Test

2023-04-30

```
# load required libraries
library(parallel)
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(stats)
library(knitr)
library(caret)
```

```
## Loading required package: ggplot2
```

```
## Loading required package: lattice
```

```
library(ggplot2)
library(foreach)
```

Load RDAs

```
load(file = file.path(root_dir,"R_data","X_wm.Rda"))
#load(file = file.path(root_dir,"R_data","X_gm.Rda"))
#load(file = file.path(root_dir,"R_data","X_cb.Rda"))
```

PCA

```
# fnto perform PCA and save output
pca_wm <- perform_pca(X_wm)
```

```
## [1] "n components: 50"
```

```
save(pca_wm, file = file.path(root_dir, "R_data", "pca_wm.Rda"))


head(pca_wm$X_train_pca)
```

```
##          PC1         PC2        PC3        PC4        PC5        PC6        PC7
## 1  -58558037    20348833    4815030   35497099 -159812755  -37864968   -9532567
## 3  -42058075    38366262   10091556    6043687   25773316    7255236   16125583
## 5  -57901251    19739726    5378775   34370889 -157653551  -40180162   -6628288
```

```
## 6  -58565306    20349631    4812371   35499181 -159817483  -37862245   -9530243
## 8 2071981792 -2301859231 -202549531 -205415578  669816438 2110863343 -566420236
## 9  -58528666    20388933    4783973   35478249 -159737083  -37866356   -9574118
##          PC8        PC9      PC10      PC11      PC12       PC13       PC14
## 1   -9933572    7436392 -34744407  -4732187  -7518749  -34921664   86810177
## 3  -27264314  -23796671  67090561  -5242861 -92036934  174983740  -87930895
## 5   -9322128    7709167 -38006497  -3558116  -5855531  -34172090   87306774
## 6   -9936709    7441567 -34741032  -4737089  -7517633  -34924695   86797685
## 8 2505382909 -889168120 876360101 -62884206 647531835 -661509429 -330030608
## 9   -9946995    7364631 -34778260  -4720532  -7635309  -34846509   86829972
##        PC15      PC16        PC17        PC18       PC19      PC20         PC21
## 1 -11829007  74851095   -13017956     9537368  -18316553 -21076960    2957296.2
## 3  33822701 100379747    32234193    22892351   53791655 -18636221  -52051351.1
## 5 -14253763  78123299   -18626270     9613691  -19208653 -27839559    -647252.3
## 6 -11822142  74840871   -13028752     9538531  -18323501 -21076331    2953185.9
## 8 903356216 276966875 -1885645222 -1166934924 1302242848 620106247 1307912034.3
## 9 -11821670  74810164   -13068895     9533712  -18317828 -21040525    2946797.6
##         PC22      PC23      PC24        PC25      PC26       PC27       PC28
## 1   10958207 -32117871 -37760875   -55057926 -25797482   -6032037  -17597508
## 3 -141554481 231389265 577702844   283868160  79239017  180396940 -420759936
## 5   17997585 -35464157 -39069779   -57793094 -42175619   -9207671  -28045071
## 6   10959874 -32128007 -37755153   -55060889 -25790436   -6036877  -17591190
## 8  255155392 116035503 422457372 -1549509951 977532182 -256051313  206280343
## 9   10991214 -32180887 -37570351   -54991445 -25865523   -5964204  -17536672
##        PC29      PC30       PC31       PC32      PC33       PC34       PC35
## 1 -24336721   4145285 10414982.8  -12717948   1964521  -33954637   48214426
## 3 248925593 244040589  -515453.3   31949117 -93538246  -66348102  -32952086
## 5 -21018022  11431163  9313407.9    1764773   6494523  -23750228   39711302
## 6 -24330662   4145102 10407904.0  -12714228   1958053  -33945717   48217871
## 8 191021162  -2740566 75005907.0 -301625868 188388350 -925418961 -147533879
## 9 -24336388   4130132 10458151.4  -12713500   1932684  -33919414   48174586
##        PC36       PC37       PC38      PC39       PC40      PC41      PC42
## 1 -42637222  -84644268  -30250186 -44597058  -11650458  11136161 -28431650
## 3 -16049511 -276534785   -1877157  -6167417 -147400825 102225676 -31519751
## 5 -35476837  -77077411  -31007174 -39827536   -2219089  11102919 -24588440
## 6 -42640923  -84652989  -30242814 -44593139  -11655305  11129696 -28426603
## 8 518046374  391231638 -664764727 675734984 -665733053 -11596373 399583538
## 9 -42656436  -84686688  -30383364 -44571780  -11557424  11224905 -28452693
##         PC43      PC44       PC45       PC46      PC47      PC48       PC49
## 1 -116477799  51081220   -3604929 -139468606 -86978760  -3787977  -21694850
## 3   11874174 183934243 -122043545  -89415434 -59768416 101377467  -83528852
## 5 -110230752  43757687   -8330206 -133006580 -88749974  -2232290  -22396047
## 6 -116483703  51076311   -3613402 -139464058 -86978205  -3782815  -21695427
## 8  558262904 -45214945  393892870  847575879 366891978 247838761 -260717520
## 9 -116584234  50960434   -3626997 -139416815 -86938830  -3844483  -21690971
##        PC50
## 1 -74619653
## 3  28273205
## 5 -83015942
## 6 -74622900
## 8 874044404
## 9 -74595193
```

```
dim(pca_wm$X_train_pca)
```

```
## [1] 348  50
```

```
head(pca_wm$y_train)
```

```
## [1] 1 1 1 1 0 2
```

```
length(pca_wm$y_train)
```

```
## [1] 348
```

```
length(pca_wm$y_test)
```

```
## [1] 86
```

```
head(pca_wm$X_test_pca)
```

```
##          PC1      PC2     PC3      PC4        PC5       PC6      PC7       PC8
## 2  -58173058 20939911 4382344 35278591 -158801422 -37854669 -9972713  -9965930
## 4  -57646138 20024432 5991999 32471486 -159457226 -39399097 -9091604  -9551926
## 7  -58509640 20340109 4839831 35440056 -159657769 -37844983 -9512860  -9986566
## 27 -58566099 20355509 4812974 35495919 -159808471 -37859538 -9535783  -9932224
## 31 -58555488 20338851 4812861 35495337 -159818312 -37873074 -9530449  -9948556
## 33 -58322937 20122893 4804433 35454780 -159696384 -38003068 -9504173 -10117472
##        PC9      PC10     PC11     PC12      PC13     PC14      PC15     PC16
## 2  6486495 -34542887 -4383859 -8737363 -33870042 86850768 -11481095 74233487
## 4  6639652 -35206643 -4728046 -8145753 -35403195 86494354 -11690917 75362008
## 7  7387906 -34757034 -4706931 -7482272 -34884605 86767235 -11836703 74909575
## 27 7433377 -34744405 -4737073 -7520727 -34915386 86807048 -11824385 74845215
## 31 7443918 -34738137 -4736688 -7519133 -34927074 86793042 -11821669 74840703
## 33 7459354 -34622064 -4757932 -7465743 -34937809 86839560 -11967515 74863722
##         PC17    PC18      PC19      PC20    PC21     PC22      PC23      PC24
## 2  -13222147 8776868 -18414831 -19898824 3611067 11427683 -32901362 -31742205
## 4  -13183407 9848613 -19043081 -20820381 3421003 14831544 -31462307 -37686156
## 7  -13010551 9513345 -18330597 -21088005 2956282 11016493 -32120360 -37757219
## 27 -13029007 9537688 -18324555 -21076677 2955170 10964614 -32124774 -37757885
## 31 -13029790 9540520 -18323628 -21076358 2954174 10960192 -32129991 -37751100
## 33 -13242827 9663032 -18485084 -21162298 3081607 10885807 -32229828 -37734056
##         PC25      PC26     PC27      PC28      PC29    PC30     PC31      PC32
## 2  -52046189 -27688170 -6859771 -18327855 -24844923  354869 11766436 -14033604
## 4  -55413399 -26349350 -5071700 -18640171 -18988632 3724646  8665575 -11402766
## 7  -55045449 -25809113 -6024432 -17599327 -24307057 4172903 10408036 -12697218
## 27 -55059117 -25795366 -6038659 -17594602 -24330665 4143566 10411347 -12710398
## 31 -55065757 -25786110 -6035403 -17587881 -24324879 4150564 10406013 -12725751
## 33 -55030197 -25736409 -6140659 -17530200 -24227446 4190433 10489603 -12805170
##         PC33      PC34     PC35      PC36      PC37      PC38      PC39
## 2  3994392.0 -33157311 49339381 -42455830 -81292085 -29523373 -44550040
## 4  -964766.6 -39891024 42061766 -46575331 -79745248 -30908595 -39925756
## 7  1935315.0 -33963235 48227584 -42638807 -84660361 -30218131 -44612661
## 27 1962264.3 -33953689 48215490 -42637046 -84651915 -30245796 -44594692
## 31 1961710.3 -33940310 48214345 -42641719 -84652651 -30242429 -44588601
## 33 1991922.7 -33962772 48260008 -42643437 -84648053 -30217962 -44533156
##         PC40     PC41      PC42       PC43     PC44     PC45       PC46
## 2  -10573830  9683576 -27334202 -117384220 49567927 -2672156 -138569298
## 4   -9887431 11193192 -28493999 -117919632 49011831 -3677719 -138804167
## 7  -11635410 11099188 -28412460 -116553769 51055637 -3653280 -139477153
```

```
## 27 -11654492 11133592 -28426907 -116489783 51080350 -3615810 -139464857
## 31 -11646288 11130093 -28428364 -116482151 51082339 -3613213 -139466934
## 33 -11679616 11149635 -28498453 -116411666 51064037 -3604416 -139411246
##         PC47     PC48      PC49      PC50
## 2  -88105537 -4503011 -21783268 -74275667
## 4  -87293649 -4413238 -21441837 -76758865
## 7  -86947184 -3787199 -21699588 -74631695
## 27 -86977201 -3784005 -21696885 -74619412
## 31 -86979966 -3781127 -21693024 -74617558
## 33 -86880797 -3751996 -21717457 -74680192
```

```
dim(pca_wm$X_test_pca)
```

```
## [1] 86 50
```