8.使用R和JAGS的贝叶斯数据分析

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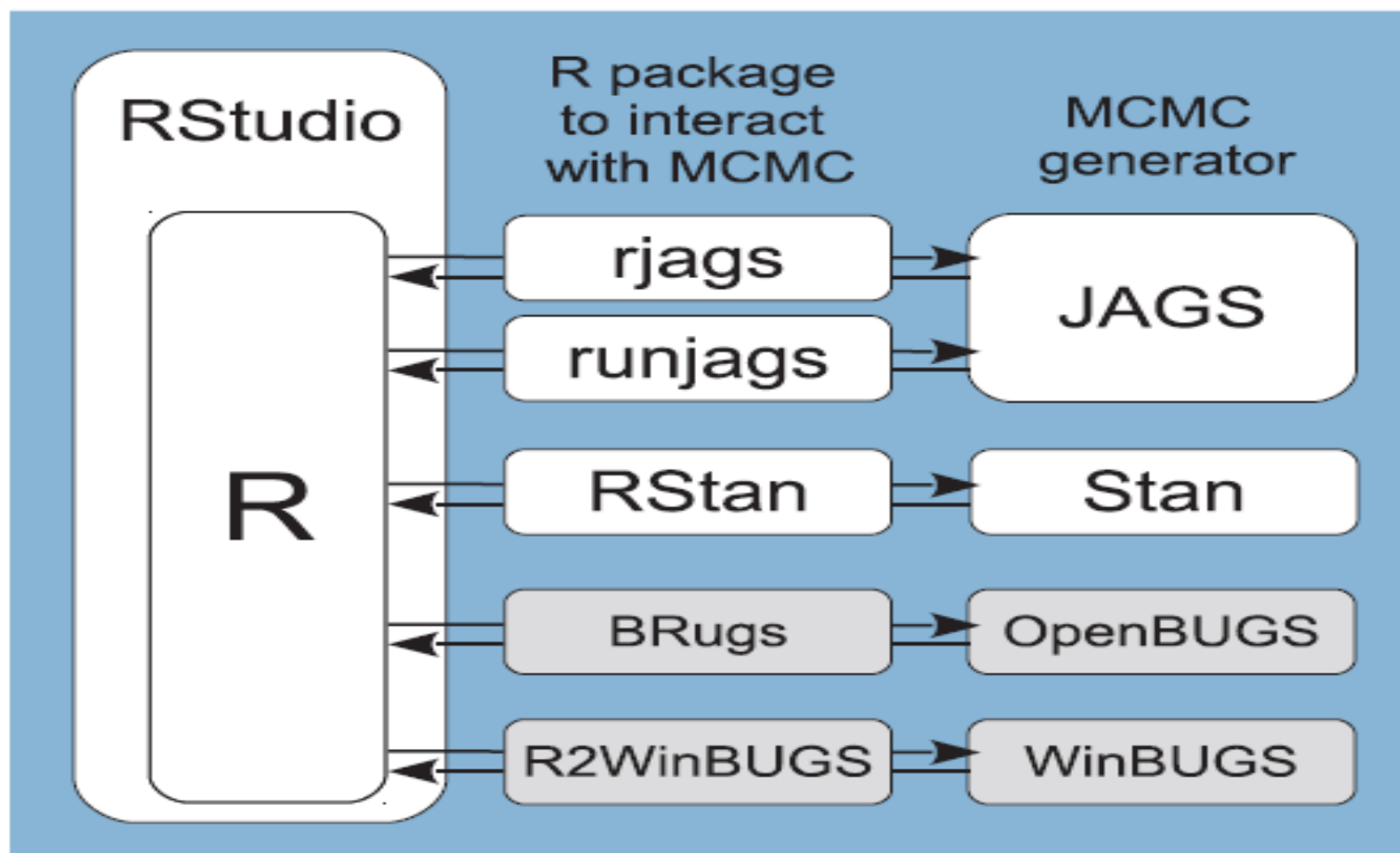
简介

ᴄ JAGS(Just Another Gibbs Sampler)是用于构建MCMC样本的系统

ᴄ 各种数据分析软件都有针对JAGS系统的界面，可以借助这些数据分析软件和相应界面，使用JAGS产生MCMC并做相应分析，例如基于R的rjags和runjags以及基于Matlab的matjags
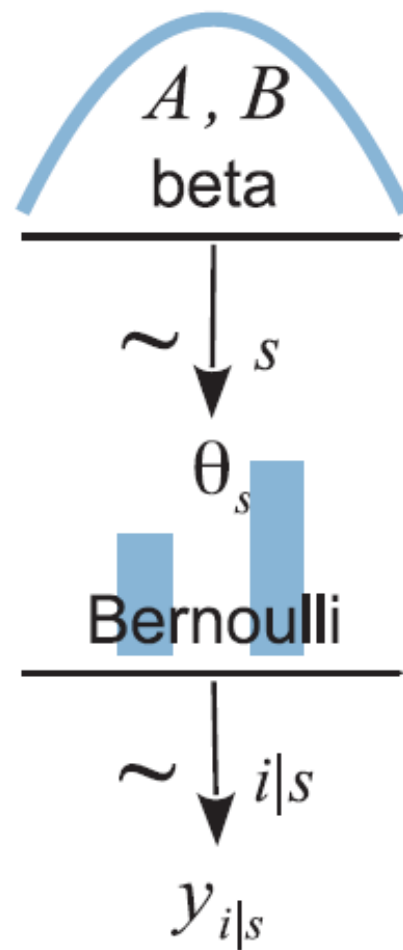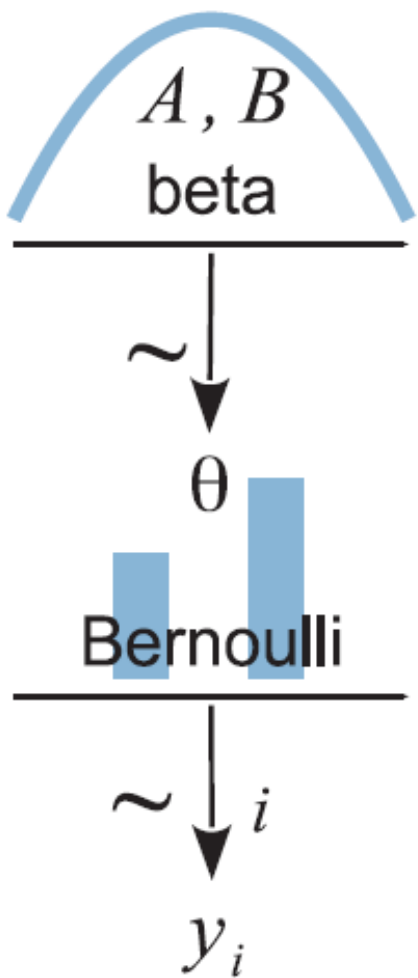
简介

∽另外，R本身也有针对其他MCMC建构系统的界面

使用JAGS的R代码

- ∽ 数据

- ∽ 模型

- ∽ MCMC初始值

- ∽ MCMC调试

- ∽ MCMC记录

- ∽ MCMC分析

模型示意图

数据代码

```
# Load the data:

myData = read.csv("z15N50.csv") # Read data file; must be in curr. work. dir.

y = myData$y        # The y values are in the column named y.

Ntotal = length(y)  # Compute the total number of flips.

dataList = list(    # Put the information into a list.

  y = y ,

  Ntotal = Ntotal

)
```

模型代码

```
# Define the model:

modelString = "

model {

  for ( i in 1:Ntotal ) {

    y[i] ~ dbern( theta )

  }

  theta ~ dbeta( 1 , 1 )

}

" # close quote for modelString

writeLines( modelString , con="TEMPmodel.txt" )
```

MCMC初始值代码

```
initsList = function() {

  resampledY = sample( y , replace=TRUE )

  thetaInit = sum(resampledY)/length(resampledY)

  thetaInit = 0.001+0.998*thetaInit # keep away from 0,1

  return( list( theta=thetaInit ) )

}
```

MCMC调试代码

jagsModel = jags.model(file="TEMPmodel.txt" , data=dataList , inits=initsList , n.chains=3 , n.adapt=500)

update(jagsModel , n.iter=500)

MCMC记录代码

codaSamples = coda.samples(jagsModel ,
variable.names=c("theta"), n.iter=3334)

save(codaSamples , file=paste0(fileNameRoot,"Mcmc.Rdata"))

MCMC分析代码

source("DBDA2E-utilities.R")

Convergence diagnostics:

diagMCMC(codaObject=codaSamples , parName="theta")

saveGraph(file=paste0(fileNameRoot,"ThetaDiag") , type="eps")

Posterior descriptives:

openGraph(height=3,width=4)

par(mar=c(3.5,0.5,2.5,0.5) , mgp=c(2.25,0.7,0))

plotPost(codaSamples[,"theta"] , main="theta" , xlab=bquote(theta))

saveGraph(file=paste0(fileNameRoot,"ThetaPost") , type="eps")

MCMC分析代码

\# Re-plot with different annotations:

plotPost(codaSamples[,"theta"] , main="theta" , xlab=bquote(theta) ,

    cenTend="median" , compVal=0.5 , ROPE=c(0.45,0.55) , credMass=0.90)

saveGraph(file=paste0(fileNameRoot,"ThetaPost2") , type="eps")

常用分析的简易代码

- Jags-Ydich-Xnom1subj-MbernBeta.r

- Jags-Ydich-XnomSsubj-MbernBeta.r

- Jags-BivariateNormalScript.r

- Jags-Ymet-Xmet-Mrobust.r

- Jags-Ybinom-Xnom1fac-Mlogistic.r

- ……