GSoC: Periodic Time Changepoint Detection Easy Test

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2024-04-01

Easy Test

Goal:

install the existing (Bayesian) periodic code from https://github.com/taylors2/PeriodCPT and run it on some binary data. Create fully reproducible code in Rmarkdown.

Install Necessary Packages

```
# Install devtools if not already installed
if (!requireNamespace("devtools", quietly = TRUE)) install.packages("devtools")

# set GITHUB_PAT to access github packages
if (!requireNamespace("PeriodCPT", quietly = TRUE)){
  Sys.setenv(GITHUB_PAT = "github_pat_11AP2TE5Y0G3nMiRDMf8LP_kYeGUKQIc5nFwL3A6Mi1TrixzC0D7NK571PrvQJpil
  # Install PeriodCPT from GitHub
  devtools::install_github("taylors2/PeriodCPT")
}

# Load the PeriodCPT package
library(PeriodCPT)
```

Generate Binary Data

```
set.seed(217) # For reproducibility
binary_data = ts( rbinom(90, size = 1, prob = rep(c(0.2, 0.8), each=6)), freq = 12)
```

Run PeriodCPT on the binary_data

```
PeriodCPT(binary_data, distribution = "bern", niter = 1e3)
```

```
## Chain 1/1 (iteration):  |====================|
```

```
## Class 'pcpt' : Changepoint Object
##         ~~   : S4 class containing 18 slots with names
##                version data.set periodlength minseglen npcpts.max distribution nsegparam pcpt.prior pa
##
## Created on   : Sun Mar 31 23:19:32 2024
##
## summary(.)   :
## ----------
## Created Using changepoint version 1.2.1
## Distribution            :  bern
## Period length           :  12
## Minimum Segment Length  :  1
## Maximum no. of cpts     :  12
## Number of chains        :  1
## Number of periodic segs :  3
## Periodic cpt locations  :  6, 8, 11
## Seg. parameters at mode :
##             Seg1      Seg2 Seg3
## Param1 0.2181818 0.5714286    1
```

Summary

- The summary indicates that the binary data exhibits periodic behavior with significant variations in patterns across different segments within the specified period length. Specifically, it identifies three distinct segments within each period.