混合高斯模型程序及运行结果

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一、程序(R语言)：

accel<-function(M,K){

dat=read.table("C:/Users/lenovo/Desktop/accel.txt")

x=dat[,1]

y=dat[,2]

z=dat[,3]

m<-M

k<-K

accel=sqrt(x^2+y^2+z^2)

n=length(accel)

a=kmeans(accel,m)

alpha=(a$size)/n

sigma=sqrt((a$withinss)/a$size)

miu=a$centers

prob <- matrix(rep(0,n\*m),ncol=m)

for (step in 1:k){

for (j in 1:m){

prob[,j]<- sapply(accel,dnorm,miu[j],sigma[j])

}

sumprob <- rowSums(prob)

prob<- prob/sumprob

oldmiu <- miu

oldsigma <- sigma

oldalpha <- alpha

for (j in 1:m){

p1 <- sum(prob[ ,j])

p2 <- sum(prob[ ,j]\*accel)

miu[j] <- p2/p1

alpha[j] <- p1/n

p3 <- sum(prob[ ,j]\*(accel-miu[j])^2)

sigma[j] <- sqrt(p3/p1)

}

epsilo <- 1e-5

if (sum(abs(miu-oldmiu))<epsilo &

sum(abs(sigma-oldsigma))<epsilo &

sum(abs(alpha-oldalpha))<epsilo) break

cat('step',step,'miu',miu,'sigma',sigma,'alpha',alpha,'\n')

}

}

二、运行结果：

> accel(2,100)

step 1 miu 10.14749 9.733779 sigma 0.7080735 2.380201 alpha 0.7918896 0.2081104

step 2 miu 10.04255 10.1037 sigma 0.3080895 2.234272 alpha 0.6919499 0.3080501

step 3 miu 10.04494 10.10703 sigma 0.1699974 2.443774 alpha 0.7350547 0.2649453

step 4 miu 10.0493 10.09622 sigma 0.1168147 2.487124 alpha 0.7423603 0.2576397

step 5 miu 10.05253 10.0856 sigma 0.1003918 2.441605 alpha 0.7321683 0.2678317

step 6 miu 10.0555 10.07672 sigma 0.09471252 2.399277 alpha 0.7224573 0.2775427

step 7 miu 10.05714 10.07216 sigma 0.09240649 2.376565 alpha 0.717056 0.282944

step 8 miu 10.05794 10.07002 sigma 0.09139312 2.365539 alpha 0.7143814 0.2856186

step 9 miu 10.05832 10.06902 sigma 0.09093234 2.360317 alpha 0.7131023 0.2868977

step 10 miu 10.0585 10.06856 sigma 0.09071966 2.357863 alpha 0.7124985 0.2875015

step 11 miu 10.05858 10.06834 sigma 0.09062083 2.356713 alpha 0.712215 0.287785

step 12 miu 10.05862 10.06824 sigma 0.09057477 2.356175 alpha 0.7120822 0.2879178

step 13 miu 10.05864 10.06819 sigma 0.09055326 2.355924 alpha 0.7120201 0.2879799

step 14 miu 10.05865 10.06817 sigma 0.09054322 2.355806 alpha 0.711991 0.288009

step 15 miu 10.05865 10.06816 sigma 0.09053852 2.355751 alpha 0.7119774 0.2880226

step 16 miu 10.05865 10.06816 sigma 0.09053633 2.355726 alpha 0.7119711 0.2880289

step 17 miu 10.05865 10.06815 sigma 0.0905353 2.355714 alpha 0.7119681 0.2880319

三、注意事项：

1. accel(M,K): M为模型中单高斯模型个数。K为迭代次数，建议M取越大，K取越大。一般在50-100左右，可根据现实情况做调整。
2. 程序中数据地址根据现实情况改变。