Reproducibility review of: 'FreeMapRetrieve: Freehand Gestures for Retrieve Operations in Large-Screen Map Environments'

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This report is part of the reproducibility review at the AGILE conference. For more information see https://reproducible-agile.github.io/. This document is published on OSF at https://osf.io/gvpd9. To cite the report use

> Granell, C. (2024, April 18). Reproducibility review of: FreeMapRetrieve: Freehand Gestures for Retrieve Operations in Large-Screen Map Environments. https://doi.org/10.17605/osf.io/gvpd9

Reviewed paper

> Hurst, J., Degbelo, A. and Kray, C.: FreeMapRetrieve: freehand gestures for retrieve operations in large-screen map environments, AGILE GIScience Ser., 5, 7, https://doi.org/10.5194/agile-giss-5-7-2024, 2024.

Summary

The workflow provided was **partially reproduced** in the sense that I was able to reproduce the data analysis of the user assessment. The manuscript also described a prototype system that required specific hardware, therefore, I skipped this part.

Reproducibility reviewer notes

The manuscript included a DASA section with two links to public GitHub repositories:

- Prototype: https://github.com/jonas-hurst/MapGestureController. As the reproduction of the prototype requires specific hardware, it is out of the scope of this reproducibility review. The software repository included a proper `README` file, MIT License, and python scripts to use and interact with the Microsoft's Azure Kinect camera to track a person interacting with a map application.
- Data analysis of user assessment: https://github.com/jonas-hurst/FreeMapRetrieve-Statistic. This is the repo subject to reproduction in this reproducibility report. It included a `README` file, MIT licence, supporting R scripts and sample data. I followed the instructions in the `README` file to reproduce figures 4 to 7 in the manuscript. So, I could reproduce them locally. Details of the workflow followed below.

I created a R project using Posit Cloud by importing the git repository https://github.com/jonas-hurst/FreeMapRetrieve-Statistic. R version 4.3.3 (2024-02-29). I also created an `install.R` file to specify all of the R libraries used.

```
/cloud/project$ cat install.R

install.packages("tidyverse")
install.packages("ggplot2")
install.packages("here")
install.packages("readxl") # 1.4.0
install.packages("bootES") #1.2.1
install.packages("gridExtra") #2.3
```

Before running any script, I created a directory called `graphs` inside the project repository as specified in the `README` file. All figures generated are stored in that folder.

```
/cloud/project$  mkdir graphs
```

Figure 4: Mean effectiveness measured in slips per polygon

Figure 4 is generated by executing the `evaluation_slips.Rmd` notebook. This R notebook (and all the other 3 below) imported the script `get_data.R`. I modified the script to avoid absolute paths to input data files (see snippet below). It is strongly recommended to use the R package here to avoid path issues during reproduction. This comment also applies to the other R notebooks.

```
#setwd("~/ma") # not recommended
library(here)  # use `here` instead

#source("./get_data.R")         # not recommended
source(here::here("get_data.R"))# use `here` instead

# Similar edits were applied throughout the notebook, especially to load data

# results <- read.csv(file = './data/questionnaire.csv')           # not recommended
results <- read.csv(file = here::here("data", "questionnaire.csv")) # use `here` instead
```

I also made some specific edits in the `evaluation_slips.Rmd` notebook to convert absolute paths to relative path using the `here` package. This comment also applies to the other R notebooks.

```
#setwd("~/ma") # not recommended
library(here)  # use `here` instead

#source("./get_data.R")           # not recommended
source(here::here("get_data.R"))  # use `here` instead

# Similar edits were applied throughout the notebook, especially to file path in `ggsave`
#ggsave(("./graphs/slips_histogram.png"), width=12, height=8, units = "cm")           # not recommended
ggsave(here::here("graphs", "slips_histogram.png"), width=12, height=8, units = "cm") # use `here` instead
```

I executed the `evaluation_slips.Rmd` notebook and got the same set of figures as the composite Figure 4 in the manuscript.

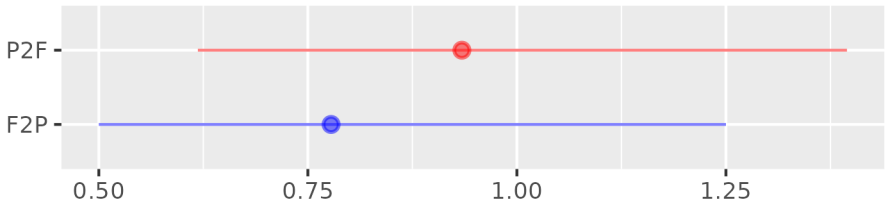

Figure 1: Fig4a Slips for all polygons

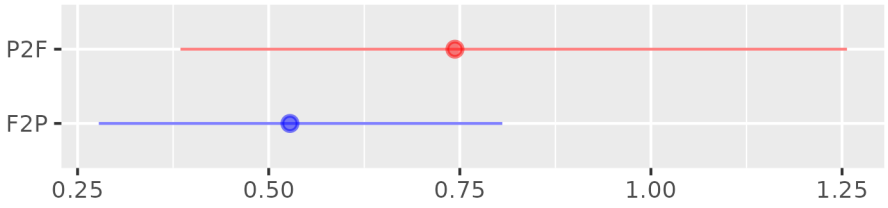

Figure 2: Fig4b Slips large polygons

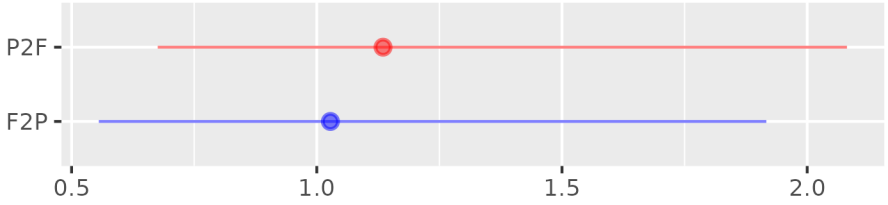

Figure 3: Fig4c Slips for small polygons

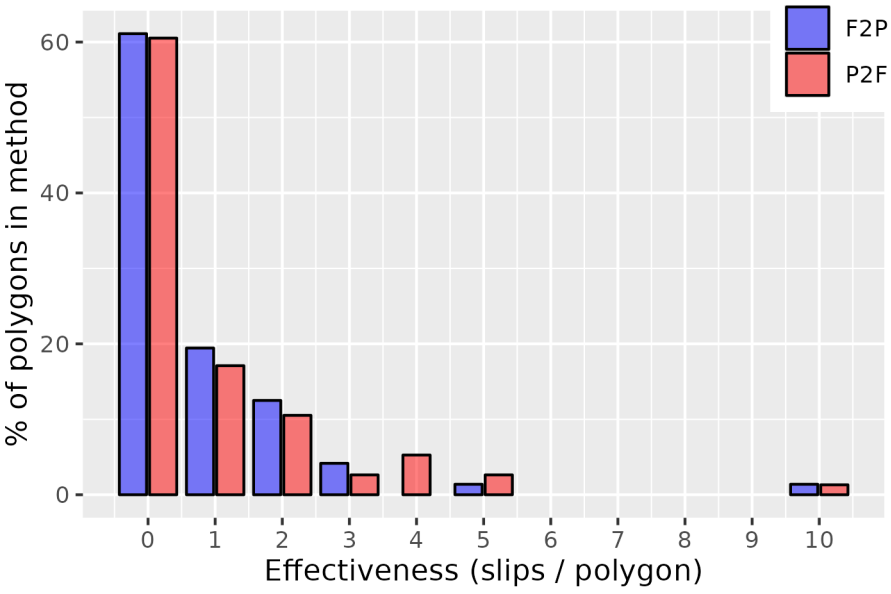

Figure 4: Fig4d Histogram for effectiveness (slips per polygon)

Figure 5: Mean efficiency (seconds) to retrieve from a polygon

Figure 5 is generated by executing the `evaluation_time.Rmd` notebook. I executed the `evaluation_time.Rmd` notebook and got the same set of figures as the composite Figure 5 in the manuscript.

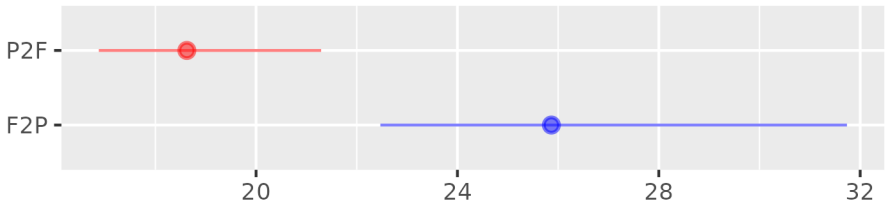

Figure 5: Fig5a Time for all polygons

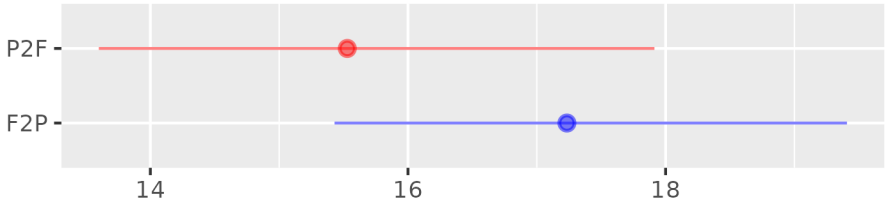

Figure 6: Fig5b Time for large polygons

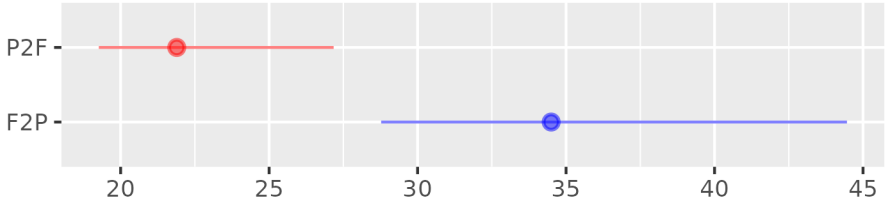

Figure 7: Fig5c Time for small polygons

Figure 6: Mean physical and mental load and frustration

Figure 6 is generated by executing the `demographic.Rmd` notebook. I executed the `demographic.Rmd` notebook and got the same figure as the original Figure 6 in the manuscript.

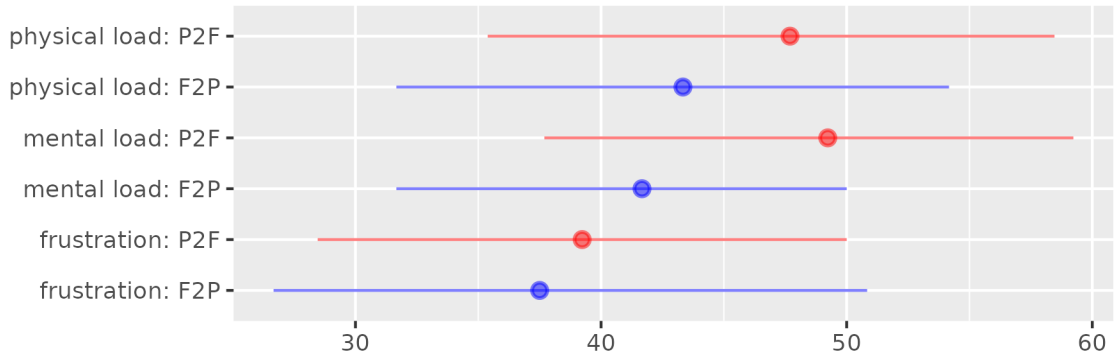

Figure 8: Fig6 Mean physical and mental load and frustration

Figure 7: Data exploration utility

Figure 7 is generated by executing the `exploration.Rmd` notebook. I executed the `exploration.Rmd` notebook and got the same set figures (**expect for Fig7a (Frequencies) whose code is not available**) as the composite Figure 7 in the manuscript.

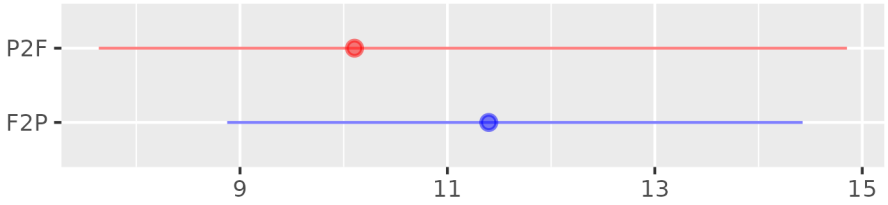

Figure 9: Fig7b Mean total exploration time

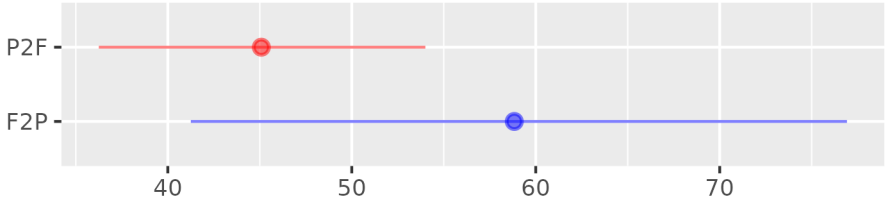

Figure 10: Fig7c Mean total insight score

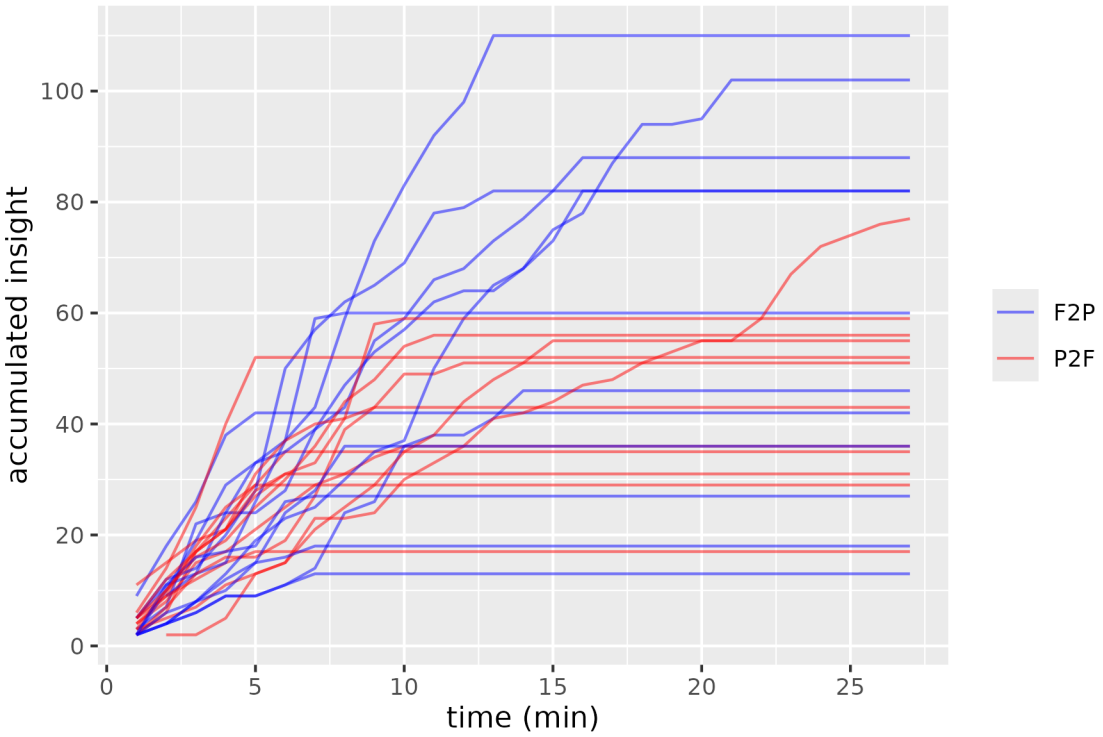

Figure 11: Fig7d Patterns of exploration evolution per individual

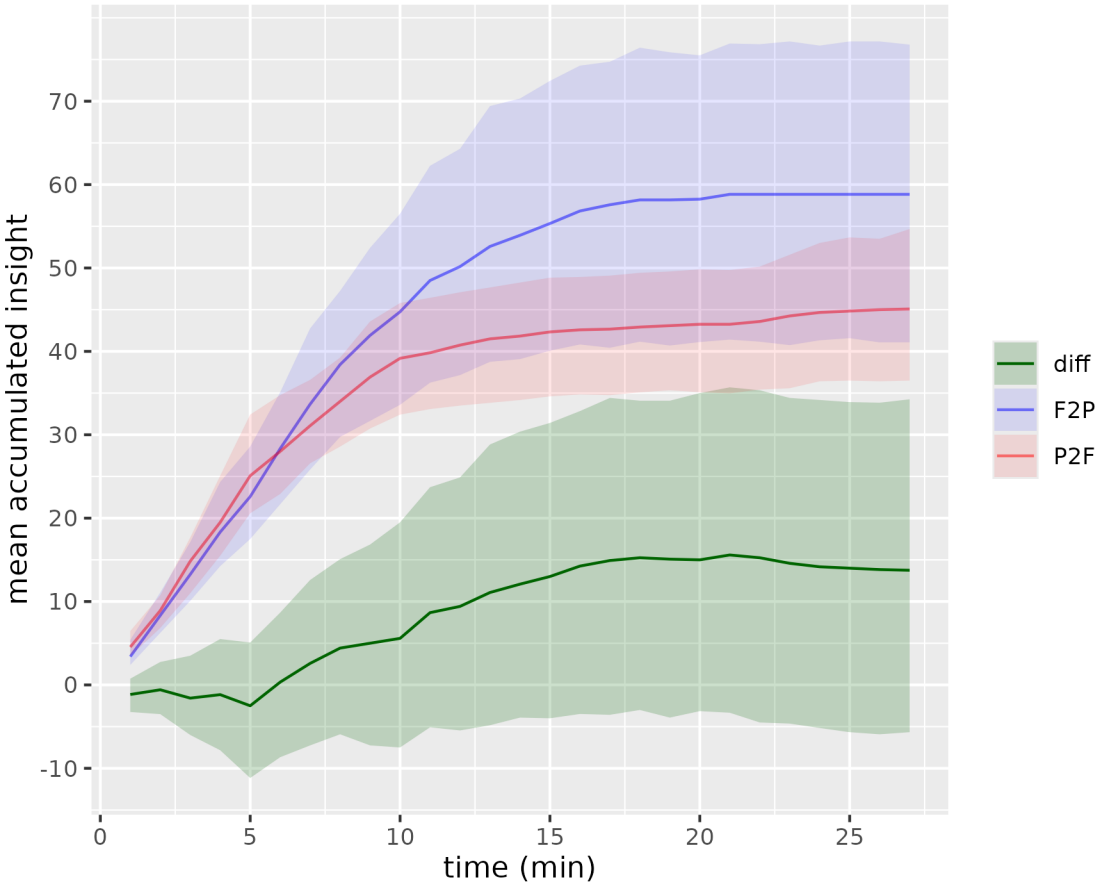

Figure 12: Fig7e Patterns of exploration evolution per condition

Comments to the authors

The GitHub repository was properly described. Below some suggestions:

- It is strongly recommended to specify the required versions of the R libraries used. Adding a `install.R` file is ideal for specifying the necesary packages and the versions used.
- It is strongly recommended to specify relative path to he project root folder instead of absolute paths. Use of `here` is almost a must. Avoid `setwd()`.