MonteHall

Thiyanga Talagala

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```r
reveal_host_choice <- function(door) {
door.allocation <- sample(c("goat","goat","car"))
notchosen <- c(1:3)[-door]
if (door.allocation[door] == "goat") {
if (door.allocation[notchosen[1]] =="goat")
host_choice = paste(door.allocation[notchosen[1]],
paste("door", notchosen[1], sep=" "), sep="-")
else
host_choice = paste(door.allocation[notchosen[2]],
paste("door", notchosen[2], sep=" "), sep="-")
}
else {
d <- sample(notchosen, 1)
host_choice = paste(door.allocation[d], paste("door", d, sep=" "), sep="-")
}
return(host_choice)
}

reveal_host_choice(1)
```

```
[1] "goat-door 3"
```

```r
play_montehall <- function(door, strategy="switch") {
door.allocation <- sample(c("goat","goat","car"))
notchosen <- c(1:3)[-door]
host_choice <- sample(notchosen, 1) # player choice is car

if (door.allocation[door] == "goat") { # player chice is goat
host_choice <- ifelse (door.allocation[notchosen[1]] == "goat",
notchosen[1], notchosen[2])
}

# Now employ strategy
final_door <- door.allocation[door] # Strategy is to stay with original choice

if (strategy == "switch") {
d <- notchosen[which(notchosen != host_choice)]
final_door <- door.allocation[d]
}

final_door
}


play_montehall(1)
```

```
[1] "car"
```

```
ncar.switch <- 0
for (i in 1:1000) {
if (play_montehall(door=1, strategy="switch") == "car")
ncar.switch <- ncar.switch+1
}
ncar.switch/1000
```
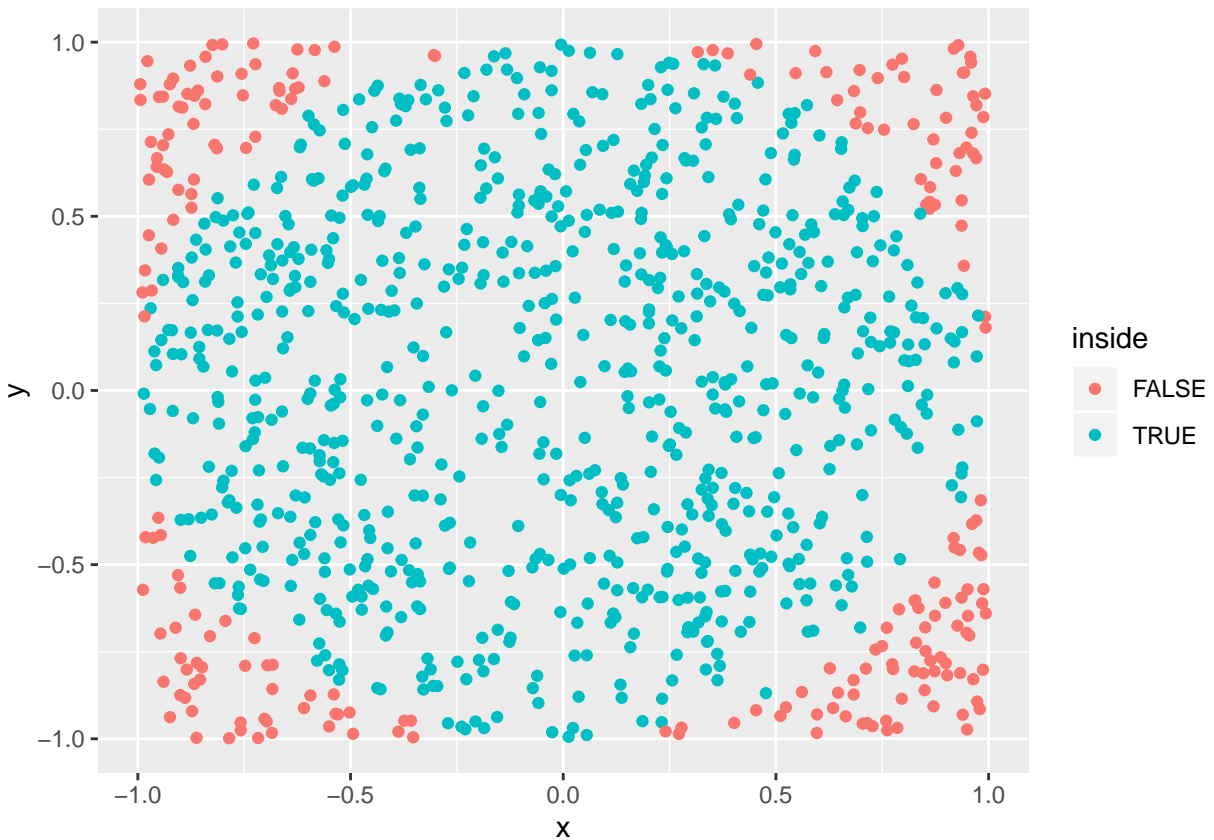
```
## [1] 0.643
```

```
ncar.stay <- 0
for (i in 1:1000) {
if (play_montehall(door=1, strategy="stay") == "car")
ncar.stay <- ncar.stay+1
}
ncar.stay/1000
```

```
## [1] 0.328
```

```
library(ggplot2)
estimate_pi <- function(N, R){
x <- runif(N, min= -R, max= R)
y <- runif(N, min= -R, max= R)
is.inside <- (x^2 + y^2) <= R^2
pi.estimate <- 4 * sum(is.inside) / N
pi.estimate
data.fr <- data.frame(x=x, y=y, inside=is.inside)
qplot(data=data.fr, x=x, y=y, col=inside)
}

estimate_pi(1000, 1)
```



```
#estimate_pi(1000000, 1)
```