PSResearchDesign_Systems

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This file is part of the PS Research Design Term Paper of Adrian Brenner.

On the weather day classification:

Warning: Paket 'readxl' wurde unter R Version 4.3.2 erstellt

Mean of Temperature: 11.05

11.05 * 1.4 = 15.47   11.05 * 1.3 = 14.365   11.05 * 0.7 = 7.735   11.05 * 0.6 = 6.63

Mean of Precipitation: 3.20

3.20 * 1.4 = 4.48   3.20 * 1.3 = 4.16   3.20 * 0.7 = 2.24   3.20 * 0.6 = 1.92

Mean of Sunshine hours: 5.38

5.38 * 1.4 = 7.532   5.38 * 1.3 = 6.994   5.38 * 0.7 = 3.766   5.38 * 0.6 = 3.228

Obviously there are a lot of strong outlying days in the Sunshine and Rainfall factor, that could present their mean score to be misleading, here it would be possible to opt for a Median approach as well. I did not decide for that, as I choose mean calculations for all other factors as well, consequently a deviation would be more unjust than just in this papers case. A practical mean deficit should become visible with a low amount of "average" sunshine and precipitation classified days.

Temperature Treatment Classification

```
## mittel_categories
##             Under 6.63    Between 6.63 and 7.735 Between 7.735 and 14.365
##                      9                         5                        8
## Between 14.365 and 15.47              Over 15.47
##                      1                         0

## mittel_categories
##             Under 6.63    Between 6.63 and 7.735 Between 7.735 and 14.365
##                      0                         2                       13
## Between 14.365 and 15.47              Over 15.47
##                      2                         2

## mittel_categories
##             Under 6.63    Between 6.63 and 7.735 Between 7.735 and 14.365
##                      0                         0                        8
## Between 14.365 and 15.47              Over 15.47
##                      1                        10
```

For Pre-Treatment Temperature: 9 bad weather 5 below average 8 average 1 above average 0 good weather

For Treatment Temperature: 0 bad weather 2 below average 13 average 2 above average 2 good weather

For Post-Treatment Temperature: 0 bad weather 0 below average 8 average 1 above average 10 good weather

Clear positive skewness for temperature as time goes on

Precipitation Treatment Classification

Note that for precipitation the counts are inversed, as higher counts equal worse weather (more rain).

```
## nieder_categories
##           Under 1.92 Between 1.92 and 2.24 Between 2.24 and 4.16
##                   15                      0                     3
## Between 4.16 and 4.48           Over 4.48
##                    0                   5

## nieder_categories
##           Under 1.92 Between 1.92 and 2.24 Between 2.24 and 4.16
##                   10                      0                     2
## Between 4.16 and 4.48           Over 4.48
##                    0                   7

## nieder_categories
##           Under 1.92 Between 1.92 and 2.24 Between 2.24 and 4.16
##                   18                      0                     0
## Between 4.16 and 4.48           Over 4.48
##                    0                   1
```

For Pre-Treatment Precipitation: 5 bad weather 0 below average 3 average 0 above average 15 good weather

For Treatment Precipitation: 7 bad weather 0 below average 2 average 0 above average 10 good weather

For Post-Treatment Precipitation: 1 bad weather 0 below average 0 average 0 above average 18 good weather

Sunshine Treatment Classification

```
## sonnen_categories
##            Under 3.228 Between 3.228 and 3.766 Between 3.766 and 6.994
##                     16                       0                      0
## Between 6.994 and 7.532         Over 7.532
##                      0                  7

## sonnen_categories
##            Under 3.228 Between 3.228 and 3.766 Between 3.766 and 6.994
##                      7                       0                      7
## Between 6.994 and 7.532         Over 7.532
##                      0                  5

## sonnen_categories
##            Under 3.228 Between 3.228 and 3.766 Between 3.766 and 6.994
##                      6                       0                      5
## Between 6.994 and 7.532         Over 7.532
##                      0                  8
```

For Pre-Treatment Sunshine: 16 bad weather 0 below average 0 average 0 above average 7 good weather

For Treatment Sunshine: 7 bad weather 0 below average 7 average 0 above average 5 good weather

For Post-Treatment Sunshine: 6 bad weather 0 below average 5 average 0 above average 8 good weather

Cumulative Weather Classsification

Here I just cross reference all results and look how many days are true for at least 2 out of 3 variables (Temperature, Precipitation, Sunshine). Note here, that this two way cross reference method does not have to add up to the respective day count of the selected time frame. All remaining days will be attributed to average with the representative factor of 0.

For Pre-Treatment: 9 bad weather 0 below average 3 average 0 above average 7 good weather

For Treatment: 7 bad weather 0 below average 7 average 0 above average 5 good weather

For Post-Treatment: 1 bad weather 0 below average 5 average 0 above average 10 good weather

It becomes obvious, that the threshold of the classified above and below average weather is not efficiently chosen, as it is to slim to actually encapsulate any instances of 2 our of 3 variables fitting. A lower threshold of 15% might me much more suitable, or even a raise of the good and bad classifications to 50%. Anything that raises the slim 10% margin window will help to make those classifications more efficent, as per this papers classification they are unused.

On the calculation of children per family household:

52.8% of household have 1 child.

36.3% have 2.

8.1% have 3.

2.7% 4 or more, so here I use 4.2 as a proposed calulation number. (As most of those household most likely have 4 children.)

As per p.6 of Landeshauptstadt Bayern: https://stadt.muenchen.de/dam/jcr:d84c2a4e-6bfb-453b-8951-65aae1da174a/Kurzinformation_Familien_in_Muenchen_181012.pdf

[1] 1.6104

So a rough average of 1.6 children per family household.

DID Model Calculation -> Done with inline Math directly in LaTeX.

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