A7_Jewitt_Ally

Ally Jewitt

2023-03-01

Link to GitHub

GitHub (https://github.com/allyjewitt/BIOL432_Assignment7)

Append dragons to the nexus data set

```
library(ape)
DragonNexus<-read.nexus.data("./data/DragonMatrix.nex.txt")
```

```
DragonNexus <- readLines("./data/DragonMatrix.nex.txt")

DragonTax <- c("75GermanXX", "76GermanXX", "77BritishX")
Codes <- c("100111110100100110001000000000111000000001101000001100100000111000000000011100", "1001011101001001010
001000000001100000010000000000011000010001011100011000011010", "1001001101001100110000010001000110000010000010100
110001000001100000000000011100")

nchar <- 78

DragonNexus <- c(DragonNexus, "MATRIX")
for (i in seq_along(DragonTax)) {
  BinaryCode <- substr(paste(rep("0", nchar - nchar(Codes[i])), collapse=""), 1, nchar - nchar(Codes[i]))
  BinaryCode <- paste(BinaryCode, Codes[i], sep="")
  DragonNexus <- c(DragonNexus, paste(DragonTax[i], BinaryCode))
}

DragonNexus <- c(DragonNexus, "END;")

write.table(DragonNexus, file = "UpdatedDragonNexus.nex.txt", sep = "")
```

```
DragonNexus2<-read.nexus.data("./input/DragonNexus2.nex.txt")
DragonNexusDF<-data.frame(matrix(unlist(DragonNexus2),ncol=79, byrow=T))
row.names(DragonNexusDF)<-names(DragonNexus2)
DragonNexusDF <- DragonNexusDF[ -c(79) ]
```

Apply the trait weightings

```
weightsDat<-read.csv("./Data/weights.csv")
```

```
weights<-paste0(weightsDat$Weight, collapse="")
weights<-strsplit(weights,split="")[[1]]
```

```
LETTERS
```

```
##  [1] "A" "B" "C" "D" "E" "F" "G" "H" "I" "J" "K" "L" "M" "N" "O" "P" "Q" "R" "S"
## [20] "T" "U" "V" "W" "X" "Y" "Z"
```

```
which(LETTERS=="G")
```

```
## [1] 7
```

```
weightsNum<-rep(NA,length(weights))
for(i in 1:length(weightsNum)){
  if(weights[i] %in% LETTERS){
    weightsNum[i]<-which(LETTERS==weights[i])+9
  } else{
    weightsNum[i]<-weights[i]
  }
}
weightsNum<-as.numeric(weightsNum)
length(weightsNum)
```

```
## [1] 78
```

```
wtDragonNexus<-DragonNexus2
for (i in 1:length(DragonNexus2)){
  RepWeight<-DragonNexus2[[i]]==1
  wtDragonNexus[[i]][RepWeight]<-weightsNum[RepWeight]
  RepWeight<-NA
}
```

```
wtDragonNexusDF<-data.frame(matrix(unlist(wtDragonNexus),ncol=79,byrow=T))
wtDragonNexusDF <- wtDragonNexusDF[ -c(79) ]
row.names(wtDragonNexusDF)<-names(wtDragonNexus)
wtDragonDist<-dist(wtDragonNexusDF,method='euclidean')
```

```
## Warning in dist(wtDragonNexusDF, method = "euclidean"): NAs introduced by
## coercion
```

Embed dragon images

Figure 1. Fire-breathing dragon with wings by Friedrich Justin Bertuch (https://en.wikipedia.org/wiki/Friedrich_Justin_Bertuch) from 1806

Dragon 1 URL (https://www.google.com/url?sa=i&url=https%3A%2F%2Fen.wikipedia.org%2Fwiki%2FDragon&psig=AOvVaw09SSA2l0HfbVopFwmELo9G&ust=1677763755347000&source=images&cd=vfe&ve

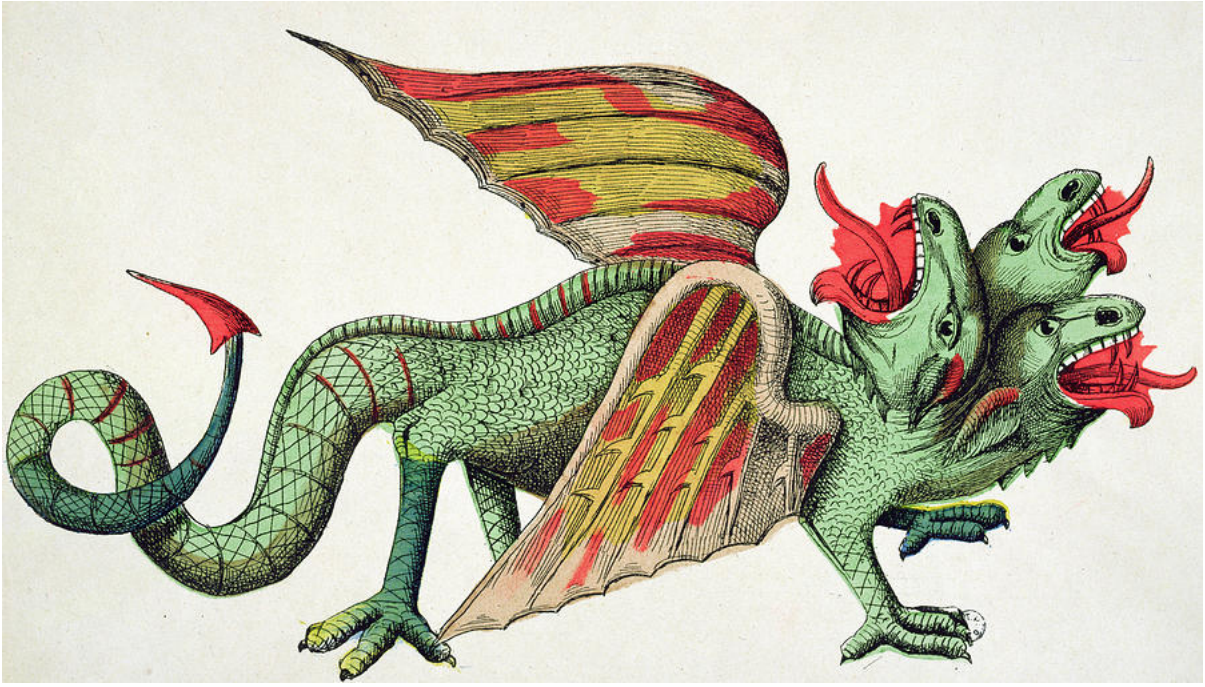


Figure 2. Fire-Spitting Three Headed Dragon painting by German School, 2013.

Dragon 2 URL (https://www.google.com/url?sa=i&url=https%3A%2F%2Fpixels.com%2Ffeatured%2Fthree-headed-dragon-spitting-fire-german-school.html&psig=AOvVaw09SSA2l0HfbVopFwmELo9G&ust=1677763755347000&source=images&cd=vfe&ved=0CBAQjRxqFwoTCMCIvpbruv0CFQAAAAAdAAAAA

Figure 3. Creator is unknown

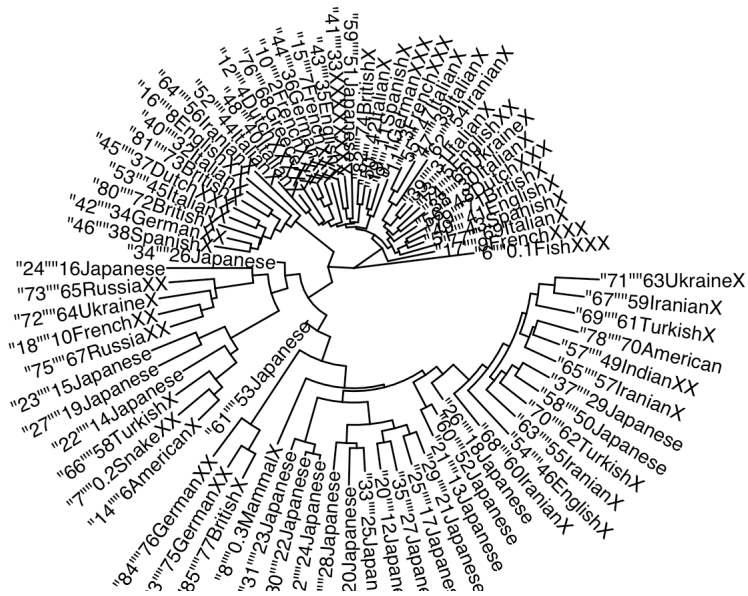
Dragon 3 URL (https://www.google.com/url?sa=i&url=https%3A%2F%2Fdreamsandmythology.com%2Fmythical-dragons%2F&psig=AOvVaw09SSA2l0HfbVopFwmELo9G&ust=1677763755347000&source=images&cd=vfe&ved=0CBAQjRxqFwoTCMCIvpbruv0CFQAAAAAdAAAA

Create phylogeny

```
library(ggtree)
WtDragonTree<-fastme.bal(wtDragonDist)
WtDragonTreeNJ<-nj(wtDragonDist)
```

```
library(ape)
ggtree(WtDragonTree,layout="circular") + geom_tiplab()
```

```
## ! The tree contained negative edge length. If you want to ignore the edge, you
## can set `options(ignore.negative.edge=TRUE)`, then re-run ggtree.
```


"71""63UkraineX
"67""59IranianX
"69""61TurkishX
"78""70American
"57""49IndianXX
"65""57IranianX
"37""29Japanese
"58""50Japanese
"70""62TurkishX
"63""55IranianX
"54""46EnglishX
"68""60IranianX
"18Japanese
"32Japanese
"13Japanese
"21Japanese
"17Japanese
"27Japanese
"12Japanese
"25Japanese
"20Japanese
"33Japanese
"28Japanese
"24Japanese
"22Japanese
"23Japanese
"31Japanese
"3Mammal
"8Japanese
"77British
"75German
"76German
"61Japanese
"53Japanese
"14American
"6Snake
"7Turkish
"0.2Japanese
"66Japanese
"58Japanese
"22Japanese
"19Japanese
"27Japanese
"14Japanese
"23Japanese
"15Japanese
"75Japanese
"67Russia
"10French
"18Russia
"64Ukraine
"72Russia
"73Russia
"65Russia
"16Japanese
"24Japanese
"26Japanese
"34Spanish
"38Spanish
"46German
"34German
"42British
"72British
"80Italian
"45Italian
"53Dutch
"37Dutch
"45Dutch
"81Italian
"39Italian
"40British
"8English
"16English
"56Iran
"64Iran
"52Iran
"12Iran
"48Iran
"4Dutch
"76Dutch
"10Dutch
"44Dutch
"36German
"15German
"43German
"31German
"59French
"41French
"33French
"5French
"51French
"27British
"13Italian
"14Spanish
"42Italian
"34Iranian
"62Italian
"70Italian
"78Italian
"54Iranian
"46Iranian
"38Iranian
"30Iranian
"22Iranian
"6Ukraine
"14Ukraine
"22Ukraine
"30Ukraine
"38Ukraine
"46Ukraine
"54Ukraine
"62Ukraine
"70Ukraine
"78Ukraine
"54English
"62English
"70English
"78English
"46English
"38English
"30English
"22English
"6English
"14English
"22British
"30British
"38British
"46British
"54British
"62British
"70British
"78British
"54Dutch
"62Dutch
"70Dutch
"78Dutch
"46Dutch
"38Dutch
"30Dutch
"22Dutch
"6Dutch
"14Dutch
"22Italian
"30Italian
"38Italian
"46Italian
"54Italian
"62Italian
"70Italian
"78Italian
"54Iranian
"62Iranian
"70Iranian
"78Iranian
"46Iranian
"38Iranian
"30Iranian
"22Iranian
"6Iranian
"14Iranian
"22Spanish
"30Spanish
"38Spanish
"46Spanish
"54Spanish
"62Spanish
"70Spanish
"78Spanish
"54French
"62French
"70French
"78French
"46French
"38French
"30French
"22French
"6French
"14French
"22German
"30German
"38German
"46German
"54German
"62German
"70German
"78German
"54British
"62British
"70British
"78British
"46British
"38British
"30British
"22British
"6British
"14British