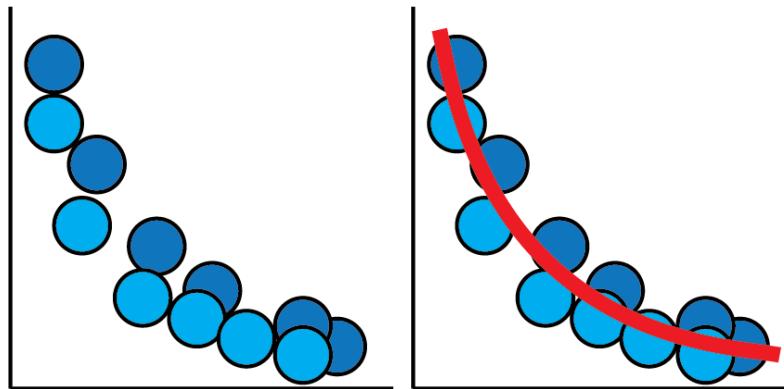


PARAMETRIC CURVES

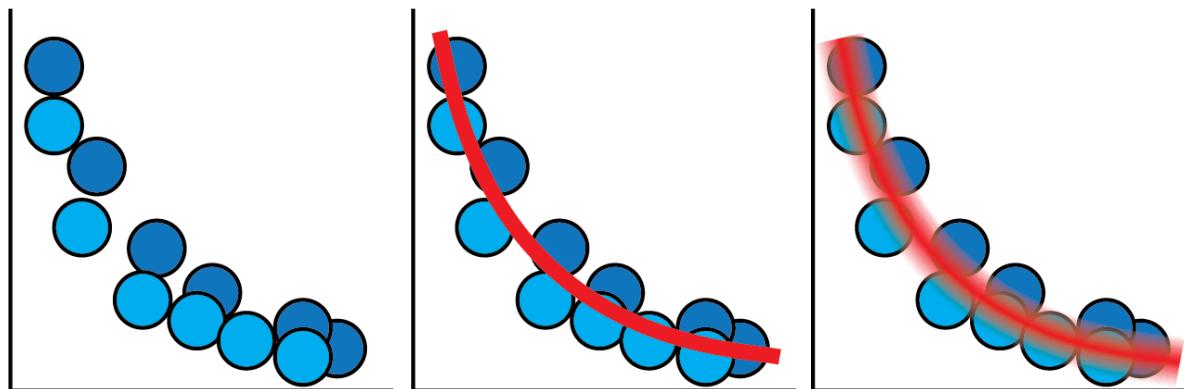
PARAMETRIC CURVES



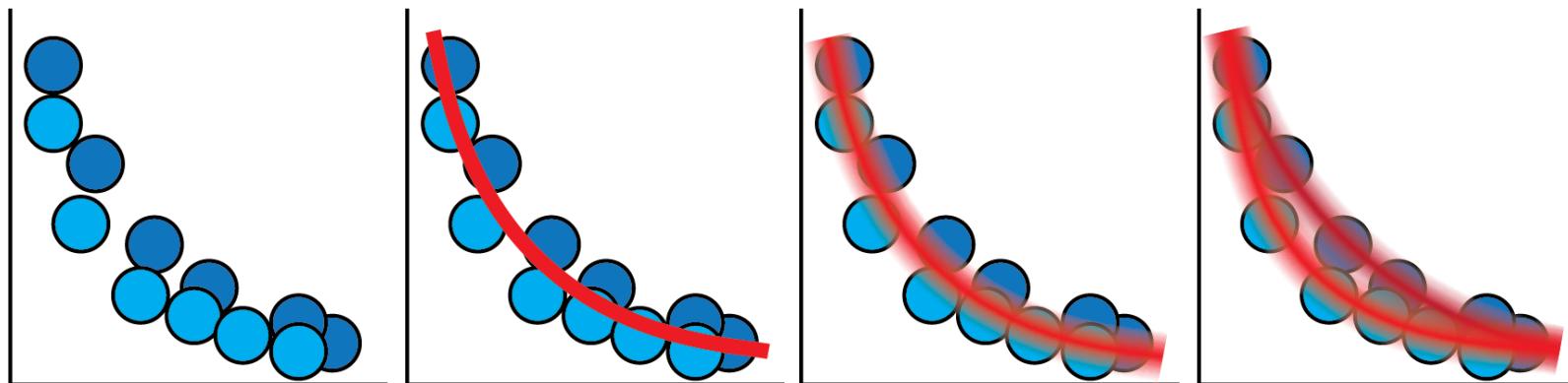
PARAMETRIC CURVES



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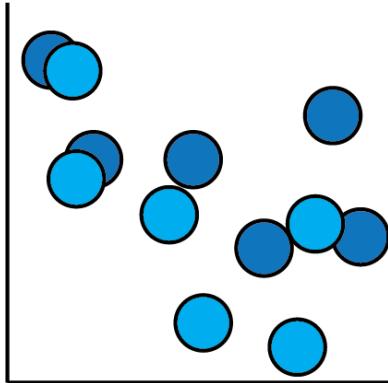


PARAMETRIC CURVES

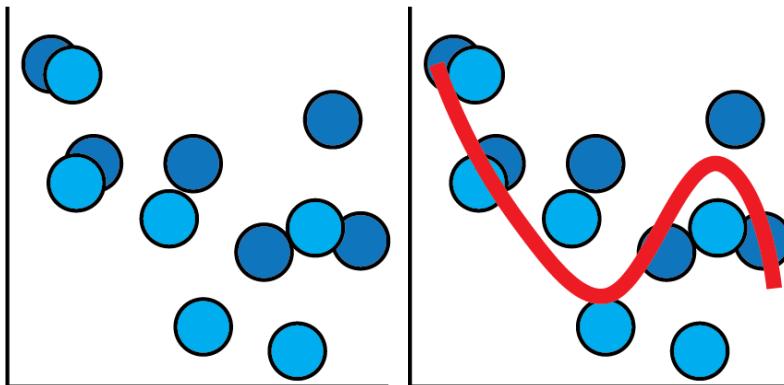


NEURAL NETWORKS

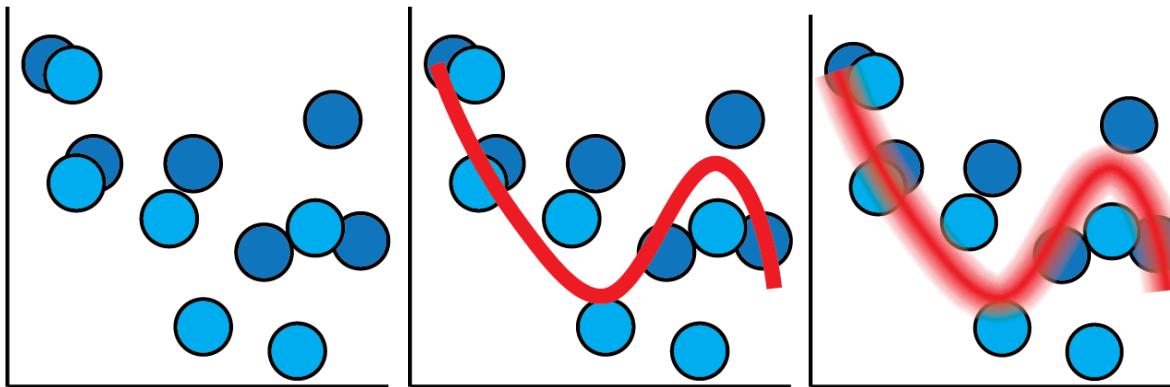
NEURAL NETWORKS



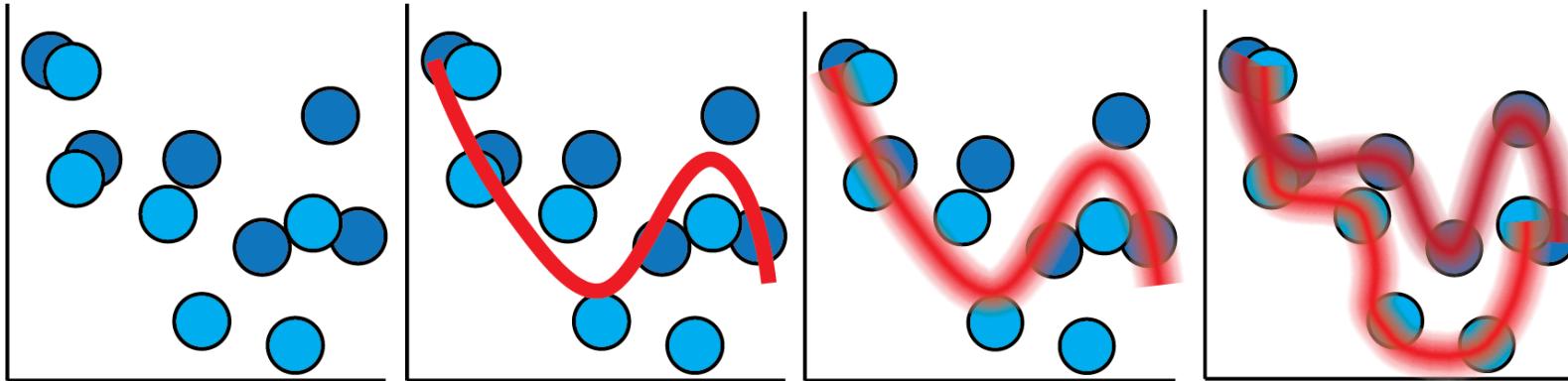
NEURAL NETWORKS

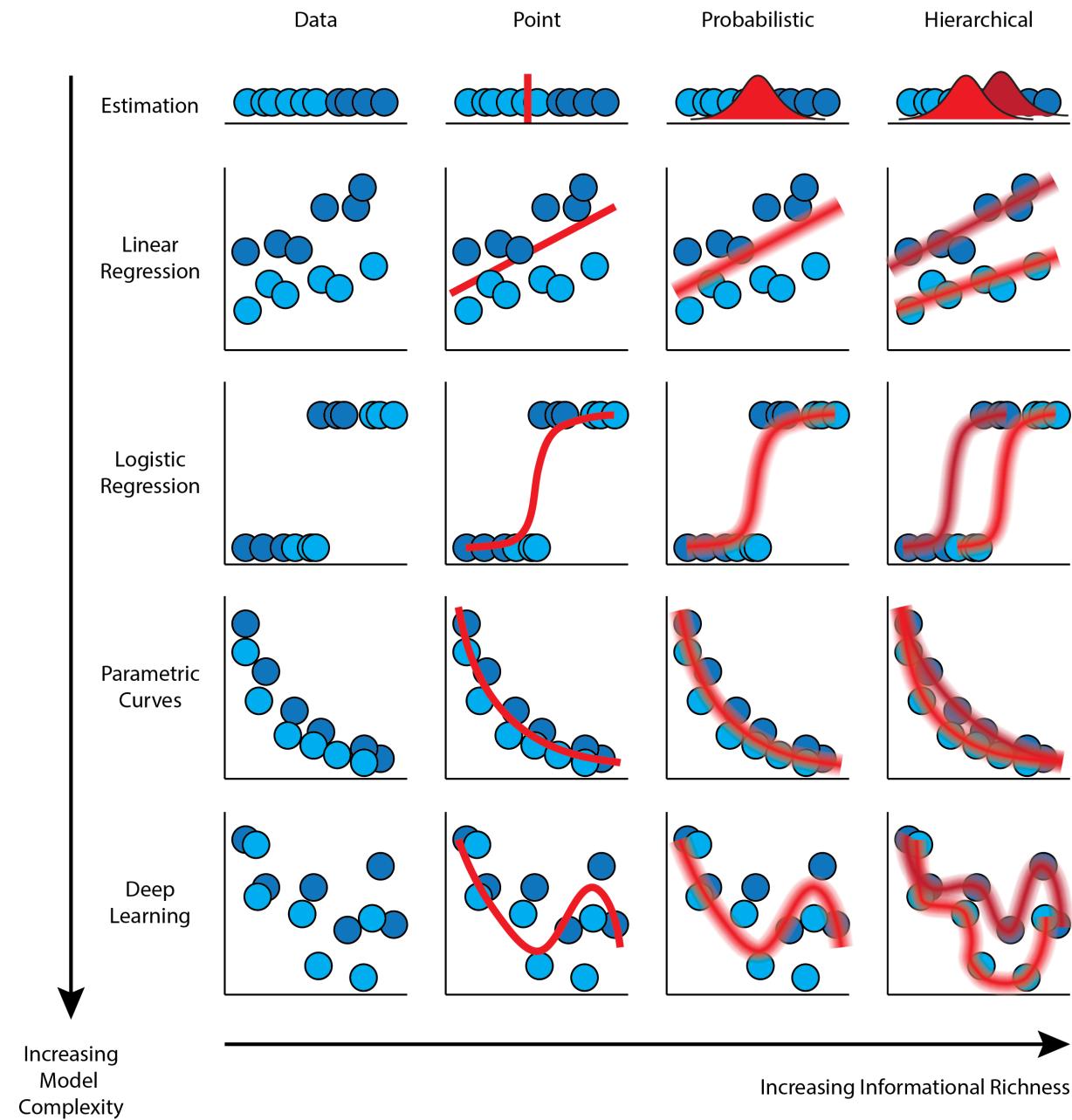


NEURAL NETWORKS



NEURAL NETWORKS





EXAMPLE: DARWIN'S FINCHES

