

Bayesian Model

Brian D. Gerber

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1 Bayesian Generalized Linear Model

1.1 Not Hierarchical Statistical Model

We want to fit a model to our data, where the occurrence of the species $(y_{i,j})$ for site i in projected area j is modeled as,

$$y_{i,j} \sim \text{Bernoulli}(p_{i,j})$$
$$\text{logit}(p_{i,j}) = \beta_0 + \beta_1 \times \text{dist.human}_{i,j}$$

1.1.1 Priors

$$\beta_0 \sim \text{Logistic}(0, 1)$$

$$\beta_1 \sim \text{Logistic}(0, 1)$$

1.1.2 Alternative Priors

$$\beta_0 \sim \text{Normal}(\mu = 0, \sigma = 1.5)$$

$$\beta_1 \sim \text{Normal}(\mu = 0, \sigma = 1.5)$$

1.2 JAGS syntax for this model

```
model {  
  
  # Priors  
  b0 ~ dlogis(0,1)  
  b1 ~ dlogis(0,1)  
  
  #Alternative priors on the logit scale  
  #Note that JAGS parameters for the Normal distribution  
  #are mu (mean) and the precision, which is  
  #the inverse of the variance,  
  #i.e., tau = 1/sigma^2  
  b0 ~ dnorm(0,1/1.5^2)  
  b1 ~ dnorm(0,1/1.5^2)  
  
  # Likelihood  
  for (i in 1:N) {  
    y[i] ~ dbern(p[i])  
    logit(p[i]) <- b0 + b1*dist.human[i]  
  } #End loop  
  
} #End Model
```