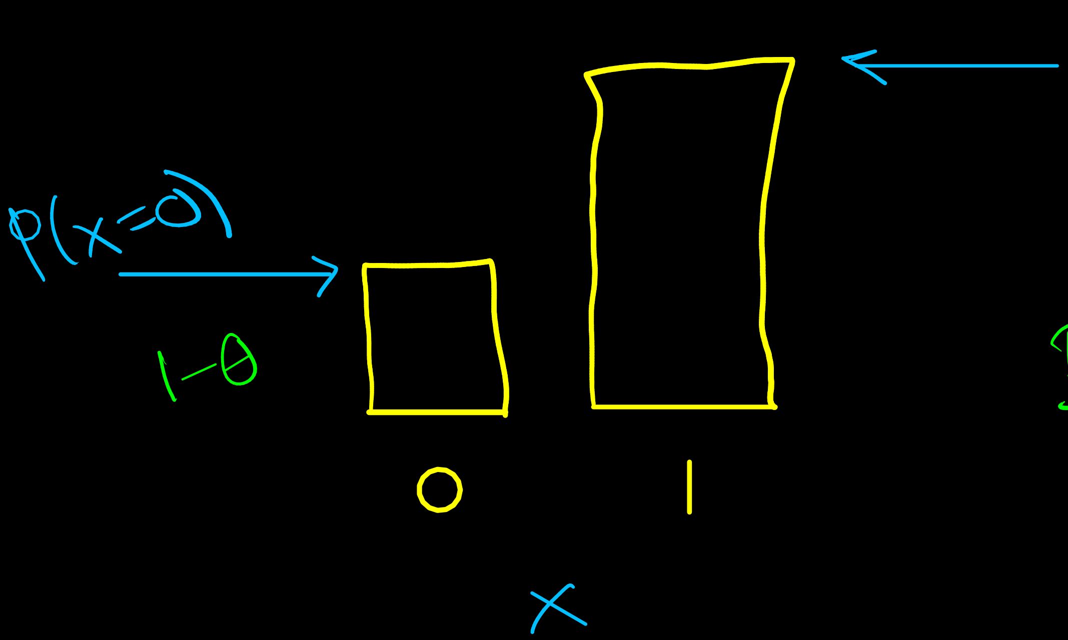


P(x=1) θ

Bernoulli(θ)

Normal linear

for each i in $1 \ldots n$

$$y_i \sim N(\mu_i, \sigma^2)$$

$$\mu_i = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

Binary outcome model

for each i in $1 \ldots n$

$$y_i \sim \text{Bernoulli}(\theta_i)$$

$$\theta_i = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

$$\theta_i \underset{\text{inverse link}}{\overset{\text{link}}{\rightleftarrows}} \phi_i$$

$$\phi_i = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

$$\phi_i \in (-\infty, \infty)$$

$$\theta_i \underset{\text{inverse link}}{\overset{\text{link}}{\rightleftarrows}} \phi_i$$

logit

$$\log\left(\frac{\theta_i}{1-\theta_i}\right) = \phi_i$$

ilogit, inverse logit

$$\frac{1}{1+e^{-\phi_i}}$$

link: logit or log odds

for i in 1 ... n

$$y_i \sim \text{Bernoulli}(\theta_i)$$

$$\log\left(\frac{\theta_i}{1-\theta_i}\right) = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

$$y_i \sim \text{Bernoulli}(\theta_i)$$

$$\phi_i = \log\left(\frac{\theta_i}{1-\theta_i}\right)$$

$$\phi_1 = \beta_0 + \sum_{k=1}^{k} \beta_k x_{ki}$$

Likelihood function

$$P(\text{Data} \mid \beta_0, \beta_1)$$

AIC

$= -2LL +$

$$P(\text{Data} \mid \beta_0 = \hat{\beta}_0, \beta_1 = \hat{\beta}_1)$$

mle

loglikelihood

$-2\ LL = \underline{\underline{\text{deviance}}}$

LL

Wilks's

$-2LL$ = deviance

$-2LL + 2K$ = AIC

CFI

AIC

WAIC

$$\log\left[\frac{P(y_i = 2)}{P(y_i = 1)}\right] = \beta_0^2 + \beta_1^2 x_i$$

for each i in $1 \ldots n$

$$y_i \sim N(\mu_i, \sigma^2)$$

$$\mu_i = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

for each i in $1 \ldots n$

$$y_i \sim \text{Poisson}(\lambda_i)$$

$$\log(\lambda_i) = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

$$\lambda_i = e^{\left[\beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}\right]}$$

Poisson

for each i

$$y_i \sim \text{Poisson}(\lambda_i)$$

$$\log(\lambda_i) = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

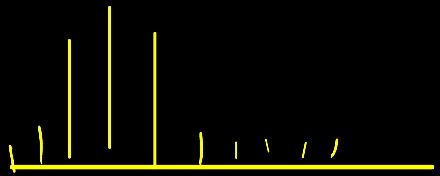
Neg binomial

for each i

$$y_i \sim \text{Negbinomial}(\mu_i, r)$$

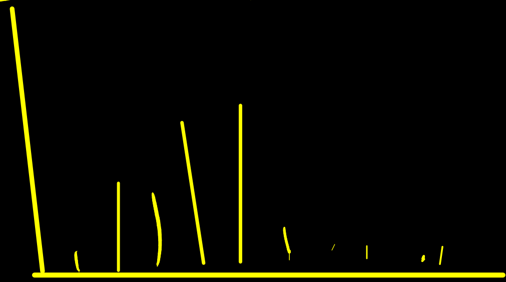
$$\log(\mu_i) = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

Poisson



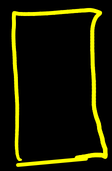
$$y \sim \text{Poisson}(\lambda)$$

Zero inflated Poisson



$$y \sim \begin{cases} \text{Poisson}(\lambda) & z = 0 \\ \text{zero\_dist} & z = 1 \end{cases}$$

$$p(z=1) = \theta$$



0

$$y_1 \quad y_2 \quad y_3 \quad \dots \quad y_n$$

$$0 \quad 0 \quad 1 \quad \quad 5$$

for each i in 1.. n

$$y_i \sim \begin{cases} \text{Poisson}(\lambda_i) & z_i = 0 \\ \text{zero\_distribution} & z_i = 1 \end{cases}$$

$$P(z_i = 1) = \theta_i \,, \quad \log\left(\frac{\theta_i}{1-\theta_i}\right) = \beta_0 + \sum_{k=1}^{K} \beta_k x_{ki}$$

$$\log(\lambda_i) = \gamma_0 + \sum_{k=1}^{K} \gamma_k x_{ki}$$

y	x	z
0	25	1
1	26	0
0	23	0
2	$\vdots$	0
3		0
1		0
0		
0		
1		0
2		0