PSY9511: Seminar 5

Beyond linearity: Extensions of linear models and tree-based models

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Outline

Exercise 3

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Exercise 3: Backward stepwise selection

http://localhost:8888/notebooks/notebooks%2FBackward%20selection.ipynb

Exercise 3: Lasso

http://localhost:8888/notebooks/notebooks/Lasso.ipynb

Exercise 4

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Extensions of linear models

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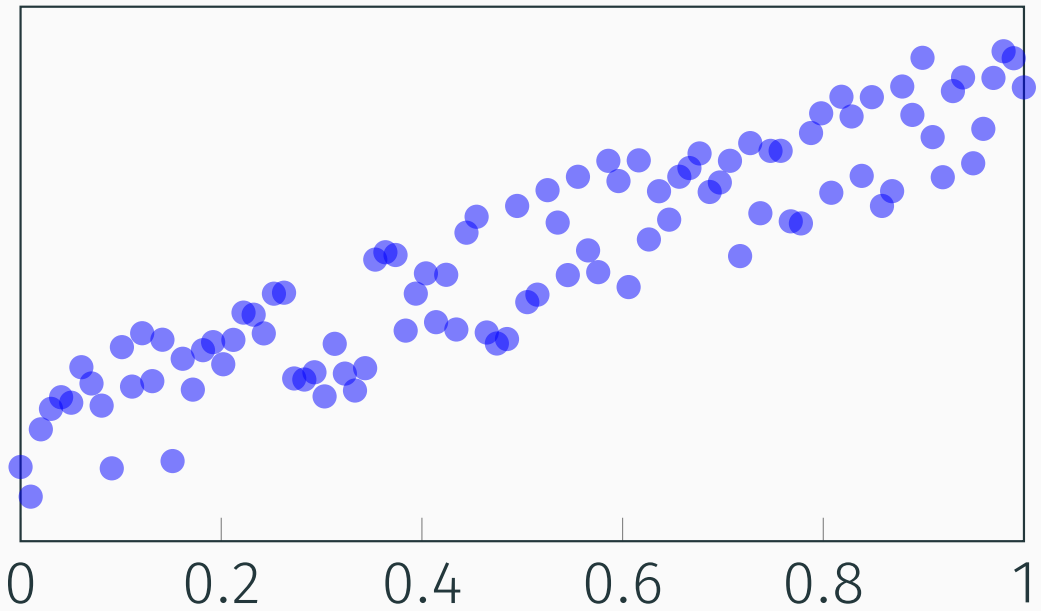
Extensions of linear models: Motivation

$$\hat{y} = \beta_0 + \sum_{i=0}^{p} \beta_i x_i$$

Extensions of linear models: Motivation



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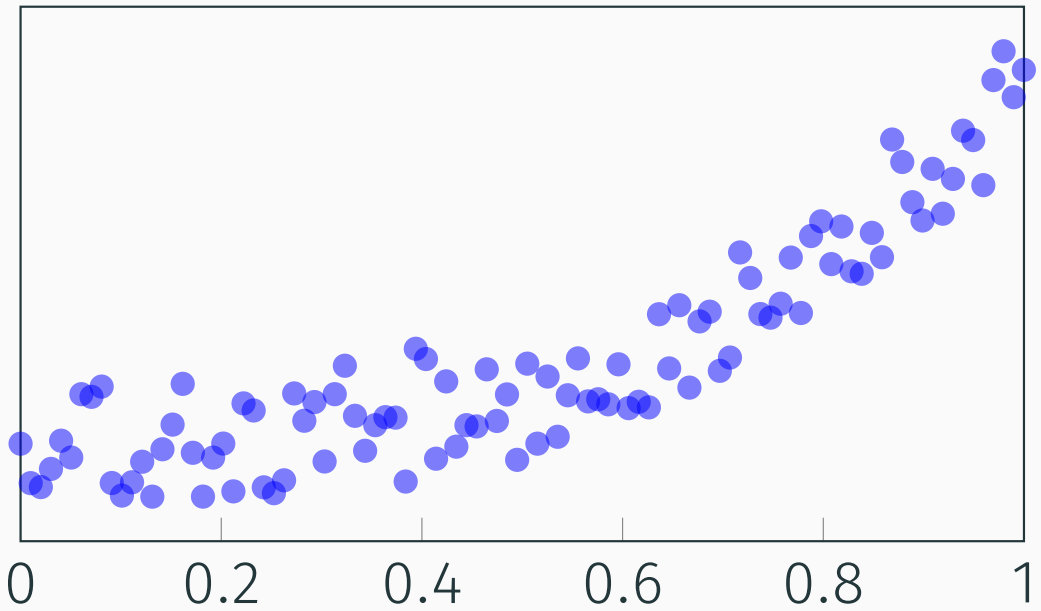
Extensions of linear models: Motivation



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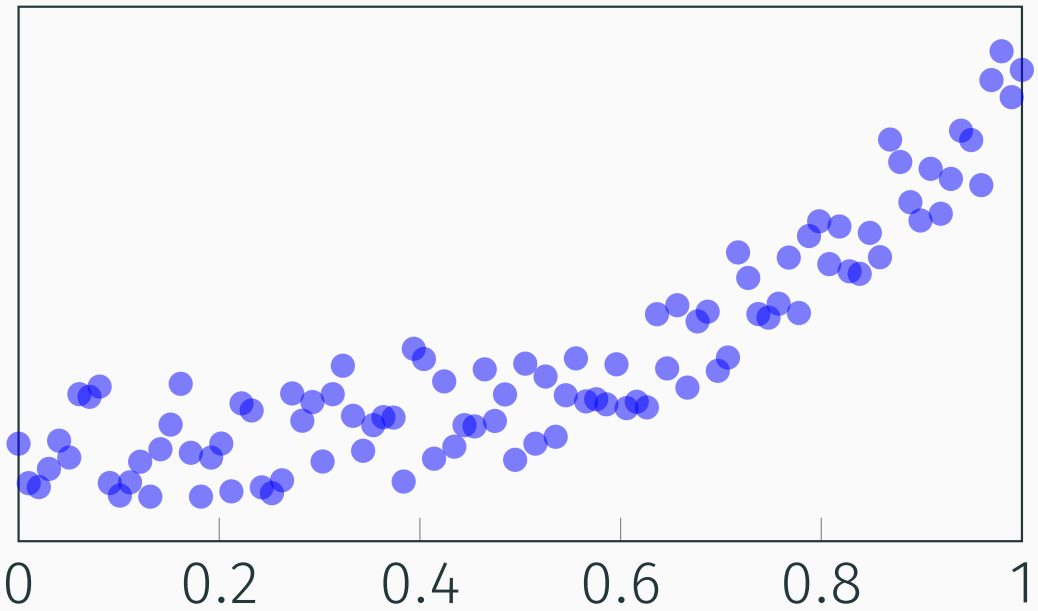

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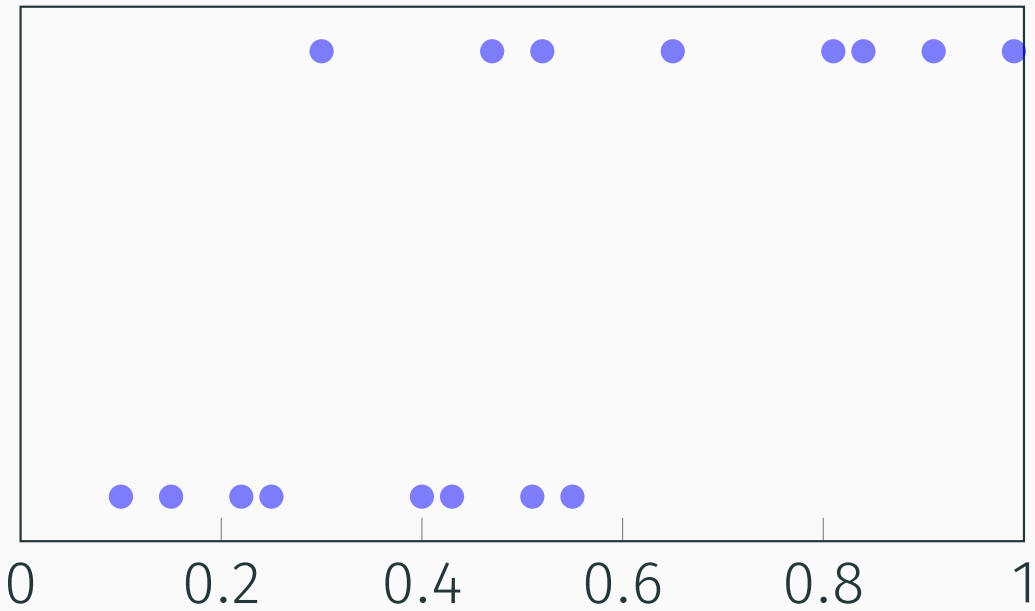

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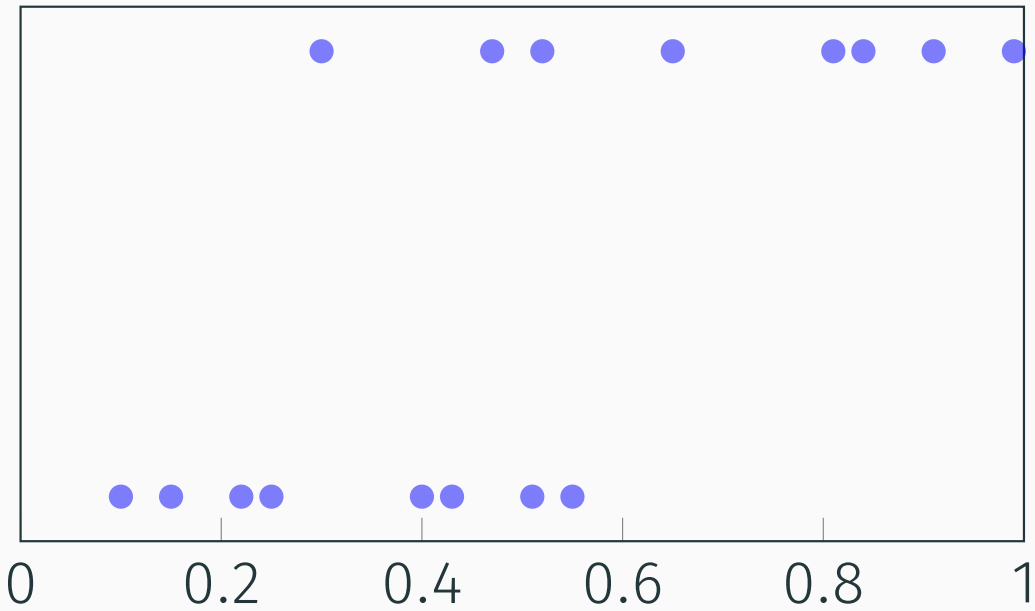
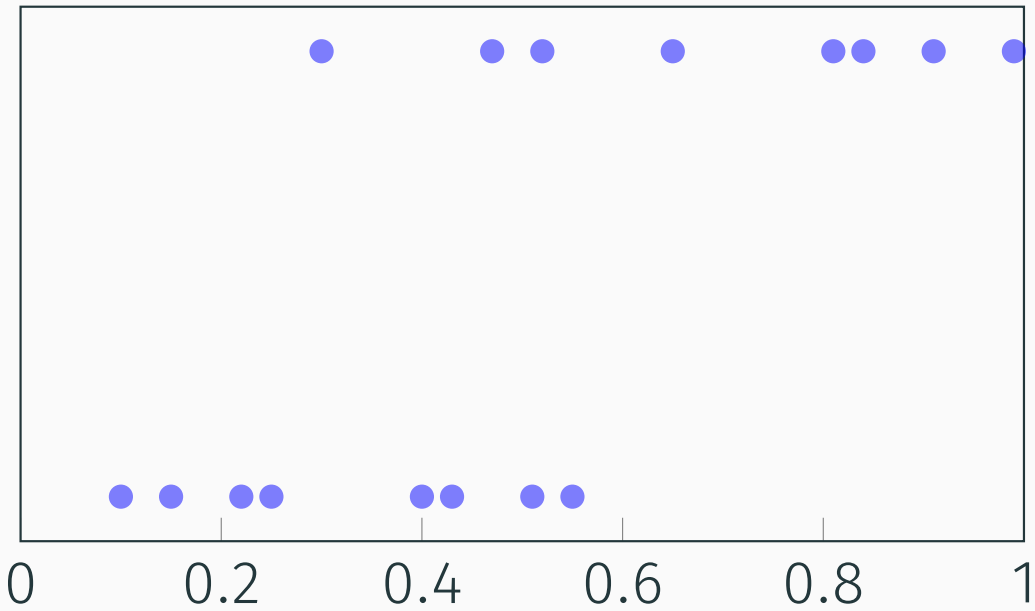


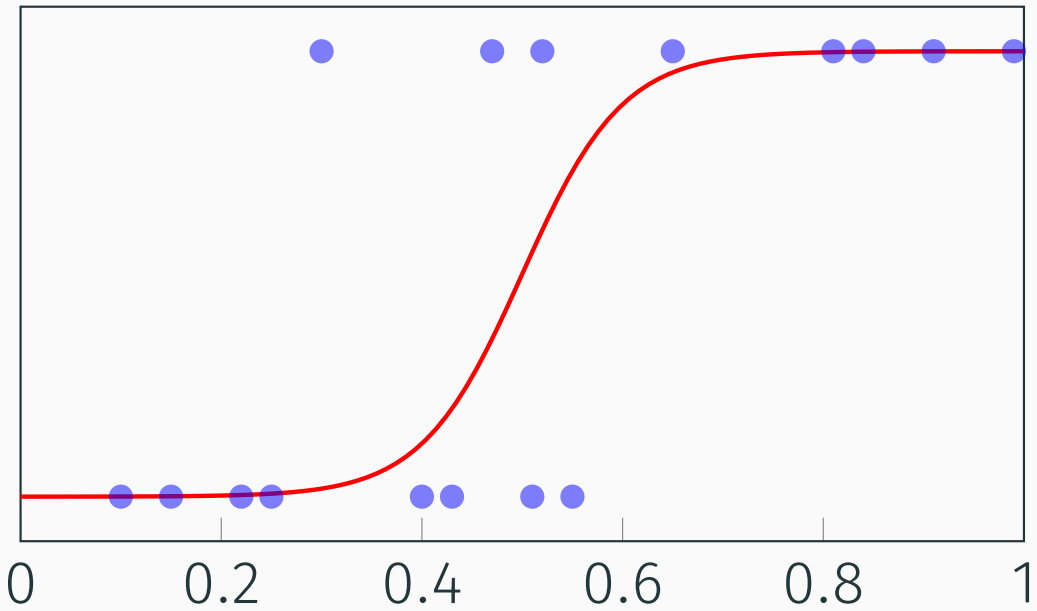
$$\log\left(\frac{p(X)}{1-p(X)}\right) = \beta_0 + \sum_{i=0}^{p} \beta_i x_i$$

Extensions of linear models: Motivation



$$p(X) = \frac{e^{\left(\beta_0 + \sum_{i=0}^{p} \beta_i x_i\right)}}{1 + e^{\left(\beta_0 + \sum_{i=0}^{p} \beta_i x_i\right)}}$$

Extensions of linear models: Motivation



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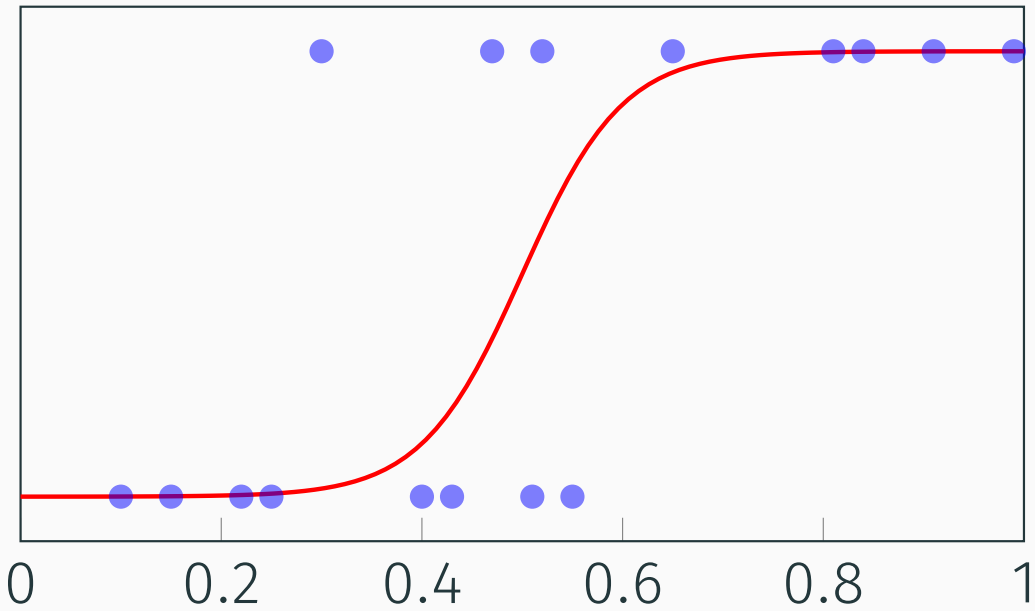

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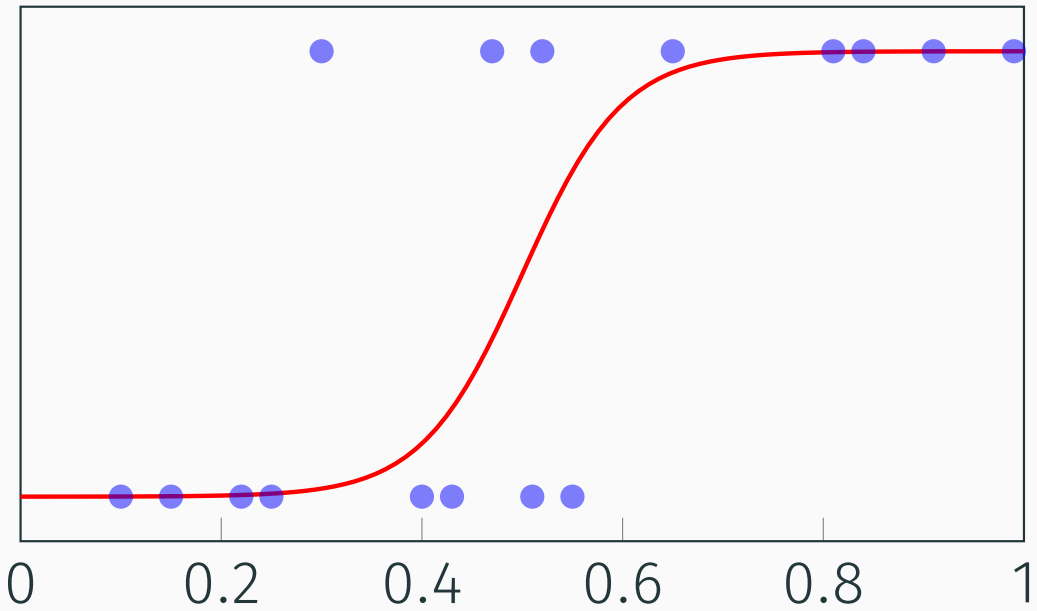
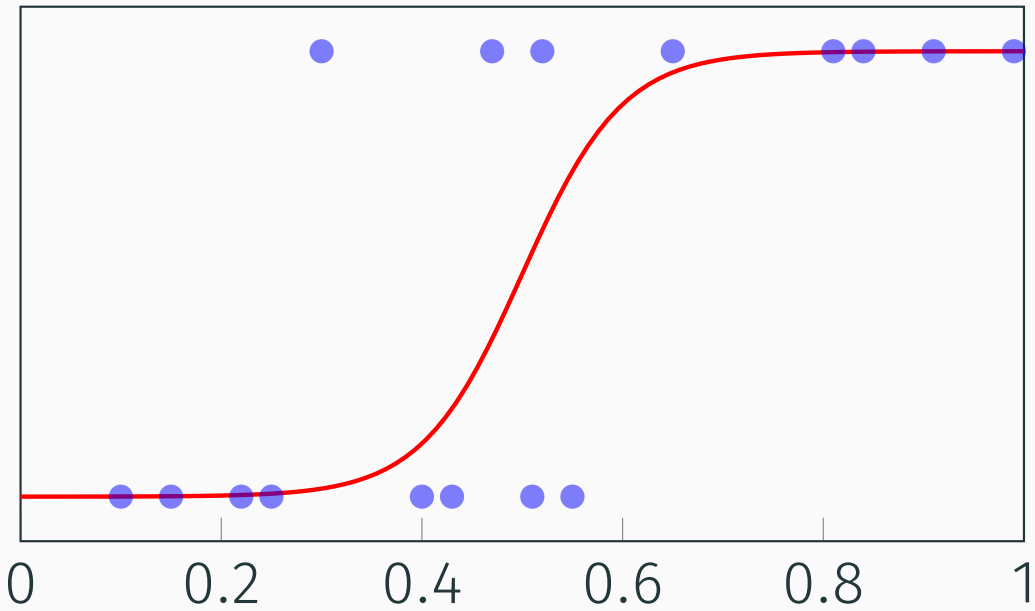


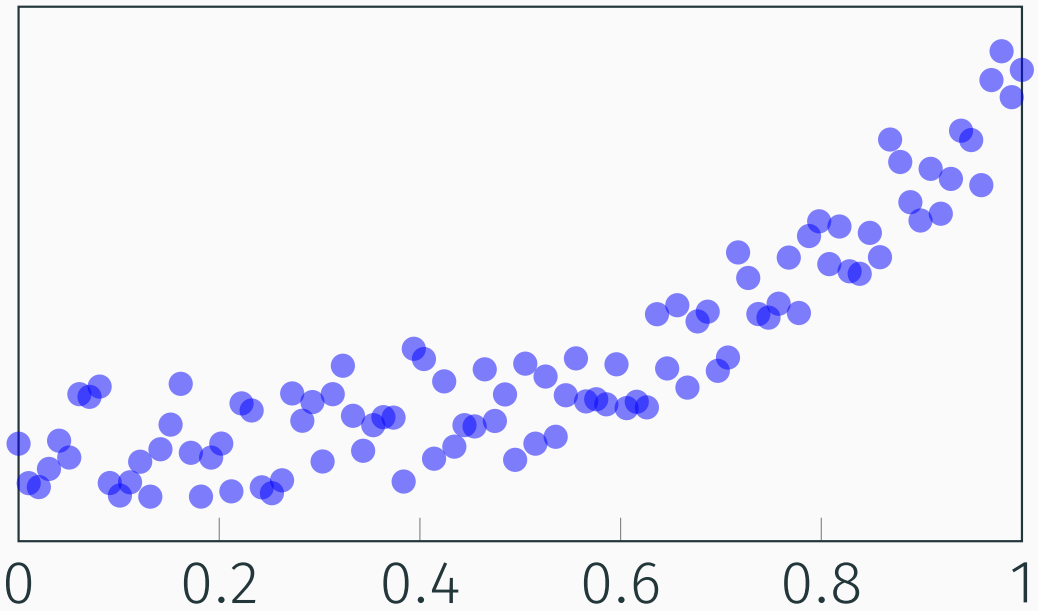
$$p(X) = f(\beta_0 + \sum_{i=0}^{p} \beta_i x_i)$$

Extensions of linear models: Motivation



$$f(\hat{y}) = \beta_0 + \sum_{i=0}^{p} \beta_i x_i$$

Extensions of linear models: Motivation



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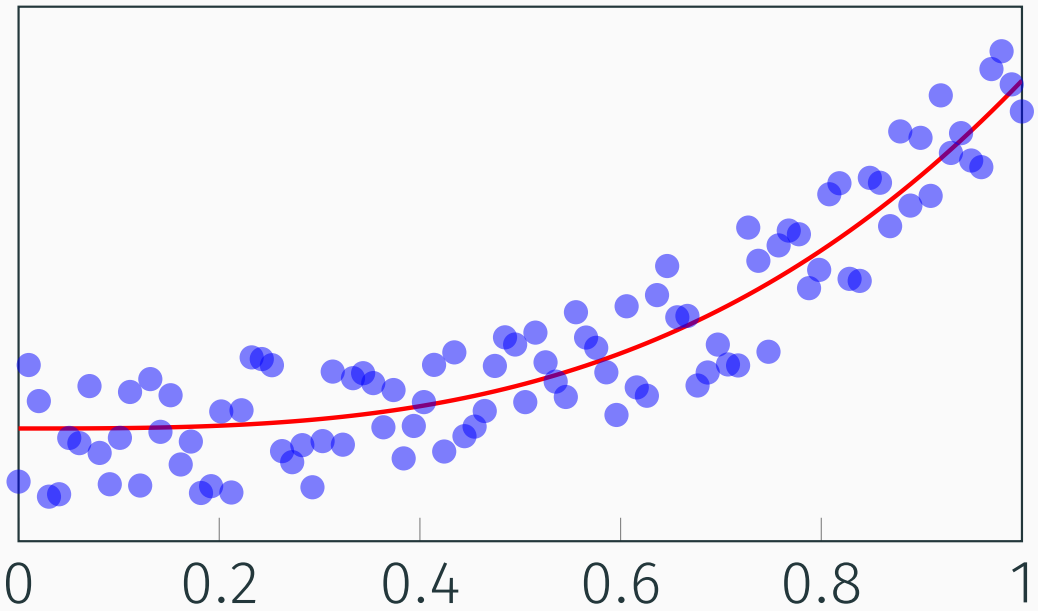

$$\log(\hat{y}) = \beta_0 + \sum_{i=0}^{p} \beta_i x_i$$

Extensions of linear models: Motivation

Generalized linear models (GLMs):

Extends upon the regular linear model by associating the predictors to the response via a non-linear link function.

Tree-based models

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