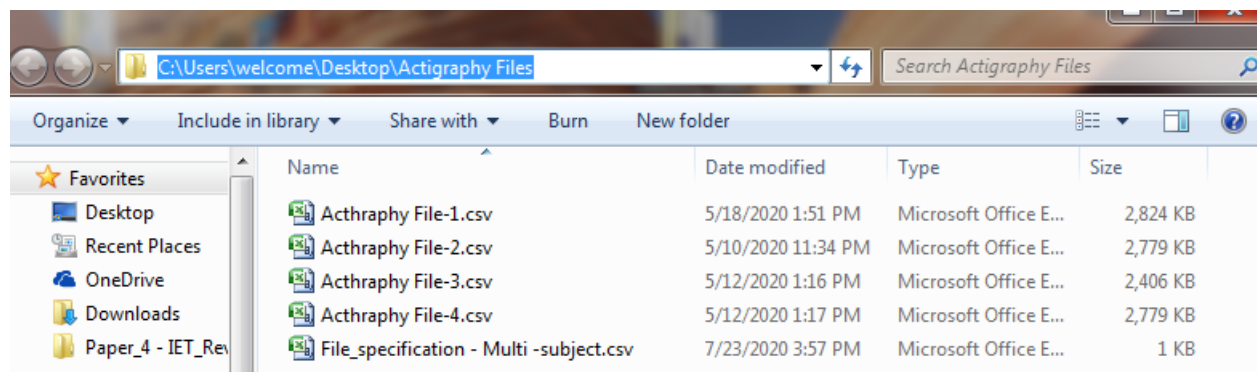


nparACT_carv R-GUI

This documents explains how to analyze actigraphy data using R Graphical User Interfaces (shiny). This GUI incorporate two analysis; nparACT and carv .

Step 1: All **actigraphy csv** files you need to analyze and a **file specification** file place in a single folder.

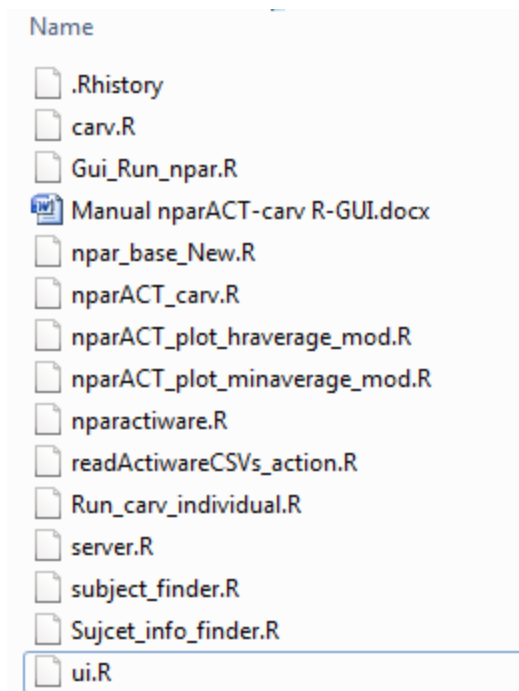
eg: You need to analyze 4 actigraphy files, and you placed all in a single folder "Actigraphy Files"



file specification : This is the information about the subject, start date& time, end date & time for the analysis. It should be a csv file and the format for file specification is given below.

| | A | B | C | D | E | F | G |
|---|----------|------------|-------------|------------|-------------|---|---|
| 1 | subject | start.day | start.time | end.day | end.time | | |
| 2 | 1741-001 | 12/26/2015 | 12:00:00 PM | 12/31/2015 | 12:00:00 PM | | |
| 3 | 1741-005 | 3/13/2016 | 12:00:00 PM | 3/18/2016 | 12:00:00 PM | | |
| 4 | | | | | | | |
| 5 | | | | | | | |
| 6 | | | | | | | |

Step 2 : Open the folder contain R-GUI, ie, " nparACT_carv R-GUI 7-27-2020". This folder look like this:



Open Rstudio and set the working directory `setwd("path")`. Eg: your R-GUI folder is at desktop, then, `setwd("/Desktop/ nparACT_carv R-GUI 7-27-2020")`

Step 3 : open "ui.R" in R. Click on the "Run App" button. Now the GUI appears as shown below.

The screenshot shows a web browser window displaying a Shiny application titled "nparACT & carv Analysis". The browser address bar shows "http://127.0.0.1:4375". The application interface is divided into two main panels: a left sidebar for input and a right panel for results.

Left Panel (Inputs):

- Enter the input Upload the files:** Includes a "Browse..." button and a status "No file selected".
- 104857600** (Text input)
- Enter the start time for individual file run:** Includes a text input with "12:00:00 PM" and a "Click for individual file run" button.
- Upload the run specification file:** Includes a "Browse..." button and a status "No file selected".
- Enter the subject ID:** Includes a text input and a "Click for file information" button.
- Enter the start date of analysis(M/D/YYYY):** Includes a text input.
- Enter the end day of analysis(M/D/YYYY):** Includes a text input.
- Enter the start time of analysis(H:M:S PM/AM):** Includes a text input with "12:00:00 PM".
- Enter the end time of analysis(H:M:S PM/AM):** Includes a text input with "12:00:00 PM".
- Enter the sampling time (Minute):** Includes a text input.

Right Panel (Results):

- Results** (Section header)
- subject ID** (Text input)
- Run specification** (Text input)
- Individual Result carv** (Text input)
- Individual Result nparACT** (Text input)
- Download Individual file Results** (Download icon button)
- Subject informations** (Text input)
- Parameter estimates of curve fit** (Text input)
- nparACT variables (Activity)** (Text input)
- nparACT variables (White Light)** (Text input)
- Download Results** (Download icon button)
- Download the plot** (Download icon button)

Step 4 : Fill the input fields.

a. "Upload the file:"

Click on the browser button and navigate to the folder that contain the actiware file (csv)

b. "Enter the start time for individual file run" (Optional)

If you want individual file run, enter the start time for individual file. Default time is 12:00:00 PM.

c. "Click for individual file run" (Optional)

If you need to analyze each file individually(In one Run), click this button. Output will result look like as follows

The screenshot displays the software's input and results sections. On the left, the 'Enter the input' section includes a file upload area with a 'Browse...' button and a status bar showing '4 files' and 'Upload complete'. Below this is a text field for 'Enter the start time for individual file run' set to '12:00:00 PM', a 'Click for individual file run' button, and a 'Upload the run specification file' section with another 'Browse...' button and 'No file selected' status. Further down are fields for 'Enter the subject ID:', 'Click for file information', 'Enter the start date of analysis(M/D/YYYY):', and 'Enter the end day of analysis(M/D/YYYY):'. On the right, the 'Results' section contains two tables. The first table, 'subject ID', has columns 'V2', 'V2.1', and 'V2.2' with values '1741-001', '1741-005', and '200445-010'. The second table, 'Individual Result carv', has columns 'Idcode', 'T.sampling', 'missing.data', 'actamp', 'actbeta', 'actphi', 'actmin', 'actmesor', 'actupmesor', and 'actdownmesor', listing data for four 'Acthraphy' files. A third table, 'Individual Result nparACT', has columns 'IS', 'IV', 'RA', 'L5', 'L5_starttime', 'M10', and 'M10_starttime', showing numerical and time data for three rows.

| subject ID | V2 | V2.1 | V2.2 |
|------------|----------|----------|------------|
| | 1741-001 | 1741-005 | 200445-010 |

| Individual Result carv | | | | | | | | | |
|------------------------|------------|--------------|--------|---------|--------|--------|----------|------------|--------------|
| Idcode | T.sampling | missing.data | actamp | actbeta | actphi | actmin | actmesor | actupmesor | actdownmesor |
| Acthraphy File-1.csv | 0.50 | 6.00 | 1.46 | 6.88 | 16.50 | 0.12 | 0.85 | 8.93 | 24.0 |
| Acthraphy File-2.csv | 0.50 | 4.66 | 1.31 | 15.78 | 14.72 | 0.13 | 0.78 | 6.66 | 22.7 |
| Acthraphy File-3.csv | 0.50 | 0.01 | 1.48 | 8.32 | 16.27 | 0.16 | 0.90 | 7.84 | 24.7 |
| Acthraphy File-4.csv | 0.50 | 4.66 | 1.31 | 15.78 | 14.72 | 0.13 | 0.78 | 6.66 | 22.7 |

| Individual Result nparACT | | | | | | |
|---------------------------|------|------|-------|--------------|--------|---------------|
| IS | IV | RA | L5 | L5_starttime | M10 | M10_starttime |
| 0.49 | 0.97 | 0.82 | 11.92 | 23:32:00 | 122.86 | 08:57:00 |
| 0.53 | 0.86 | 0.90 | 5.41 | 00:05:00 | 106.31 | 07:09:00 |
| 0.66 | 0.75 | 0.93 | 6.25 | 01:49:30 | 174.97 | 07:47:30 |

You can download the result by clicking "Download file Individual Result"

Run the program with file specification csv file (Optional)

d. "Upload the run specification file"

Click on the browser button and navigate to the folder that contain the run specification file (csv). When you finish the upload, Other input fields except **"Enter the sampling time (Minute):"** will disable.

e. "Click for the file information"

It will give the information about all the subject that you specified in the file specification. If the subject in the specification file not present in uploaded file list, then an error message will appeared. **Error! subject not uploaded**

Now the GUI is look like as shown below.

The screenshot shows the nparACT R-GUI interface. The browser address bar indicates the URL is http://127.0.0.1:4375. The interface includes a sidebar on the left with input fields for subject ID and start time, and a main panel on the right with several tabs.

Run specification

| subject | start.day | start.time | end.day | end.time |
|----------|------------|-------------|------------|-------------|
| 1741-001 | 12/26/2015 | 12:00:00 PM | 12/31/2015 | 12:00:00 PM |
| 1741-005 | 3/13/2016 | 12:00:00 PM | 3/18/2016 | 12:00:00 PM |

Individual Result carv

Individual Result nparACT

Download Individual file Results

Subject informations

| Subject.ID | default.Ts | start.date | start.time | end.date | end.time |
|------------|------------|------------|-------------|-----------|------------|
| 1741-001 | 0.50 | 12/25/2015 | 12:00:00 PM | 3/2/2016 | 6:30:30 PM |
| 1741-005 | 0.50 | 3/13/2016 | 2:12:00 PM | 3/19/2016 | 8:03:30 PM |

Parameter estimates of curve fit

f. "Enter the sampling time of analysis (Minute):"

Enter the sampling time of actigraphy data. Wait for completing the analysis. After successful run, results display on the right side as shown.

The screenshot shows the nparACT R-GUI interface. On the left, there are input fields for: "Enter the start date of analysis(M/D/YYYY):", "Enter the end day of analysis(M/D/YYYY):", "Enter the start time of analysis(H:M:S PM/AM):" (set to 12:00:00 PM), "Enter the end time of analysis(H:M:S PM/AM):" (set to 12:00:00 PM), and "Enter the sampling time (Minute):" (set to 0.5). A button "Click for file information" is also present. On the right, the results are displayed in four tables:

| Subject.ID | default.Ts | start.date | start.time | end.date | end.time |
|------------|------------|------------|-------------|-----------|------------|
| 1741-001 | 0.50 | 12/25/2015 | 12:00:00 PM | 3/2/2016 | 6:30:30 PM |
| 1741-005 | 0.50 | 3/13/2016 | 2:12:00 PM | 3/19/2016 | 8:03:30 PM |

| missing.data | actamp | actbeta | actphi | actmin | actlph | actmesor | actupmesor | actdownmesor | actwidthratio |
|--------------|--------|---------|--------|--------|--------|----------|------------|--------------|---------------|
| 1.80 | 1.38 | 7.43 | 16.65 | 0.17 | -0.39 | 0.86 | 9.11 | 24.19 | 0.63 |
| 0.01 | 1.45 | 8.72 | 15.95 | 0.21 | -0.51 | 0.94 | 7.91 | 23.98 | 0.67 |

| Activity.IS | Activity.IV | Activity.RA | Activity.L5 | Activity.L5ST | Activity.M10 | Activity.M10ST |
|-------------|-------------|-------------|-------------|---------------|--------------|----------------|
| 0.64 | 0.55 | 0.85 | 9.80 | 00:26:30 | 121.22 | 09:51:30 |
| 0.69 | 0.87 | 0.93 | 6.23 | 01:49:00 | 167.02 | 07:45:00 |

| WLight.IS | WLight.IV | WLight.RA | WLight.L5 | WLight.L5ST | WLight.M10 | WLight.M10ST |
|-----------|-----------|-----------|-----------|-------------|------------|--------------|
| 0.32 | 1.89 | 0.99 | 0.87 | 00:41:30 | 150.96 | 09:31:30 |
| 0.51 | 0.99 | 1.00 | 0.03 | 01:54:00 | 498.94 | 07:59:00 |

At the bottom, there are buttons for "Download Results" and "Download the plot".

You can download the result as well as plot by clicking "Download Results" and "Download plot".

You can enter any sampling rate 0.5 min (30 sec), 1 min, 2 min, etc. However nparACT doesn't work if sampling rate > 1 min. **If you enter sampling rate > 1 min , GUI display a warning message.**

Run the program without file specification csv file (Optional)

You can also run the analysis without file specification csv file. After uploading the actigraphy files, follow the below instructions.

a. " Enter the subject ID:"

Enter the subject ID that you want to analyze.

b. "Click for the file information"

It will give the information about all the subject that you specified in the file specification. If the subject in the specification file not present in uploaded file list, then an error message will appeared. **Error! subject not uploaded**

c. "Enter the start date of analysis (M/D/YYYY):"

Enter the start date. **eg:** 12/26/2015

d. "Enter the end date of analysis (M/D/YYYY):"

Enter the end date. **eg:** 12/28/2015

e. "Enter the start time of analysis (H:M:S PM/AM):"

Enter the start time of analysis. You need to specify whether it is AM or PM . default starting time is 12:00:00 AM

f. "Enter the end time of analysis (H:M:S PM/AM):"

Enter the end time of analysis. You need to specify whether it is AM or PM . default ending time is 12:00:00 PM

g. "Enter the sampling time (Minute):"

Enter the sampling time of actigraphy data.

Wait for completing the analysis. After successful run, results display on the right side as shown.

The screenshot shows the nparACT GUI interface. On the left, there are input fields for: 'Upload the run specification file' (with a 'Browse...' button), 'Enter the subject ID:' (with a text box containing '1741-001'), 'Enter the start date of analysis(M/D/YYYY):' (with a text box containing '12/26/2015'), 'Enter the end day of analysis(M/D/YYYY):' (with a text box containing '12/30/2015'), 'Enter the start time of analysis(H:M:S PM/AM):' (with a text box containing '12:00:00 PM'), 'Enter the end time of analysis(H:M:S PM/AM):' (with a text box containing '12:00:00 PM'), and 'Enter the sampling time (Minute):' (with a text box containing '0.5'). On the right, the 'Individual Result nparACT' section displays several tables. The 'Subject informations' table has columns: Subject.ID, default.Ts, start.date, start.time, end.date, end.time. The 'Parameter estimates of curve fit' table has columns: missing.data, actamp, actbeta, actphi, actmin, actalph, actmesor, actupmesor, actdownmesor, actwidththra. The 'nparACT variables (Activity)' table has columns: Activity.IS, Activity.IV, Activity.RA, Activity.L5, Activity.L5ST, Activity.M10, Activity.M10ST. The 'nparACT variables (White Light)' table has columns: WLight.IS, WLight.IV, WLight.RA, WLight.L5, WLight.L5ST, WLight.M10, WLight.M10ST. At the bottom right, there are buttons for 'Download Results' and 'Download the plot'.

| Subject.ID | default.Ts | start.date | start.time | end.date | end.time |
|------------|------------|------------|-------------|----------|------------|
| 1741-001 | 0.50 | 12/25/2015 | 12:00:00 PM | 1/1/2016 | 8:15:00 PM |

| missing.data | actamp | actbeta | actphi | actmin | actalph | actmesor | actupmesor | actdownmesor | actwidththra |
|--------------|--------|---------|--------|--------|---------|----------|------------|--------------|--------------|
| 2.25 | 1.31 | 14.41 | 17.07 | 0.21 | -0.36 | 0.87 | 9.67 | 24.47 | 0. |

| Activity.IS | Activity.IV | Activity.RA | Activity.L5 | Activity.L5ST | Activity.M10 | Activity.M10ST |
|-------------|-------------|-------------|-------------|---------------|--------------|----------------|
| 0.66 | 0.47 | 0.88 | 7.85 | 00:50:30 | 127.57 | 09:52:30 |

| WLight.IS | WLight.IV | WLight.RA | WLight.L5 | WLight.L5ST | WLight.M10 | WLight.M10ST |
|-----------|-----------|-----------|-----------|-------------|------------|--------------|
| 0.38 | 1.43 | 0.99 | 0.81 | 00:49:30 | 109.50 | 11:18:30 |