First model output pattern analysis for validation

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Abstract

This document was produced for the purpose of presentation to Laurence, Eckhard and Ronald on 11/03/2022, the first BLT Model Meeting while in Germany. We will consider two runs (simple, n = 28 days each) with distinct values of `input_forget_val` (18 and 700, less and more memory, respectively). This value is similar to a 'working memory' and, the higher the value, more trees the tamarins remember.

Data

Empirical

```
dat.gua.orig <- read.csv2("D:/Data/Documentos/github/BLT-Movement-Patterns/asltraj/ltraj
dat.gua.orig <- dat.gua.orig %>%
  rename(datetime = POSIXct) %>%
  mutate(datetime = lubridate::ymd_hms(datetime))

dat.gua.orig <- dat.gua.orig %>%
  mutate(day = lubridate::day(datetime)) %>%
  mutate(month = lubridate::month(datetime))
unique(paste0(dat.gua.orig$day, "-", dat.gua.orig$month))
```

Simulated

```
ifv_18_tam <- read.table(here("Model_development", "BLT_Model_Meeting1", "input_forget_v
ifv_18_fru <- read.table(here("Model_development", "BLT_Model_Meeting1", "input_forget_v
ifv_18_slp <- read.table(here("Model_development", "BLT_Model_Meeting1", "input_forget_v

ifv_700_tam <- read.table(here("Model_development", "BLT_Model_Meeting1", "input_forget_
ifv_700_fru <- read.table(here("Model_development", "BLT_Model_Meeting1", "input_forget_
ifv_700_slp <- read.table(here("Model_development", "BLT_Model_Meeting1", "input_forget_
```
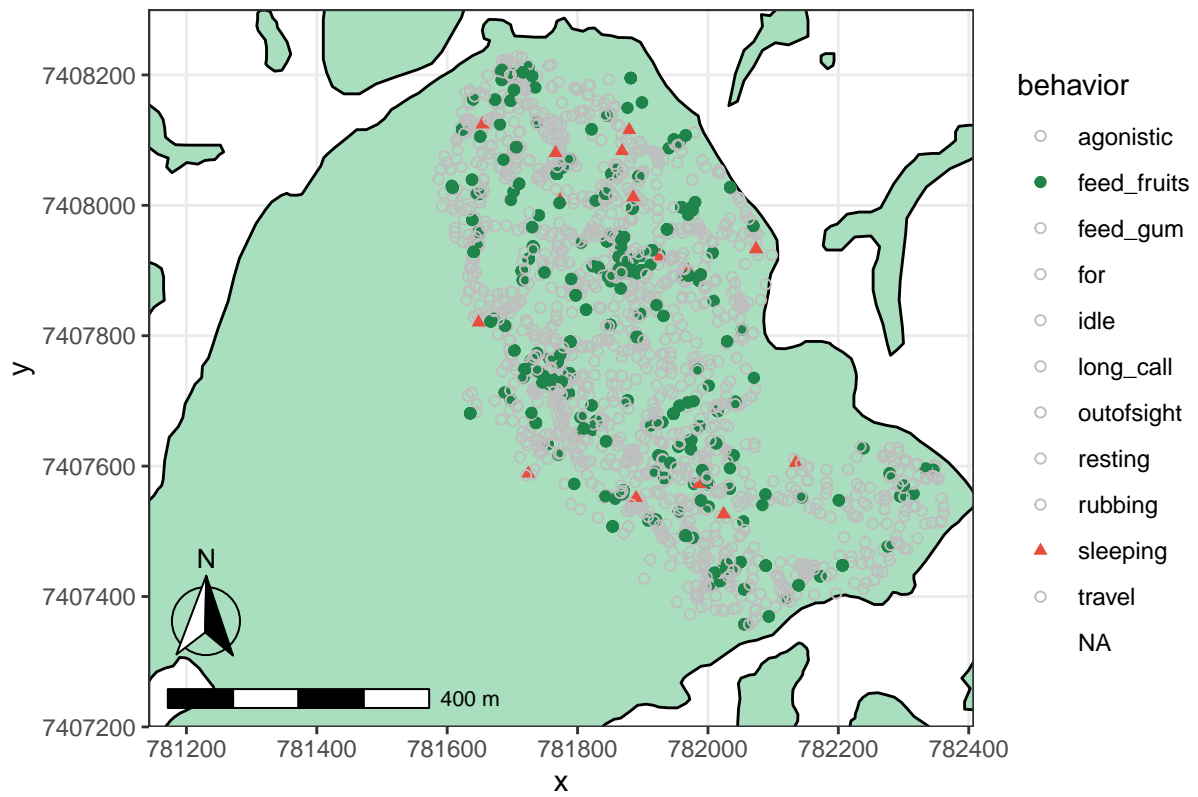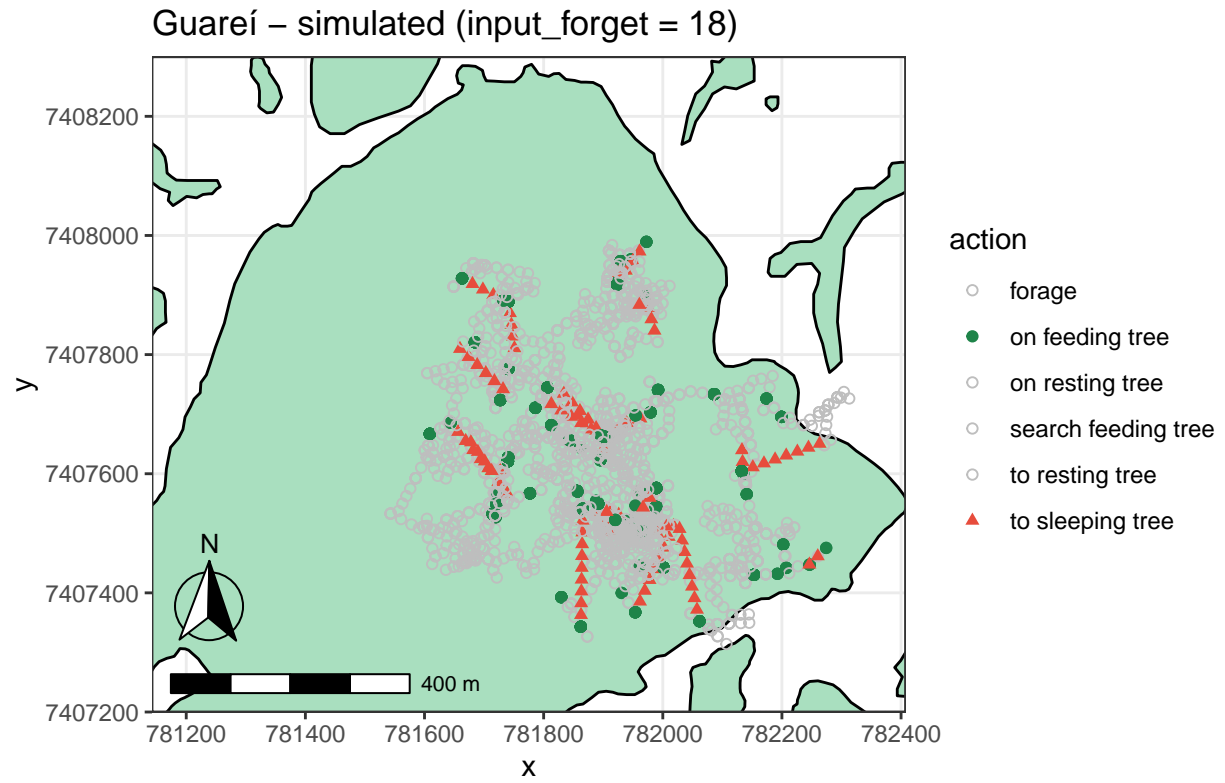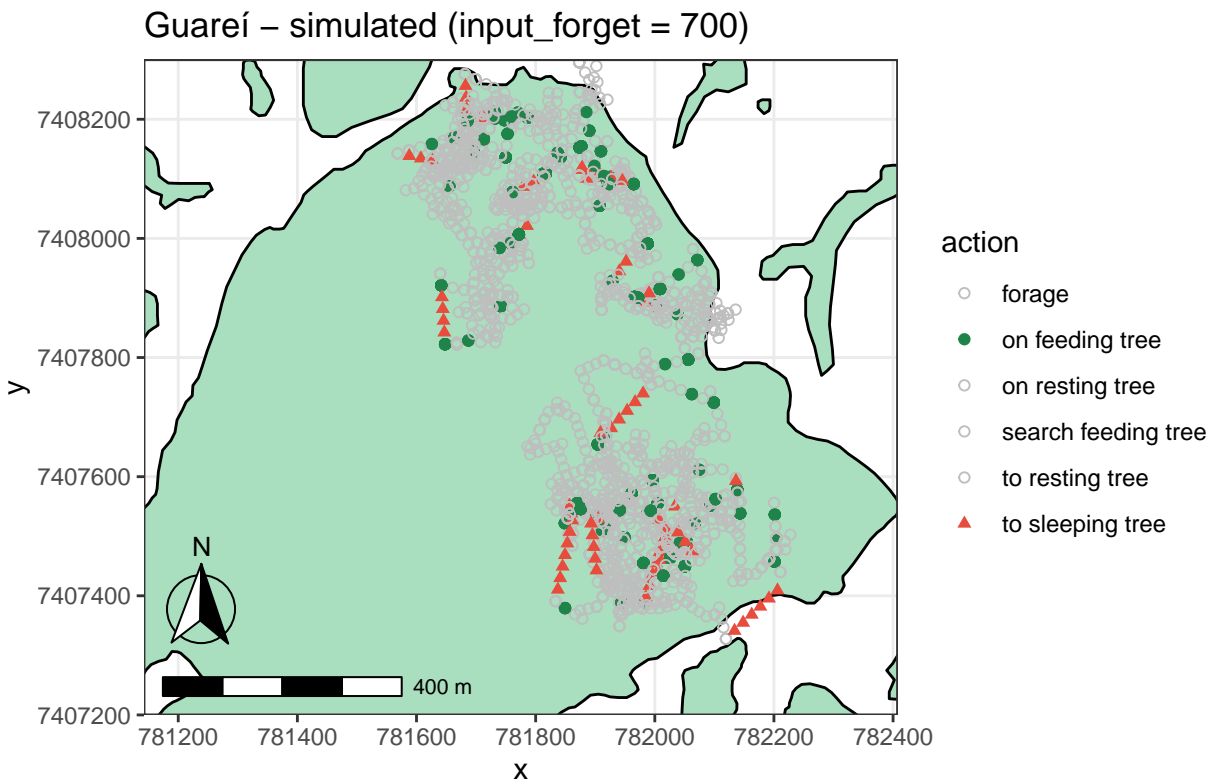
Spatial plots

Guareí empirical (all data, 28 days)

```
## Warning: Removed 276 rows containing missing values (geom_point).
```

Guareí – empirical

behavior

- ○ agonistic
- ● feed_fruits
- ○ feed_gum
- ○ for
- ○ idle
- ○ long_call
- ○ outofsight
- ○ resting
- ○ rubbing
- ▲ sleeping
- ○ travel
- NA

400 m

N

Guareí simulated

Guareí – simulated (input_forget = 18)

Guareí – simulated (input_forget = 700)

Patterns of validation

We are not checking seed dispersal patterns now, just movement related patterns.

Dayly Path Lenght (DPL)

Calculate DPL

```
dpl <- function(df) {
  dist_list <- numeric()
  dist <- numeric()
  for (df in split(df, df$day)) {
    dist <- 0
    for (i in 2:nrow(df)) {
      dist <- dist + sqrt((df$x[i] - df$x[i - 1]) ^ 2 +
                            (df$y[i] - df$y[i - 1]) ^ 2)
    }
    dist_list <- c(dist_list, dist)
  }
```
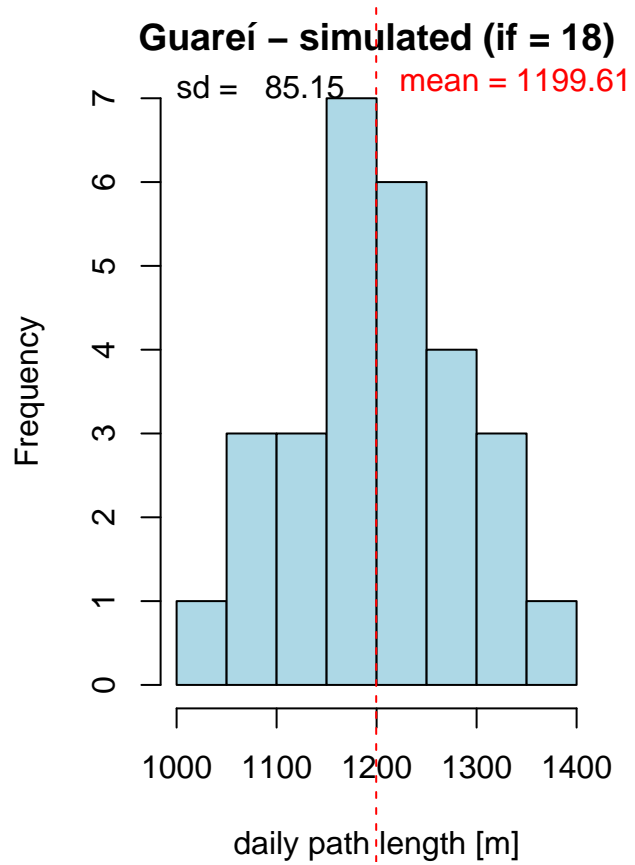
```
  return(dist_list)
}

dpl_18 <- dpl(df = ifv_18_tam)
dpl_700 <- dpl(df = ifv_700_tam)

avg_dist18 <- mean(dpl_18)
sd_dist18 <- sd(dpl_18)
avg_dist700 <- mean(dpl_700)
sd_dist700 <- sd(dpl_700)

# # ifv 18
# dist_list <- numeric()
# ad <- ifv_18_tam
#
# for(df in split(ad, ad$day)) {
# dist <- 0
#   for (i in 2:nrow(df)) {
#     dist <- dist + sqrt((df$x[i] - df$x[i - 1]) ^ 2 +
#                         (df$y[i] - df$y[i - 1]) ^ 2)
#   }
#   dist_list <- c(dist_list, dist)
# }
```
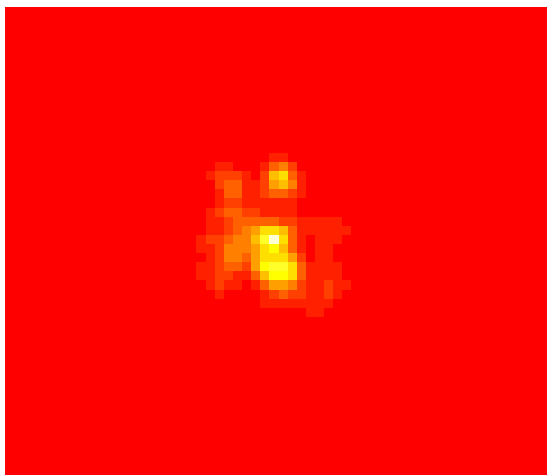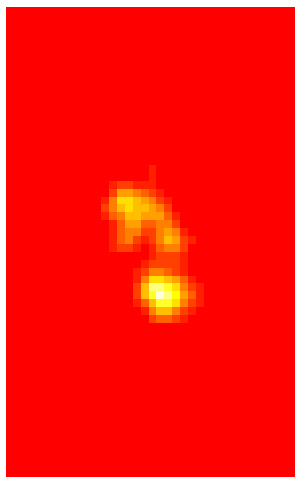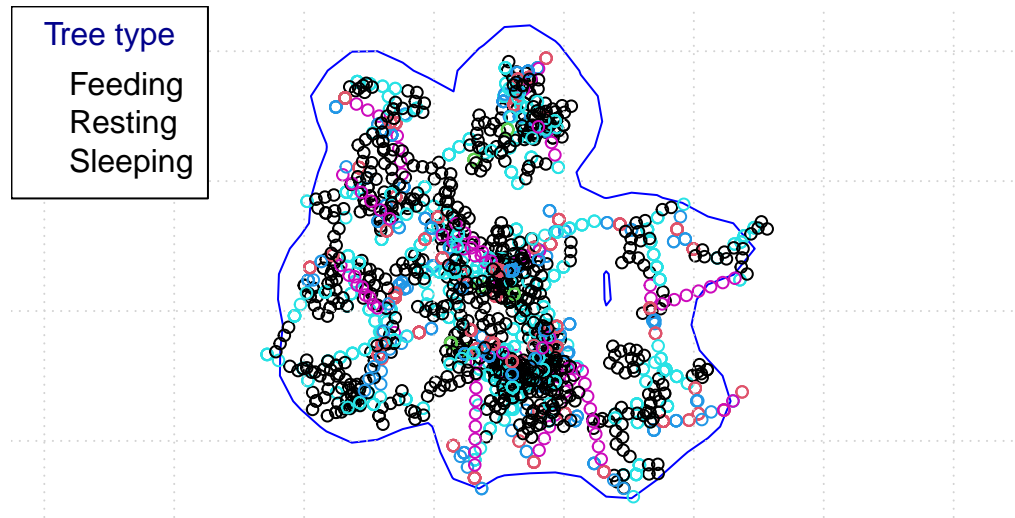
Plot DPL
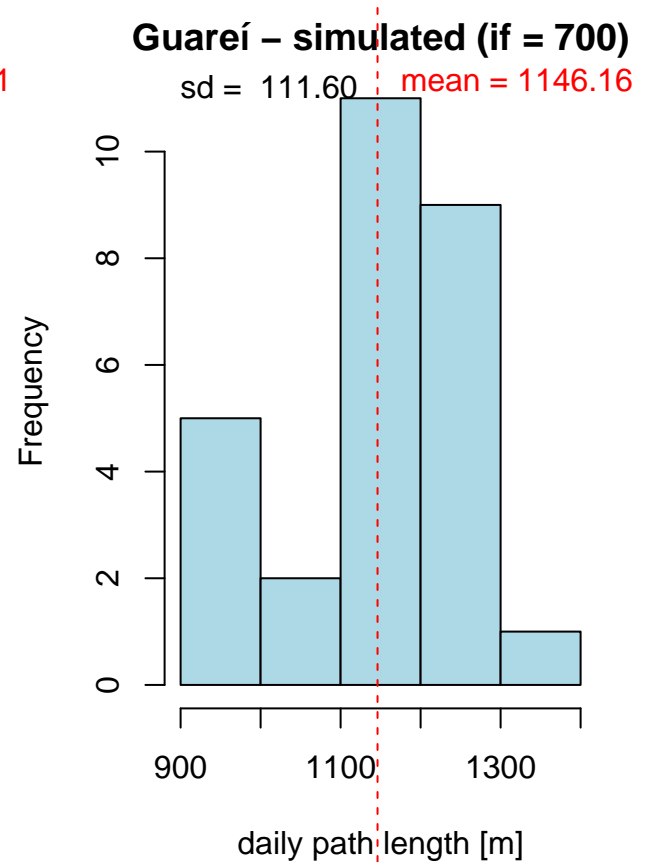
Home Range

Based on this vignette and Ronaald code

```
## [1] "35.7850444335937 ha"
```

```
## [1] "48.5105017578125 ha"
```

Tree type
Feeding
Resting
Sleeping

Turning Angles and Step Lenghts

Empirical

Simulated

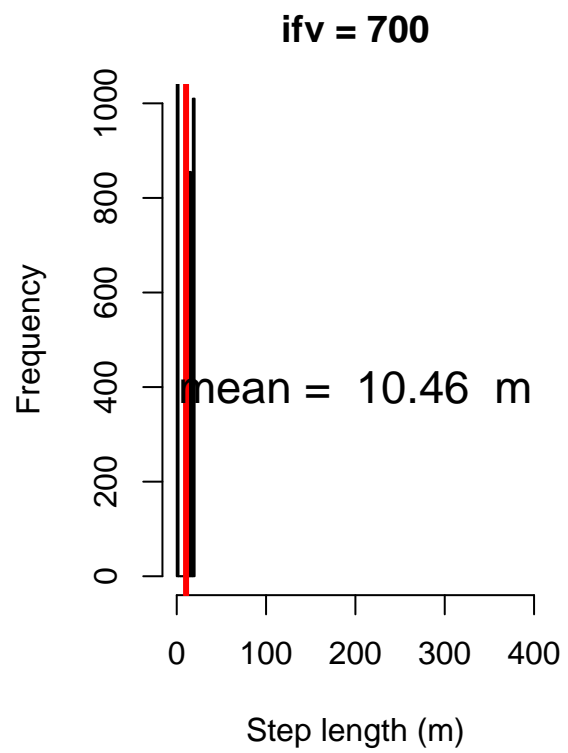```
[1] "Mean Relative Angle (degrees) ifv = 18: 0.850806549045215"

[1] "Mean Relative Angle (degrees) ifv = 700: 0.774590819021553"

[1] "Mean Relative Angle (degrees) ifv = 18: 48.7476244423811"

[1] "Mean Relative Angle (degrees) ifv = 700: 44.3807847795167"

[1] "Mean Step lenght (meters) ifv = 18: 10.8562176130296"

[1] "Mean Step lenght (meters) ifv = 700: 10.456989865881"
```
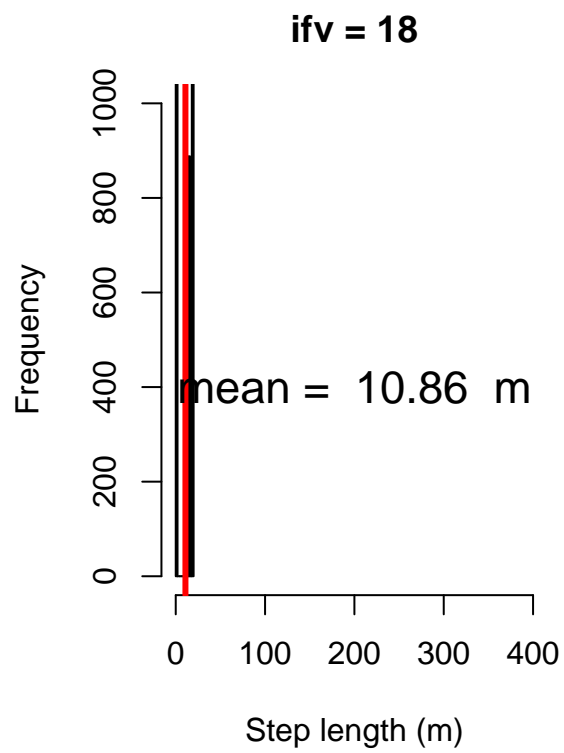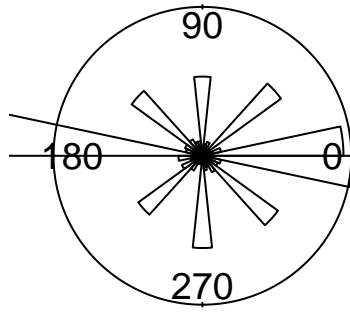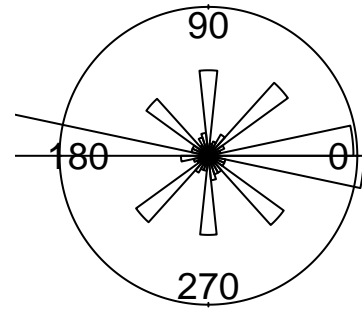
**ifv = 18**

**ifv = 700**

mean = 10.86 m

mean = 10.46 m

Frequency

Frequency

Step length (m)

Step length (m)

**ifv=18**                              **ifv=700**



Revisitations (coming soon)