error count and jadud regression

XXX

2023-07-08

Error count

use error count to predict midterm 1

```
# predict midterm1 with only compiler errors
summary(rfit(Midterm1 ~
             C_totalError_HW3+C_totalError_HW4,
           data = allError, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm1 ~ C_totalError_HW3 + C_totalError_HW4,
##     data = allError, scores = bentscores3)
##
## Coefficients:
##                   Estimate Std. Error t.value   p.value
## (Intercept)      92.080364   1.801472 51.1139 < 2.2e-16 ***
## C_totalError_HW3 -0.060857   0.017913 -3.3974 0.0008145 ***
## C_totalError_HW4 -0.096988   0.047204 -2.0547 0.0411558 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.07646293
## Reduction in Dispersion Test: 8.65193 p-value: 0.00025
```

```
# predict midterm1 with both compiler and runtime errors
summary(rfit(Midterm1 ~
             R_totalError_HW3+R_totalError_HW4+
             C_totalError_HW3+C_totalError_HW4,
           data = allError, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm1 ~ R_totalError_HW3 + R_totalError_HW4 +
##     C_totalError_HW3 + C_totalError_HW4, data = allError, scores = bentscores3)
##
## Coefficients:
##                   Estimate Std. Error t.value   p.value
## (Intercept)      94.534848   2.157611 43.8146 < 2.2e-16 ***
## R_totalError_HW3 -0.137248   0.138343 -0.9921  0.322313
## R_totalError_HW4 -0.254083   0.152965 -1.6611  0.098216 .
## C_totalError_HW3 -0.055061   0.017845 -3.0856  0.002309 **
## C_totalError_HW4 -0.096316   0.046704 -2.0622  0.040433 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
```

```
##
## Multiple R-squared (Robust): 0.09644761
## Reduction in Dispersion Test: 5.52393 p-value: 3e-04
```

use error count to predict midterm 2

```
# predict midterm2 with compiler errors
summary(rfit(Midterm2 ~
             C_totalError_HW3+C_totalError_HW4+
             C_totalError_HW5+C_totalError_HW6+
             C_totalError_HW7++C_totalError_HW8,
           data = allError,scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm2 ~ C_totalError_HW3 + C_totalError_HW4 +
##     C_totalError_HW5 + C_totalError_HW6 + C_totalError_HW7 +
##     +C_totalError_HW8, data = allError, scores = bentscores3)
##
## Coefficients:
##                     Estimate Std. Error t.value p.value
## (Intercept)      91.7130201  3.5674395 25.7084 < 2e-16 ***
## C_totalError_HW3  0.0024174  0.0223515  0.1082 0.91403
## C_totalError_HW4 -0.1441793  0.0577854 -2.4951 0.01378 *
## C_totalError_HW5 -0.0080038  0.0133583 -0.5992 0.55005
## C_totalError_HW6 -0.0240221  0.0276233 -0.8696 0.38602
## C_totalError_HW7 -0.0203218  0.0438426 -0.4635 0.64373
## C_totalError_HW8 -0.0516098  0.0252417 -2.0446 0.04281 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.07921169
## Reduction in Dispersion Test: 1.96426 p-value: 0.07492
```

```
# predict midterm2 with both compiler and runtime errors
summary(rfit(Midterm2 ~
             R_totalError_HW3+R_totalError_HW4 +
             R_totalError_HW5+R_totalError_HW6+
             R_totalError_HW7+R_totalError_HW8+
             C_totalError_HW3+C_totalError_HW4+
             C_totalError_HW5+C_totalError_HW6+
             C_totalError_HW7++C_totalError_HW8,
           data = allError,scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm2 ~ R_totalError_HW3 + R_totalError_HW4 +
##     R_totalError_HW5 + R_totalError_HW6 + R_totalError_HW7 +
##     R_totalError_HW8 + C_totalError_HW3 + C_totalError_HW4 +
##     C_totalError_HW5 + C_totalError_HW6 + C_totalError_HW7 +
##     +C_totalError_HW8, data = allError, scores = bentscores3)
##
## Coefficients:
##                      Estimate  Std. Error t.value   p.value
## (Intercept)       1.0199e+02  3.5425e+00 28.7908 < 2.2e-16 ***
## R_totalError_HW3 -1.3634e-01  1.5656e-01 -0.8708  0.385441
## R_totalError_HW4 -2.6788e-01  1.6388e-01 -1.6346  0.104539
```

```
## R_totalError_HW5 -6.2558e-02  1.5321e-02 -4.0831 7.688e-05 ***
## R_totalError_HW6 -1.2391e-02  1.3381e-02 -0.9260  0.356159
## R_totalError_HW7 -1.7985e-03  2.9560e-02 -0.0608  0.951578
## R_totalError_HW8 -9.8046e-02  3.3465e-02 -2.9298  0.004002 **
## C_totalError_HW3  1.0612e-02  2.1290e-02  0.4985  0.618999
## C_totalError_HW4 -8.8260e-02  5.4451e-02 -1.6209  0.107441
## C_totalError_HW5 -3.3935e-04  1.2279e-02 -0.0276  0.977994
## C_totalError_HW6 -2.1630e-02  2.5203e-02 -0.8582  0.392326
## C_totalError_HW7 -1.8009e-02  4.0593e-02 -0.4436  0.658031
## C_totalError_HW8 -4.7268e-02  2.3090e-02 -2.0471  0.042650 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.2239622
## Reduction in Dispersion Test: 3.15052 p-value: 0.00057
```

Jadud

use jadud to predict midterm 1 grades

```
# predict midterm1 with only compiler jadud measures
summary(rfit(Midterm1 ~ jadud_hw_03_c + jadud_hw_04_c, data = jadud_df, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm1 ~ jadud_hw_03_c + jadud_hw_04_c,
##     data = jadud_df, scores = bentscores3)
##
## Coefficients:
##               Estimate Std. Error t.value   p.value
## (Intercept)    97.7457     1.3872 70.4604 < 2.2e-16 ***
## jadud_hw_03_c -39.4112     5.2492 -7.5081 8.396e-13 ***
## jadud_hw_04_c  -2.8046     4.7220 -0.5940     0.553
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.1563423
## Reduction in Dispersion Test: 25.4808 p-value: 0
```

```
# predict midterm1 with both compiler and runtime jadud measures
summary(rfit(Midterm1 ~ jadud_hw_03_c + jadud_hw_04_c + jadud_hw_03_r + jadud_hw_04_r, data = jadud_df,
```

```
## Call:
## rfit.default(formula = Midterm1 ~ jadud_hw_03_c + jadud_hw_04_c +
##     jadud_hw_03_r + jadud_hw_04_r, data = jadud_df, scores = bentscores3)
##
## Coefficients:
##               Estimate Std. Error t.value   p.value
## (Intercept)    98.2818     1.5157 64.8439 < 2.2e-16 ***
## jadud_hw_03_c -37.4073     5.2095 -7.1805 6.598e-12 ***
## jadud_hw_04_c  -4.0868     4.6930 -0.8708   0.38462
## jadud_hw_03_r  -2.8644    49.6745 -0.0577   0.95406
## jadud_hw_04_r -12.5796     7.1076 -1.7699   0.07786 .
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.1684053
## Reduction in Dispersion Test: 13.82123 p-value: 0
```

use jadud to predict midterm 2 grades

```
# predict midterm2 with only compiler jadud measures
summary(rfit(Midterm2 ~
               jadud_hw_03_c + jadud_hw_04_c + jadud_hw_05_c +
               jadud_hw_06_c + jadud_hw_07_c + jadud_hw_08_c, data = jadud_df, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm2 ~ jadud_hw_03_c + jadud_hw_04_c +
##     jadud_hw_05_c + jadud_hw_06_c + jadud_hw_07_c + jadud_hw_08_c,
##     data = jadud_df, scores = bentscores3)
##
## Coefficients:
```

```
##                Estimate Std. Error t.value   p.value
## (Intercept)    95.3153     1.2322 77.3507 < 2.2e-16 ***
## jadud_hw_03_c -23.8215     5.7930 -4.1121 5.229e-05 ***
## jadud_hw_04_c   2.5879     4.8122  0.5378   0.59117
## jadud_hw_05_c  -9.0741     8.5902 -1.0563   0.29177
## jadud_hw_06_c -30.4867    13.3090 -2.2907   0.02276 *
## jadud_hw_07_c  -3.4511     6.7417 -0.5119   0.60915
## jadud_hw_08_c  -3.7420     8.5242 -0.4390   0.66103
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.1220283
## Reduction in Dispersion Test: 6.16184 p-value: 0
```

```
# predict midterm2 with both compiler and runtime jadud measures
summary(rfit(Midterm2 ~
               jadud_hw_03_c + jadud_hw_04_c + jadud_hw_05_c +
               jadud_hw_06_c + jadud_hw_07_c + jadud_hw_08_c +
               jadud_hw_03_r + jadud_hw_04_r + jadud_hw_05_r +
               jadud_hw_06_r + jadud_hw_07_r + jadud_hw_08_r, data = jadud_df, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm2 ~ jadud_hw_03_c + jadud_hw_04_c +
##     jadud_hw_05_c + jadud_hw_06_c + jadud_hw_07_c + jadud_hw_08_c +
##     jadud_hw_03_r + jadud_hw_04_r + jadud_hw_05_r + jadud_hw_06_r +
##     jadud_hw_07_r + jadud_hw_08_r, data = jadud_df, scores = bentscores3)
##
## Coefficients:
##                Estimate Std. Error t.value   p.value
## (Intercept)   100.43168    1.82307 55.0892 < 2.2e-16 ***
## jadud_hw_03_c -20.08757    5.57887 -3.6007 0.0003801 ***
## jadud_hw_04_c   0.23414    4.70847  0.0497 0.9603784
## jadud_hw_05_c  -4.77676    8.27621 -0.5772 0.5643260
## jadud_hw_06_c -30.33021   12.85574 -2.3593 0.0190506 *
## jadud_hw_07_c  -5.12848    6.43365 -0.7971 0.4261001
## jadud_hw_08_c  -4.53404    8.11877 -0.5585 0.5770083
## jadud_hw_03_r  12.32617   47.04379  0.2620 0.7935175
## jadud_hw_04_r  -8.93693    6.83651 -1.3072 0.1922872
## jadud_hw_05_r -16.03634   12.26104 -1.3079 0.1920591
## jadud_hw_06_r -33.71706   15.93072 -2.1165 0.0352542 *
## jadud_hw_07_r  -4.65656    7.09114 -0.6567 0.5119720
## jadud_hw_08_r -23.32749    6.09196 -3.8292 0.0001612 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.2021562
## Reduction in Dispersion Test: 5.48986 p-value: 0
```

RED

use RED to predict midterm 1 grades

```
# predict midterm1 with only compiler RED measures
summary(rfit(Midterm1 ~ RED_hw_03_c + RED_hw_04_c, data = RED_df, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm1 ~ RED_hw_03_c + RED_hw_04_c,
##     data = RED_df, scores = bentscores3)
##
## Coefficients:
##              Estimate Std. Error t.value   p.value
## (Intercept) 94.000000   1.618624 58.0740 < 2.2e-16 ***
## RED_hw_03_c -0.257197   0.044823 -5.7380 2.567e-08 ***
## RED_hw_04_c -0.356401   0.136726 -2.6067  0.009651 **
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.1085958
## Reduction in Dispersion Test: 16.44645 p-value: 0
```

```
# predict midterm1 with both compiler and runtime RED measures
summary(rfit(Midterm1 ~ RED_hw_03_c + RED_hw_04_c + RED_hw_03_r + RED_hw_04_r, data = RED_df, scores = b
```

```
## Call:
## rfit.default(formula = Midterm1 ~ RED_hw_03_c + RED_hw_04_c +
##     RED_hw_03_r + RED_hw_04_r, data = RED_df, scores = bentscores3)
##
## Coefficients:
##              Estimate Std. Error t.value   p.value
## (Intercept) 94.514551   1.383872 68.2972 < 2.2e-16 ***
## RED_hw_03_c -0.248857   0.044417 -5.6028 5.229e-08 ***
## RED_hw_04_c -0.382847   0.135149 -2.8328  0.004965 **
## RED_hw_03_r -2.625002   7.982714 -0.3288  0.742537
## RED_hw_04_r -1.190490   0.494935 -2.4053  0.016835 *
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.1264892
## Reduction in Dispersion Test: 9.70197 p-value: 0
```

use RED to predict midterm 2 grades

```
# predict midterm2 with only compiler RED measures
summary(rfit(Midterm2 ~
                     RED_hw_03_c + RED_hw_04_c + RED_hw_05_c +
                             RED_hw_06_c + RED_hw_07_c + RED_hw_08_c, data = RED_df, scores = bentscores
```

```
## Call:
## rfit.default(formula = Midterm2 ~ RED_hw_03_c + RED_hw_04_c +
##     RED_hw_05_c + RED_hw_06_c + RED_hw_07_c + RED_hw_08_c, data = RED_df,
##     scores = bentscores3)
##
## Coefficients:
```

```
##              Estimate Std. Error t.value   p.value
## (Intercept) 93.026735   1.257433 73.9815 < 2.2e-16 ***
## RED_hw_03_c -0.064603   0.044094 -1.4651 0.1440642
## RED_hw_04_c -0.465046   0.134450 -3.4589 0.0006315 ***
## RED_hw_05_c -0.068126   0.053156 -1.2816 0.2010883
## RED_hw_06_c -0.035360   0.056438 -0.6265 0.5315078
## RED_hw_07_c -0.110381   0.114991 -0.9599 0.3379722
## RED_hw_08_c -0.053470   0.037841 -1.4130 0.1588191
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.06544336
## Reduction in Dispersion Test: 3.10449 p-value: 0.0059
```

```
# predict midterm2 with both compiler and runtime RED measures
summary(rfit(Midterm2 ~
                    RED_hw_03_c + RED_hw_04_c + RED_hw_05_c +
                            RED_hw_06_c + RED_hw_07_c + RED_hw_08_c +
                            RED_hw_03_r + RED_hw_04_r + RED_hw_05_r +
                            RED_hw_06_r + RED_hw_07_r + RED_hw_08_r, data = RED_df, scores = bentscores
```

```
## Call:
## rfit.default(formula = Midterm2 ~ RED_hw_03_c + RED_hw_04_c +
##     RED_hw_05_c + RED_hw_06_c + RED_hw_07_c + RED_hw_08_c + RED_hw_03_r +
##     RED_hw_04_r + RED_hw_05_r + RED_hw_06_r + RED_hw_07_r + RED_hw_08_r,
##     data = RED_df, scores = bentscores3)
##
## Coefficients:
##              Estimate Std. Error t.value   p.value
## (Intercept) 96.554545   1.643415 58.7524 < 2.2e-16 ***
## RED_hw_03_c -0.054228   0.042873 -1.2648  0.207064
## RED_hw_04_c -0.395981   0.135040 -2.9323  0.003664 **
## RED_hw_05_c -0.011715   0.051481 -0.2276  0.820172
## RED_hw_06_c -0.025389   0.054181 -0.4686  0.639746
## RED_hw_07_c -0.152046   0.112328 -1.3536  0.177044
## RED_hw_08_c -0.067712   0.036216 -1.8697  0.062653 .
## RED_hw_03_r  4.555301   7.512028  0.6064  0.544778
## RED_hw_04_r  0.132299   0.473436  0.2794  0.780125
## RED_hw_05_r -0.498214   0.095634 -5.2096 3.854e-07 ***
## RED_hw_06_r -0.471503   0.388809 -1.2127  0.226351
## RED_hw_07_r -0.422282   0.257522 -1.6398  0.102259
## RED_hw_08_r -0.883721   0.192623 -4.5878 6.972e-06 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.1662941
## Reduction in Dispersion Test: 4.32171 p-value: 0
```

HW grades

use HW grades to predict midterm 1

```
summary(rfit(Midterm1 ~ HW3 + HW4, data = grade, scores = bentscores3))
```

```
## Call:
## rfit.default(formula = Midterm1 ~ HW3 + HW4, data = grade, scores = bentscores3)
##
## Coefficients:
##              Estimate Std. Error t.value   p.value
## (Intercept) 48.723818   6.345296  7.6787 2.933e-13 ***
## HW3          0.436165   0.043363 10.0584 < 2.2e-16 ***
## HW4          0.026712   0.079818  0.3347    0.7381
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.178964
## Reduction in Dispersion Test: 29.53539 p-value: 0
```

use HW grades to predict midterm 2

```
## Call:
## rfit.default(formula = Midterm2 ~ HW3 + HW4 + HW5 + HW6 + HW7 +
##     HW8, data = grade, scores = bentscores3)
##
## Coefficients:
##              Estimate Std. Error t.value   p.value
## (Intercept) 75.982253   6.742895 11.2685 < 2.2e-16 ***
## HW3          0.334412   0.055084  6.0710 4.348e-09 ***
## HW4         -0.024196   0.094596 -0.2558 0.7983117
## HW5         -0.497066   0.097770 -5.0840 6.961e-07 ***
## HW6          0.165118   0.048183  3.4269 0.0007069 ***
## HW7          0.137427   0.051657  2.6604 0.0082773 **
## HW8          0.074503   0.045673  1.6312 0.1040201
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Multiple R-squared (Robust): 0.2494467
## Reduction in Dispersion Test: 14.78959 p-value: 0
```