Trendline_DTWdistance_per_Pen

Y. Gomez

1. Datafiles

```
require(mgcv)
```

```
distmat11 <- read.csv("G:/Gruppen/VPHI/Welfare/2- Research Projects/Yamenah
Gomez/Ranging_Data/Distmat11.csv", sep=",", header=T,stringsAsFactors=FALSE)
distmat12 <- read.csv("G:/Gruppen/VPHI/Welfare/2- Research Projects/Yamenah
Gomez/Ranging_Data/Distmat12.csv", sep=",", header=T,stringsAsFactors=FALSE)
distmat13 <- read.csv("G:/Gruppen/VPHI/Welfare/2- Research Projects/Yamenah
Gomez/Ranging_Data/Distmat13.csv", sep=",", header=T,stringsAsFactors=FALSE)
distmat14 <- read.csv("G:/Gruppen/VPHI/Welfare/2- Research Projects/Yamenah
Gomez/Ranging_Data/Distmat14.csv", sep=",", header=T,stringsAsFactors=FALSE)
```

Pen 11 2. Get Daywise matrices

```
rm(allmat)
allmat <- list(matrix(NA,ncol=108,nrow=108))# adjust ncol and nrow based on number of hens
within pen
for(g in 1:72) {
allmat[[g]] <- distmat11[seq(g, (72*108),72),seq(g,(72*108),72)] # change distmat based on Pen
}
```

general structure of next steps progress: d1 <- (allmat[[1]]) d1 <- d1[,-1] D1.mean <- mean((as.matrix(d1)),na.rm=T) Dall.mean <- rbind(D1.mean,D2.mean,D3.mean,D4.mean,D5.mean,D6.mean,D7.mean,D8.mean,D9.mean,D10.mean, etc.)

3. Additive Model

```
mod <- gamm(mean.value ~ s(Trueday,bs="cr"),
data = Dall.mean, method = "REML",
correlation = corAR1(form = ~ 1 | Date),
knots = list(Day = c(0, 72)))
summary(mod$gam)

pred <- predict(mod$gam, newdata = Dall.mean, type = "terms")
# the change from day 1 to day 72 in dissimilarity distance values
tail(pred[,1], 1) - head(pred[,1], 1)
```

4. Test Stationarity of the time series

if P < 0.05, this means time serie is stationary, so no trends, no seasonal effects

```
str(Dall.mean)
library(tseries)
adf.test(ts(Dall.mean$mean.value))
```

5.Visualization of trends

```
par(mfrow=c(1,2))
plot(mod$gam, residuals=TRUE,all.terms=TRUE, main="Pen 11", xlab="Days", ylab="mean DTW
dissimilarity distance")
ptemp <- attr(pred, "constant") + pred[,1]
plot(mean.value ~ Trueday, data = Dall.mean, type = "l",
main="Pen 11",
xlab = "Day",
ylab = "mean DTW distance")
lines(ptemp ~ Trueday, data = Dall.mean, col = "red", lwd = 2)
```

Pen 12 2. Get Daywise matrices

```
rm(allmat)
allmat <- list(matrix(NA,ncol=103,nrow=103))# adjust ncol and nrow based on number of hens
within pen
for(g in 1:72) {
allmat[[g]] <- distmat12[seq(g, (72*103),72),seq(g,(72*103),72)] # change distmat based on Pen
}
```

3. Additive Model

```
mod <- gamm(mean.value ~ s(Trueday,bs="cr"),
data = Dall.mean, method = "REML",
correlation = corAR1(form = ~ 1 | Date),
knots = list(Day = c(0, 72)))
summary(mod$gam)
pred <- predict(mod$gam, newdata = Dall.mean, type = "terms")
# the change from day 1 to day 72 in dissimilarity distance values
tail(pred[,1], 1) - head(pred[,1], 1)
```

4. Test Stationarity of the time series

```
str(Dall.mean)
library(tseries)
adf.test(ts(Dall.mean$mean.value))
```

5.Visualization of trends

```
plot(mod$gam, residuals=TRUE,all.terms=TRUE, main="Pen 12", xlab="Days", ylab="mean DTW
dissimilarity distance")
ptemp <- attr(pred, "constant") + pred[,1]
plot(mean.value ~ Trueday, data = Dall.mean, type = "l",
main="Pen 12",
xlab = "Day",
ylab = "mean DTW distance")
lines(ptemp ~ Trueday, data = Dall.mean, col = "red", lwd = 2)
```

Pen 13 2. Get Daywise matrices

```
rm(allmat)
allmat <- list(matrix(NA,ncol=106,nrow=106))# adjust ncol and nrow based on number of hens
within pen
for(g in 1:72) {
allmat[[g]] <- distmat13[seq(g, (72*106),72),seq(g,(72*106),72)] # change distmat based on Pen
}
```

3. Additive Model

```
mod <- gamm(mean.value ~ s(Trueday,bs="cr"),
data = Dall.mean, method = "REML",
correlation = corAR1(form = ~ 1 | Date),
knots = list(Day = c(0, 72)))
summary(mod$gam)
pred <- predict(mod$gam, newdata = Dall.mean, type = "terms")
# the change from day 1 to day 72 in dissimilarity distance values
tail(pred[,1], 1) - head(pred[,1], 1)
```

4. Test Stationarity of the time series

```
str(Dall.mean)
library(tseries)
adf.test(ts(Dall.mean$mean.value))
```

5.Visualization of trends

```
par(mfrow=c(1,2))
plot(mod$gam, residuals=TRUE,all.terms=TRUE, main="Pen 13", xlab="Days", ylab="mean DTW
dissimilarity distance")
ptemp <- attr(pred, "constant") + pred[,1]
plot(mean.value ~ Trueday, data = Dall.mean, type = "l",
main="Pen 13",
xlab = "Day",
ylab = "mean DTW distance")
lines(ptemp ~ Trueday, data = Dall.mean, col = "red", lwd = 2)
```

Pen 14 2. Get Daywise matrices

```
rm(allmat)
allmat <- list(matrix(NA,ncol=104,nrow=104))# adjust ncol and nrow based on number of hens
within pen
for(g in 1:72) {
allmat[[g]] <- distmat14[seq(g, (72*104),72),seq(g,(72*104),72)] # change distmat based on Pen
}
```

3. Additive Model

```
mod <- gamm(mean.value ~ s(Trueday,bs="cr"),
data = Dall.mean, method = "REML",
correlation = corAR1(form = ~ 1 | Date),
knots = list(Day = c(0, 72)))
summary(mod$gam)
pred <- predict(mod$gam, newdata = Dall.mean, type = "terms")
# the change from day 1 to day 72 in dissimilarity distance values
tail(pred[,1], 1) - head(pred[,1], 1)
```

4. Test Stationarity of the time series

```
str(Dall.mean)
library(tseries)
adf.test(ts(Dall.mean$mean.value))
```

5.Visualization of trends

```
par(mfrow=c(1,2))
plot(mod$gam, residuals=TRUE,all.terms=TRUE, main="Pen 14", xlab="Days", ylab="mean DTW
dissimilarity distance")
ptemp <- attr(pred, "constant") + pred[,1]
plot(mean.value ~ Trueday, data = Dall.mean, type = "l",
main="Pen 14",
xlab = "Day",
ylab = "mean DTW distance")
lines(ptemp ~ Trueday, data = Dall.mean, col = "red", lwd = 2)
```