

Untitled

GrJa23

January 18, 2024

Explanations

Test have been performed in the below website as user “a7710” https://arnaud-legrand.shinyapps.io/design_of_experiments/?user_a7710

The goal is to find the best series of number between [0,1] in a range [x1,...,x11] that will provide the highest score final score.

Loading data

```
library(tidyverse)
```

```
## -- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
## v dplyr      1.1.4      v readr      2.1.5
## v forcats    1.0.0      v stringr   1.5.1
## v ggplot2    3.4.4      v tibble    3.2.1
## v lubridate  1.9.3      v tidyr     1.3.0
## v purrr      1.0.2
```

```
## -- Conflicts ----- tidyverse_conflicts() --
```

```
## x dplyr::filter() masks stats::filter()
```

```
## x dplyr::lag()      masks stats::lag()
```

```
## i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become errors
```

```
library(dplyr)
```

```
library(ggplot2)
```

```
df_loaded <- read_delim("Data/user_a7710",delim = ",",show_col_types = FALSE)
```

```
print(tail(df_loaded))
```

```
## # A tibble: 6 x 13
```

```
##   Date      x1    x2    x3    x4    x5    x6    x7    x8    x9    x10   x11    y
##   <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 2024--  0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.5    0.7    1.81
## 2 2024--  0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.6    0.7    1.80
## 3 2024--  0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.7    0.7    1.80
## 4 2024--  0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.8    0.7    1.80
## 5 2024--  0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.9    0.7    1.80
## 6 2024--  0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.95   0.7    1.80
```

Steps Followed during the testing

1. I have first tested with only 0 values in all lines. the result is that all numbers are having values are all different with values going from ~1.01149 to ~1.01951.

```
df_loaded[1:10,]
```

```
## # A tibble: 10 x 13
##   Date      x1      x2      x3      x4      x5      x6      x7      x8      x9      x10     x11      y
##   <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 2 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 3 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 4 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.01
## 5 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 6 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.01
## 7 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 8 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 9 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
## 10 2023~    0      0      0      0      0      0      0      0      0      0      0      0 1.02
```

```
min(df_loaded[1:10,]$y)
```

```
## [1] 1.011496
```

```
max(df_loaded[1:10,]$y)
```

```
## [1] 1.019509
```

2. I have then selected randomly (with 1 digit) numbers in each columns. The result is at ~1.7998

```
df_loaded[11:11,]
```

```
## # A tibble: 1 x 13
##   Date      x1      x2      x3      x4      x5      x6      x7      x8      x9      x10     x11      y
##   <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.3    1.80
```

3. I have then used the previous numbers for all rows but in x1 to x10 only changing the last column with incrementals. Numbers are going from ~1.7983 to ~1.8092

```
df_loaded[12:22,]
```

```
## # A tibble: 11 x 13
##   Date      x1      x2      x3      x4      x5      x6      x7      x8      x9      x10     x11      y
##   <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.05 1.80
## 2 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.1 1.80
## 3 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.2 1.80
## 4 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.3 1.80
## 5 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.4 1.80
## 6 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.5 1.81
## 7 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.6 1.80
## 8 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.7 1.81
## 9 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.8 1.81
## 10 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.9 1.81
## 11 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2    0.95 1.80
```

```
min(df_loaded[12:22,]$y)
```

```
## [1] 1.798308
```

```
max(df_loaded[12:22,]$y)
```

```
## [1] 1.809425
```

4. I have then the exact same table changing only one value in the 8th row in X10. Numbers are going from ~1.8010 to ~1.8086. No significant changes in the result can be seen.

```
df_loaded[23:33,]
```

```
## # A tibble: 11 x 13
```

##	Date	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	y
##	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
##	1 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.05	1.81
##	2 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.1	1.80
##	3 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.2	1.80
##	4 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.3	1.80
##	5 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.4	1.80
##	6 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.5	1.81
##	7 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.6	1.81
##	8 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.7	0.7	1.81
##	9 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.8	1.80
##	10 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.9	1.80
##	11 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.95	1.80

```
min(df_loaded[23:33,]$y)
```

```
## [1] 1.801009
```

```
max(df_loaded[23:33,]$y)
```

```
## [1] 1.808582
```

5. I have then the exact same table changing again one value in the 8th row in X10. Numbers are going from ~1.7990 to ~1.8049. No significant changes in the result can be seen.

```
df_loaded[34:44,]
```

```
## # A tibble: 11 x 13
```

##	Date	x1	x2	x3	x4	x5	x6	x7	x8	x9	x10	x11	y
##	<chr>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>	<dbl>
##	1 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.05	1.80
##	2 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.1	1.80
##	3 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.2	1.80
##	4 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.3	1.80
##	5 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.4	1.80
##	6 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.5	1.80
##	7 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.6	1.80
##	8 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.05	0.7	1.80
##	9 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.8	1.80
##	10 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.9	1.80
##	11 2024~	0.5	0.2	0.3	0.4	0.5	0.1	0.5	0.1	0.1	0.2	0.95	1.80

```
min(df_loaded[34:44,]$y)
```

```
## [1] 1.799003
```

```
max(df_loaded[34:44,]$y)
```

```
## [1] 1.804943
```

6. I have then restarted from the table in 3. and changed the column X11 with 0.7. Numbers are going from ~1.8000 to ~1.8058. No significant changes in the result can be seen.

```
df_loaded[45:55,]
```

```
## # A tibble: 11 x 13
##   Date      x1      x2      x3      x4      x5      x6      x7      x8      x9      x10     x11      y
##   <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.05    0.7    1.80
## 2 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.1     0.7    1.80
## 3 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2     0.7    1.81
## 4 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.3     0.7    1.80
## 5 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.4     0.7    1.80
## 6 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.5     0.7    1.80
## 7 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.6     0.7    1.80
## 8 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.7     0.7    1.80
## 9 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.8     0.7    1.80
## 10 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.9     0.7    1.80
## 11 2024~ 0.5    0.2    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.95    0.7    1.80
```

```
min(df_loaded[45:55,]$y)
```

```
## [1] 1.800037
```

```
max(df_loaded[45:55,]$y)
```

```
## [1] 1.805801
```

6. I have then restarted then changed the column X2 with 0.7. Numbers are going from ~1.7989 to ~1.8072. No significant changes in the result can be seen.

```
df_loaded[56:66,]
```

```
## # A tibble: 11 x 13
##   Date      x1      x2      x3      x4      x5      x6      x7      x8      x9      x10     x11      y
##   <chr> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl> <dbl>
## 1 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.05    0.7    1.81
## 2 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.1     0.7    1.80
## 3 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.2     0.7    1.80
## 4 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.3     0.7    1.80
## 5 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.4     0.7    1.80
## 6 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.5     0.7    1.81
## 7 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.6     0.7    1.80
## 8 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.7     0.7    1.80
## 9 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.8     0.7    1.80
## 10 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.9     0.7    1.80
## 11 2024~ 0.5    0.7    0.3    0.4    0.5    0.1    0.5    0.1    0.1    0.95    0.7    1.80
```

```
min(df_loaded[56:66,]$y)
```

```
## [1] 1.798993
```

```
max(df_loaded[56:66,]$y)
```

```
## [1] 1.807244
```