Lab05

Vanderlin Amorim Júnior - Curso Verão 2016 - Curso R

25 de fevereiro de 2016

Aula 05 - Laboratório

Recuperação de imagem

A bibliotecas utilizadas

```
library(magrittr)
library(ggplot2)
library(tidyr)
```

```
##
## Attaching package: 'tidyr'

## The following object is masked from 'package:magrittr':
##
##     extract
```

```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':
##
##     filter, lag

## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(jpeg)
library(tree)
```

Armazendo a imagem

```
img <- readJPEG("xadrez_colorido.jpg")
img_dim <- dim(img)

img_df <- data.frame(
  x = rep(1:img_dim[2], each = img_dim[1]),
  y = rep(img_dim[1]:1, img_dim[2]),
  r = as.vector(img[,,1]),
  g = as.vector(img[,,2]),
  b = as.vector(img[,,3])
) %>%
  mutate(cor = rgb(r, g, b),
         id = 1:n())
```

img__dim

img__dim <- dim(img)

ggplot(data = img)

```
img_df <- data.frame(
  x = rep(1:img_dim[2], each = img_dim[1]),
  y = rep(img_dim[1]:1, img_dim[2]),
  r = as.vector(img[,,1]),
  g = as.vector(img[,,2]),
  b = as.vector(img[,,3])
) %>%
  mutate(cor = rgb(r, g, b),
         id = 1:n())
```

mais codigo:

```
img_df_parte1 <- img_df %>%
  sample_frac(3/5) %>% # separando 3/5 do banco
  mutate(b_backup = b, # backup do azul original
         b = 0, # retirando o azul da imagem
         cor = rgb(r, g, b)) # cor da imagem sem o azul

dim(img_df_parte1)
```

```
## [1] 11059     8
```

```
img_df_parte2 <- img_df %>% filter(!id%in%img_df_parte1$id)
```

Exercício 5: Outra Imagem

Repita os exercícios de 1 a 4, mas agora para a imagem xadrez_colorido.jpg. Quanto ao desempenho para recuperar o azul de imagens, teve uma técnica melhor? Resposta: foi pela técnica da árvores de decisão

pelo modelo da regressão linear

```
modelo_lm = lm(b~r+g+x+y,data=img_df_parte2)
```

pelo modelo da árvores de decisão

```
modelo_tree = tree(b~r+g+x+y,data=img_df_parte2)
```

```
img_df_parte1 <- img_df %>%
  sample_frac(3/5) %>% # separando 3/5 do banco
  mutate(b_backup = b, # backup do azul original
         b = 0, # retirando o azul da imagem
         cor = rgb(r, g, b)) # cor da imagem sem o azul

dim(img_df_parte1)
```

```
## [1] 11059     8
```

```
predito_lm <- predict(modelo_lm,img_df_parte1)

summary(predito_lm)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 0.04254 0.13370 0.16650 0.17950 0.21940 0.33380
```

```
predito_tree <- predict(modelo_tree,img_df_parte1)

summary(predito_tree)
```

```
##    Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
## 0.03582 0.04657 0.04757 0.17930 0.04757 0.95730
```

```
summary(img_df_parte1)
```

```
##        x             y                r                  g
##  Min.   :  1   Min.   :  1.00   Min.   :0.000000   Min.   :0.000000
##  1st Qu.: 37   1st Qu.: 32.00   1st Qu.:0.007843   1st Qu.:0.003922
##  Median : 73   Median : 65.00   Median :0.290196   Median :0.023529
##  Mean   : 73   Mean   : 64.66   Mean   :0.412625   Mean   :0.250372
##  3rd Qu.:109   3rd Qu.: 96.00   3rd Qu.:0.941176   3rd Qu.:0.498039
##  Max.   :144   Max.   :128.00   Max.   :1.000000   Max.   :1.000000
##        b          cor                 id           b_backup
##  Min.   :0   Length:11059       Min.   :    4   Min.   :0.000000
##  1st Qu.:0   Class :character   1st Qu.: 4680   1st Qu.:0.007843
##  Median :0   Mode  :character   Median : 9261   Median :0.027451
##  Mean   :0                      Mean   : 9280   Mean   :0.180003
##  3rd Qu.:0                      3rd Qu.:13934   3rd Qu.:0.152941
##  Max.   :0                      Max.   :18431   Max.   :1.000000
```

```
mdf_predito_x <- img_df_parte1 %>%
  mutate(predito_lm,predito_tree)

summary(mdf_predito_x)
```

```
##        x             y                r                  g
##  Min.   :  1   Min.   :  1.00   Min.   :0.000000   Min.   :0.000000
##  1st Qu.: 37   1st Qu.: 32.00   1st Qu.:0.007843   1st Qu.:0.003922
##  Median : 73   Median : 65.00   Median :0.290196   Median :0.023529
```

```
##  Mean   : 73   Mean   : 64.66   Mean   :0.412625   Mean   :0.250372
##  3rd Qu.:109   3rd Qu.: 96.00   3rd Qu.:0.941176   3rd Qu.:0.498039
##  Max.   :144   Max.   :128.00   Max.   :1.000000   Max.   :1.000000
##         b          cor                    id           b_backup
##  Min.   :0   Length:11059       Min.   :    4   Min.   :0.000000
##  1st Qu.:0   Class :character   1st Qu.: 4680   1st Qu.:0.007843
##  Median :0   Mode  :character   Median : 9261   Median :0.027451
##  Mean   :0                      Mean   : 9280   Mean   :0.180003
##  3rd Qu.:0                      3rd Qu.:13934   3rd Qu.:0.152941
##  Max.   :0                      Max.   :18431   Max.   :1.000000
##    predito_lm       predito_tree
##  Min.   :0.04254   Min.   :0.03582
##  1st Qu.:0.13368   1st Qu.:0.04657
##  Median :0.16647   Median :0.04757
##  Mean   :0.17946   Mean   :0.17932
##  3rd Qu.:0.21939   3rd Qu.:0.04757
##  Max.   :0.33383   Max.   :0.95726
```

```
?summary
```

```
## starting httpd help server ...
```

```
##  done
```

```
mean((mdf_predito_x$b_backup-mdf_predito_x$predito_lm)^2)
```

```
## [1] 0.09264017
```

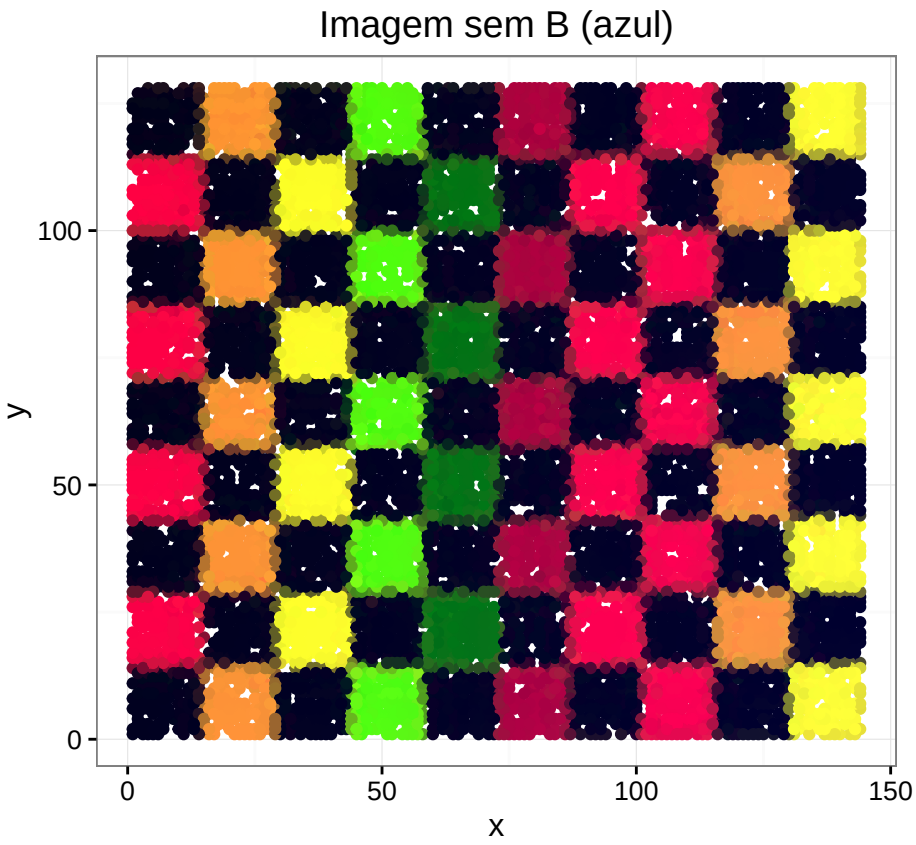
```
mean((mdf_predito_x$b_backup-mdf_predito_x$predito_tree)^2)
```

```
## [1] 0.006656049
```

```
mdf_predito_cores <- mdf_predito_x %>%
  mutate(predito_lm = ifelse(predito_lm < 0, 0, predito_lm),
         predito_tree = ifelse(predito_tree < 0, 0, predito_tree)) %>%
  mutate(cor_lm = rgb(r, g, predito_lm),
         cor_tree = rgb(r, g, predito_tree))
```

Tentativa de recuperação do azul pela regressão linear

```
ggplot(mdf_predito_cores, aes(x = x, y = y)) +
  geom_point(colour = mdf_predito_cores$cor_lm) +
  labs(x = "x", y = "y", title = "Imagem sem B (azul)") +
  coord_fixed(ratio = 1) +
  theme_bw()
```



Tentativa de recuperação do azul pela árvores de decisão

```
ggplot(mdf_predito_cores, aes(x = x, y = y)) +
  geom_point(colour = mdf_predito_cores$cor_tree) +
  labs(x = "x", y = "y", title = "Imagem sem B (azul)") +
  coord_fixed(ratio = 1) +
  theme_bw()
```

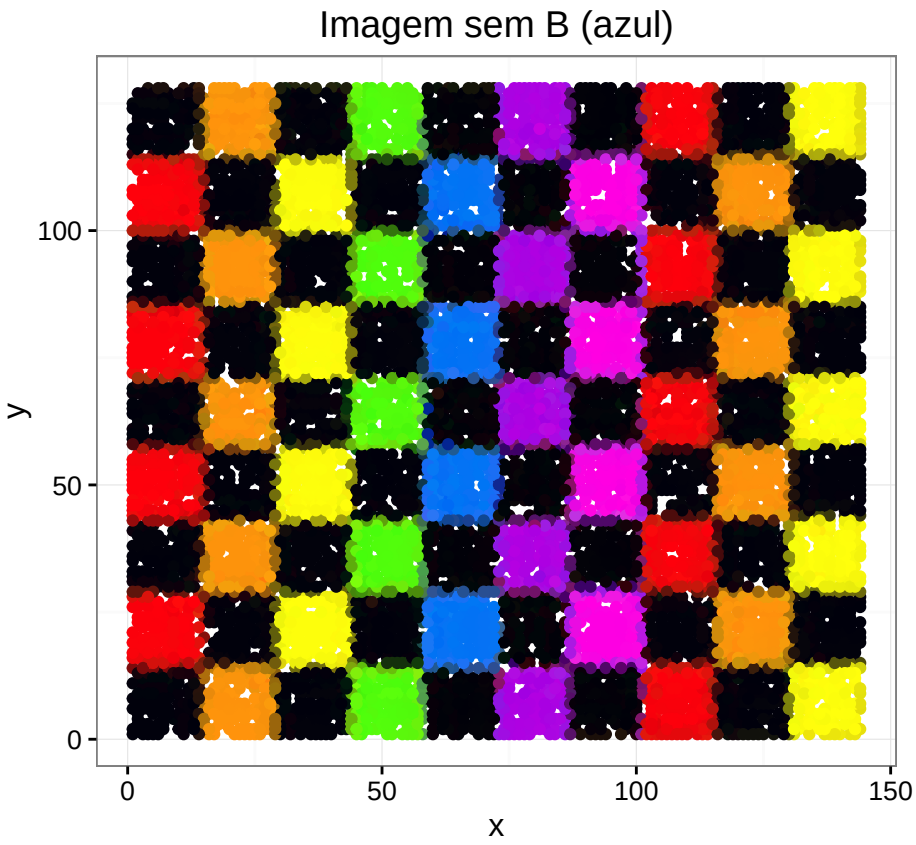


Imagem sem B (azul)
100
50
0
y
0
50
100
150
x