Reproducibility Report: System and R Environment Summary

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2024-10-10

This report summarises our R environment, OS, CPU, and memory for reproducibility. This report will capture the key details for anyone wishing to replicate our computational setup.

System Information

Operating System (OS) Info

This section retrieves the operating system and system kernel details.

```
Sys.info()
```

```
##                                                                  sysname
##                                                                  "Linux"
##                                                                  release
##                                                          "6.8.0-44-generic"
##                                                                  version
## "#44~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Thu Aug 22 15:00:55 UTC 2"
##                                                                 nodename
##                                                             "u-a0053509"
##                                                                  machine
##                                                                 "x86_64"
##                                                                    login
##                                                                "287658c"
##                                                                     user
##                                                                "287658c"
##                                                           effective_user
##                                                                "287658c"
```

CPU and Memory Information (Linux/macOS)

Below is the CPU and memory information retrieved from system commands.

```
# CPU Info
system("lscpu", intern = TRUE)
```

```
##  [1] "Architecture:                         x86_64"
##  [2] "CPU op-mode(s):                       32-bit, 64-bit"
##  [3] "Address sizes:                        46 bits physical, 48 bits virtual"
##  [4] "Byte Order:                           Little Endian"
```

```
##  [5] "CPU(s):                                24"
##  [6] "On-line CPU(s) list:                   0-23"
##  [7] "Vendor ID:                             GenuineIntel"
##  [8] "Model name:                            Intel(R) Core(TM) i9-10920X CPU @ 3.50GHz"
##  [9] "CPU family:                            6"
## [10] "Model:                                 85"
## [11] "Thread(s) per core:                    2"
## [12] "Core(s) per socket:                    12"
## [13] "Socket(s):                             1"
## [14] "Stepping:                              7"
## [15] "CPU max MHz:                           4800.0000"
## [16] "CPU min MHz:                           1200.0000"
## [17] "BogoMIPS:                              6999.82"
## [18] "Flags:                                 fpu vme de pse tsc msr pae mce cx8 apic sep mtrr pge mca
## [19] "Virtualisation:                        VT-x"
## [20] "L1d cache:                             384 KiB (12 instances)"
## [21] "L1i cache:                             384 KiB (12 instances)"
## [22] "L2 cache:                              12 MiB (12 instances)"
## [23] "L3 cache:                              19.3 MiB (1 instance)"
## [24] "NUMA node(s):                          1"
## [25] "NUMA node0 CPU(s):                     0-23"
## [26] "Vulnerability Gather data sampling:    Mitigation; Microcode"
## [27] "Vulnerability Itlb multihit:           KVM: Mitigation: VMX disabled"
## [28] "Vulnerability L1tf:                    Not affected"
## [29] "Vulnerability Mds:                     Not affected"
## [30] "Vulnerability Meltdown:                Not affected"
## [31] "Vulnerability Mmio stale data:         Mitigation; Clear CPU buffers; SMT vulnerable"
## [32] "Vulnerability Reg file data sampling: Not affected"
## [33] "Vulnerability Retbleed:                Mitigation; Enhanced IBRS"
## [34] "Vulnerability Spec rstack overflow:    Not affected"
## [35] "Vulnerability Spec store bypass:       Mitigation; Speculative Store Bypass disabled via prctl"
## [36] "Vulnerability Spectre v1:              Mitigation; usercopy/swapgs barriers and __user pointer s
## [37] "Vulnerability Spectre v2:              Mitigation; Enhanced / Automatic IBRS; IBPB conditional;
## [38] "Vulnerability Srbds:                   Not affected"
## [39] "Vulnerability Tsx async abort:         Mitigation; TSX disabled"
```

```
# Memory Info
system("free -h", intern = TRUE)
```

```
## [1] "               total        used        free      shared  buff/cache   available"
## [2] "Mem:            62Gi        16Gi        32Gi       324Mi        14Gi        45Gi"
## [3] "Swap:          2.0Gi          0B       2.0Gi"
```

Note about code editor

Note that the Rstudio editor version gave errors and so the Emacs ESS editor was used instead.

The Rstudio Editor was

```
RStudio 2023.06.1+524 "Mountain Hydrangea" Release (547dcf861cac0253a8abb52c135e44e02ba407a1, 2023-07-05
Mozilla/5.0 (X11; Linux x86_64) AppleWebKit/537.36 (KHTML, like Gecko) rstudio/2023.06.1+524 Chrome/110
```

R Environment

The session information, including R version, platform, and loaded packages.

```
# sessioninfo provides more detailed session information
sessioninfo::session_info()
```

```
## - Session info ---------------------------------------------------------------
##  setting  value
##  version  R version 4.3.1 (2023-06-16)
##  os       Ubuntu 22.04.4 LTS
##  system   x86_64, linux-gnu
##  ui       X11
##  language en_AU:en
##  collate  en_AU.UTF-8
##  ctype    en_AU.UTF-8
##  tz       Australia/Perth
##  date     2024-10-10
##  pandoc   3.1.1 @ /usr/lib/rstudio/resources/app/bin/quarto/bin/tools/ (via rmarkdown)
##
## - Packages -------------------------------------------------------------------
##  package     * version date (UTC) lib source
##  cli           3.6.1   2023-03-23 [1] CRAN (R 4.3.1)
##  digest        0.6.33  2023-07-07 [1] CRAN (R 4.3.1)
##  evaluate      0.21    2023-05-05 [2] CRAN (R 4.3.1)
##  fastmap       1.1.1   2023-02-24 [1] CRAN (R 4.3.1)
##  htmltools     0.5.6   2023-08-10 [1] CRAN (R 4.3.1)
##  knitr         1.43    2023-05-25 [1] CRAN (R 4.3.1)
##  rlang         1.1.1   2023-04-28 [1] CRAN (R 4.3.1)
##  rmarkdown     2.24    2023-08-14 [1] CRAN (R 4.3.1)
##  rstudioapi    0.15.0  2023-07-07 [1] CRAN (R 4.3.1)
##  sessioninfo   1.2.2   2021-12-06 [1] CRAN (R 4.3.1)
##  xfun          0.40    2023-08-09 [1] CRAN (R 4.3.1)
##  yaml          2.3.10  2024-07-26 [1] CRAN (R 4.3.1)
##
##  [1] /home/287658c/R/x86_64-pc-linux-gnu-library/4.3
##  [2] /usr/local/lib/R/site-library
##  [3] /usr/lib/R/site-library
##  [4] /usr/lib/R/library
##
## ------------------------------------------------------------------------------
```

Summary

This report provides a complete summary of the system and R environment to aid in reproducibility of analyses. This document along with our code and data ensure that others can replicate our results under a similar computational setup.