Cai

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1 准备图像

```
if (!require("png")) {
  install.packages("png")
  stopifnot(require("png"))
  }
```

```
## Loading required package: png
```

```
## Warning: package 'png' was built under R version 4.1.2
```

```
library(png)
cai <- readPNG("~/Downloads/IMG_1841.png")
red.cai <- cai[,,1] #red color channel
green.cai <- cai[,,2] #green color channel
blue.cai <- cai[,,3] #blue color channel
#我检查之后发现，第 4个图层全是空值，所以实际不存在。
```

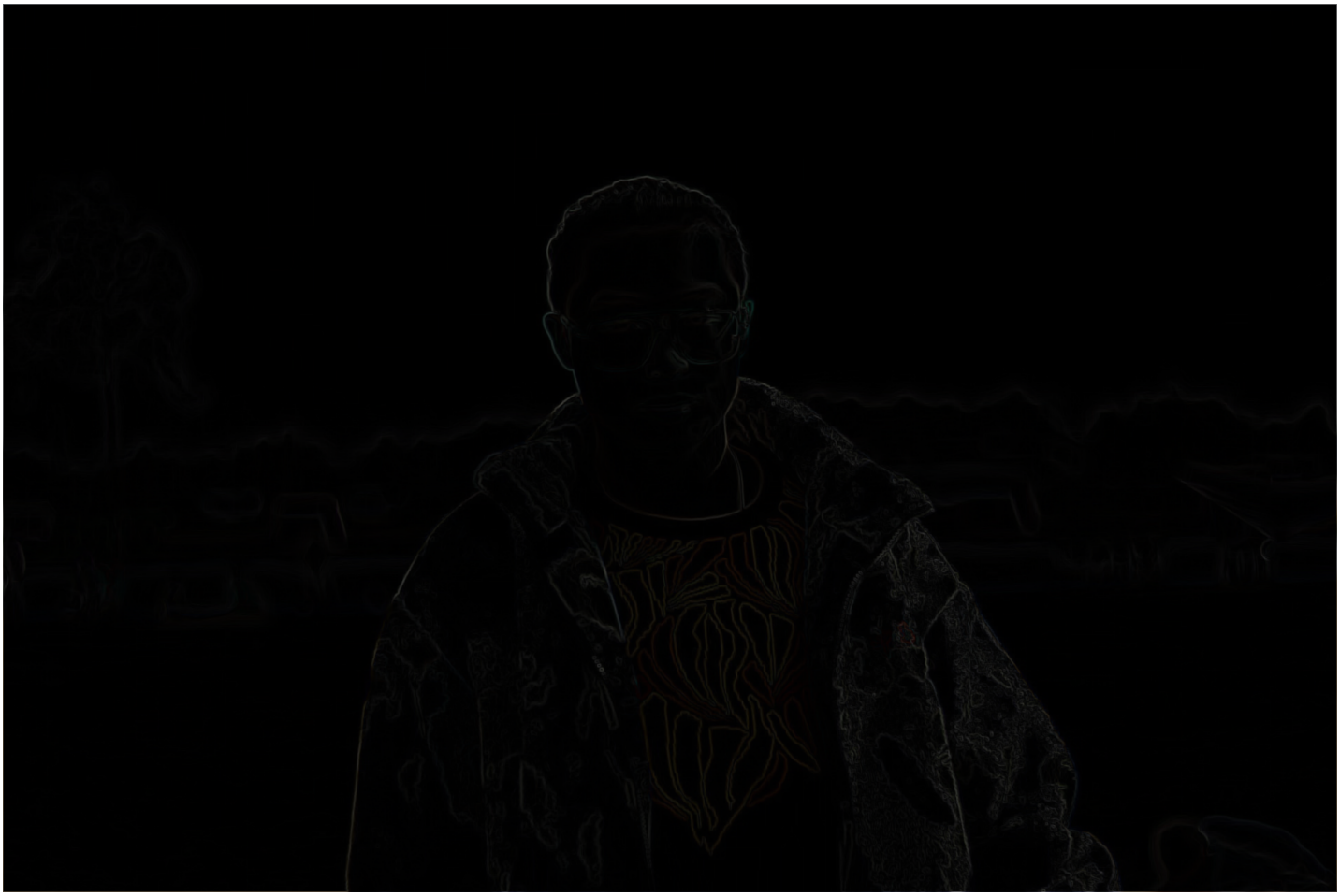
2 标准差画法：描绘框架

```
#Filter Sd Matrix
ksd=function(matrix, k){
  dimension=dim(matrix) #Store the dimensions of the matrix, say, n×m.
  pad.X <- matrix(0, dimension[1]+2*k, dimension[2]+2*k) #Pad the image with zeros,depen
ding on k.
  pad.X[(k+1):(dimension[1]+k), (k+1):(dimension[2]+k)] <- matrix
  pad.X.2 <- matrix(0, dimension[1], dimension[2])
  for (a in 1:dimension[1]){
    for (b in 1:dimension[2]){
      pad.X.2[a,b]<-sd(pad.X[a:(a+2*k), b:(2*k +b)])
    }
  }#obtain a sd matrix
  return(pad.X.2)
}
```

```
#Assemble the three processed matrices into an array
assemble=function(matrix1, matrix2,matrix3,k){
  result <- array(c(ksd(matrix1,k),ksd(matrix2,k),ksd(matrix3,k)),dim = c(dim(matrix1)
[1],dim(matrix2)[2],3))
  return(result)
}
```

```
#Use writePNG() function to create USERNAME_k.png, where k is the window size.
plot=function(result,k){
  return(writePNG(result,target =sprintf("Qinan_%s.png",k)))
}

plot(assemble(red.cai,green.cai,blue.cai,1),1) #Create files USERNAME_1.png
```



红绿蓝3个图层叠加（标准差画法）

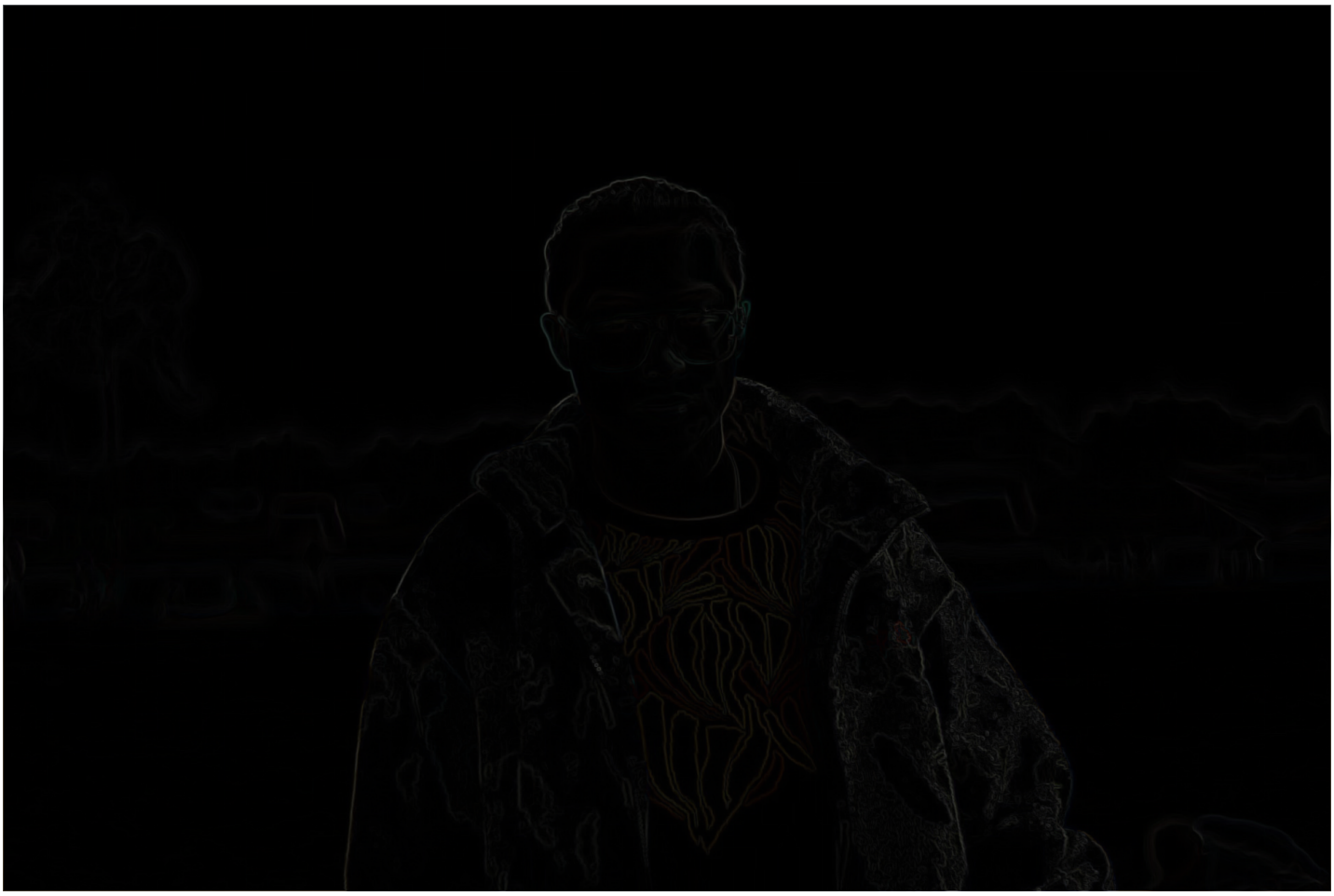
3 平均数画法：近似原图

```
#Filter Mean Matrix
kmean=function(matrix, k){
  dimension=dim(matrix) #Store the dimensions of the matrix, say, n×m.
  pad.X <- matrix(0, dimension[1]+2*k, dimension[2]+2*k) #Pad the image with zeros,depen
ding on k.
  pad.X[(k+1):(dimension[1]+k), (k+1):(dimension[2]+k)] <- matrix
  pad.X.2 <- matrix(0, dimension[1], dimension[2])
  for (a in 1:dimension[1]){
    for (b in 1:dimension[2]){
      pad.X.2[a,b]<-mean(pad.X[a:(a+2*k), b:(2*k +b)])
    }
  }#obtain a mean matrix
  return(pad.X.2)
}
```

```
#Assemble the three processed matrices into an array
assemble2=function(matrix1, matrix2,matrix3,k){
  result <- array(c(kmean(matrix1,k),kmean(matrix2,k),kmean(matrix3,k)),dim = c(dim(matr
ix1)[1],dim(matrix2)[2],3))
  return(result)
}
```

```
#Use writePNG() function to create USERNAME_k.png, where k is the window size.
plot2=function(result,k){
  return(writePNG(result,target =sprintf("Qinan_%s.png",k)))
}

plot2(assemble2(red.cai,green.cai,blue.cai,1),2) #Create files USERNAME_1.png
```



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