Untitled

[1]

2021-03-01

[1] , standard@kedi.re.kr

Contents

Chapter 1

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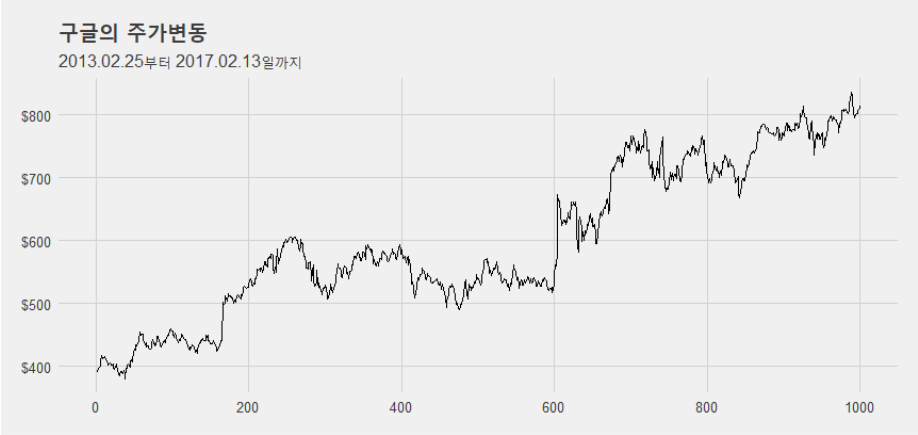

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, .
. (Supervised Learning),
(Unsupervised Learning), (Reinforcement learning) .
. , , . Azure,

AWS, H2O , .[1]

Facebook

(Prophet) .

, , , , .

1.1 ?

(Time Series) .

, , (Feature)

.

	date	status	0-9세	10-19세	20-29세	30-39세	40-49세	50-59세	60-69세	70-79세	80세 이상
1	2020-04-09	신규	2	4	12	7	7	2	2	0	3
2	2020-04-10	신규	1	1	7	4	2	3	6	2	1
3	2020-04-11	신규	1	5	5	2	3	6	7	0	1
4	2020-04-12	신규	0	3	13	5	1	4	3	3	0
5	2020-04-13	신규	2	1	10	2	1	2	5	1	1
6	2020-04-14	신규	0	3	7	4	4	3	3	2	1
7	2020-04-15	신규	0	4	9	5	3	2	1	2	1
8	2020-04-16	신규	3	3	5	1	2	3	2	1	2
9	2020-04-17	신규	1	4	9	3	1	2	1	1	0
10	2020-04-18	신규	2	0	9	1	1	2	1	1	1
11	2020-04-19	신규	0	2	3	1	0	1	0	0	1
12	2020-04-20	신규	0	3	5	2	0	3	0	0	0
13	2020-04-21	신규	0	1	2	0	1	3	0	1	1
14	2020-04-22	신규	0	1	3	1	4	0	1	1	0
15	2020-04-23	신규	0	1	2	1	1	1	0	1	1
16	2020-04-24	신규	0	1	1	1	0	1	1	0	1
17	2020-04-25	신규	1	1	3	1	2	0	2	0	0
18	2020-04-26	신규	2	0	3	4	1	0	0	0	0

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’Target’ . , .

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[1] https://www.mckinsey.com/~/media/mckinsey/featured%20insights/artificial%20intelligence/notes%20from%20the%20ai%20frontier%20applications%20and%20value%20of%20deep%20learning/notes-from-the-ai-frontier-insights-from-hundreds-of-use-cases-discussion-paper.ashx

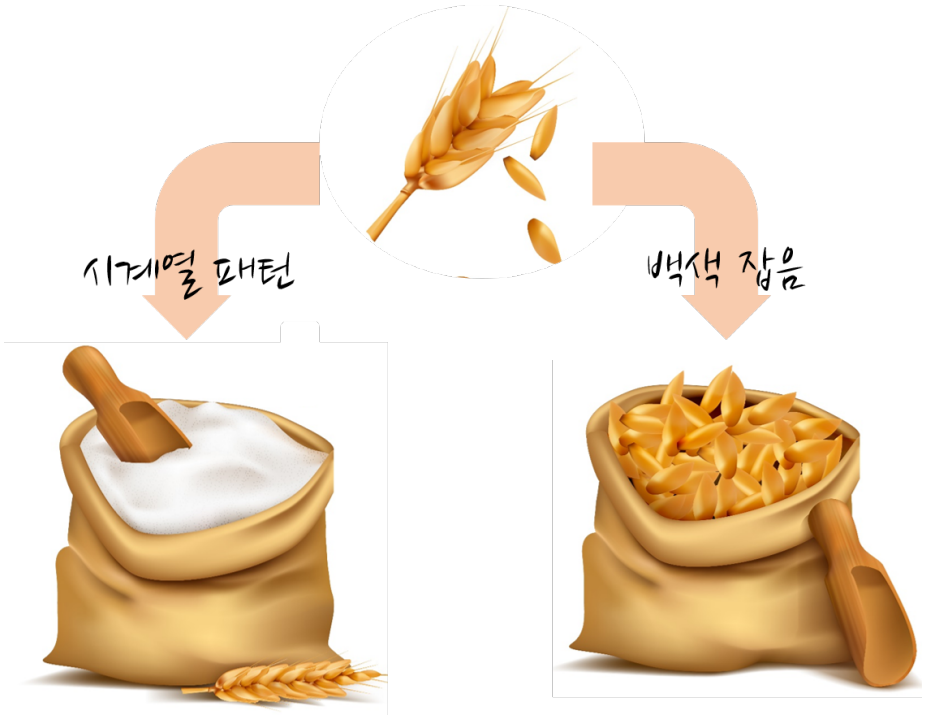

Figure 1.1: www.freepik.com

1.2

1.2.1

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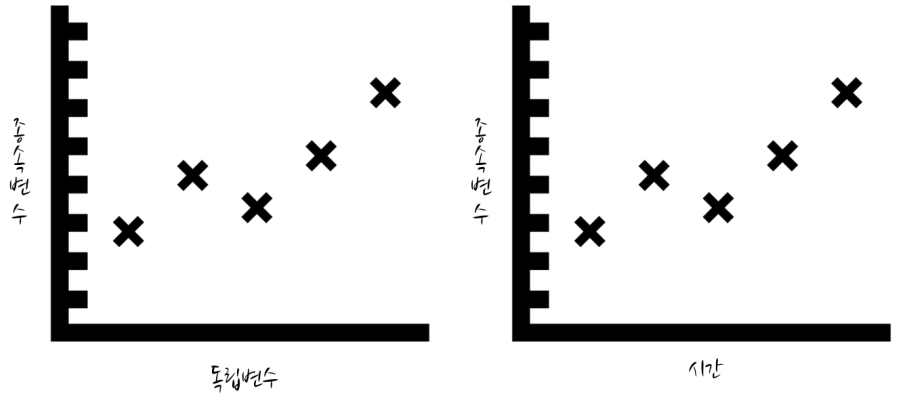

일반데이터 시계열데이터

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. plot EDA(Exploratory Data Analysis) .

1.2.2

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. n (n (lag)) . n

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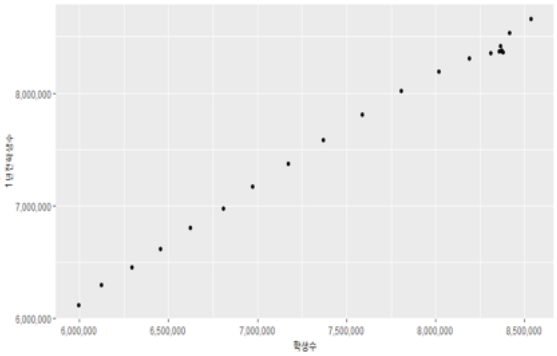
1999 2020 , , , . 1 plot plot .

plot 1 plot . , .

연도	전체학생수	1년전학생수
1999	8,658,358	-
2000	8,535,867	8,658,358
2001	8,414,423	8,535,867
2002	8,361,933	8,414,423
2003	8,379,775	8,361,933
2004	8,371,630	8,379,775
2005	8,371,421	8,371,630
2006	8,354,891	8,371,421
2007	8,309,932	8,354,891
2008	8,187,782	8,309,932
2009	8,016,924	8,187,782
2010	7,807,663	8,016,924
2011	7,586,266	7,807,663
2012	7,370,308	7,586,266
2013	7,173,904	7,370,308
2014	6,973,154	7,173,904
2015	6,806,411	6,973,154
2016	6,621,547	6,806,411
2017	6,454,281	6,621,547
2018	6,295,366	6,454,281
2019	6,122,198	6,295,366
2020	5,995,239	6,122,198
		5,995,239



1.2.3 (Trend)

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plot . plot . 2003 2007

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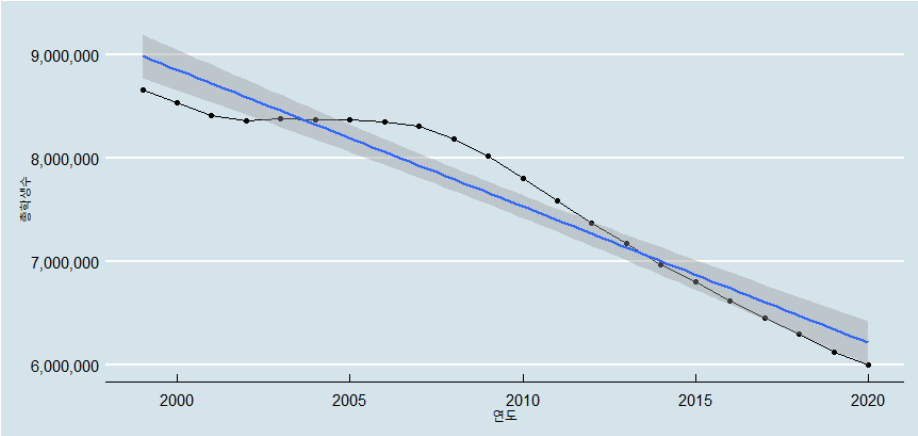

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1.2.4 (Seasonality), (Cyclic)

(Calender)
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plot . 2013 2020 plot . plot
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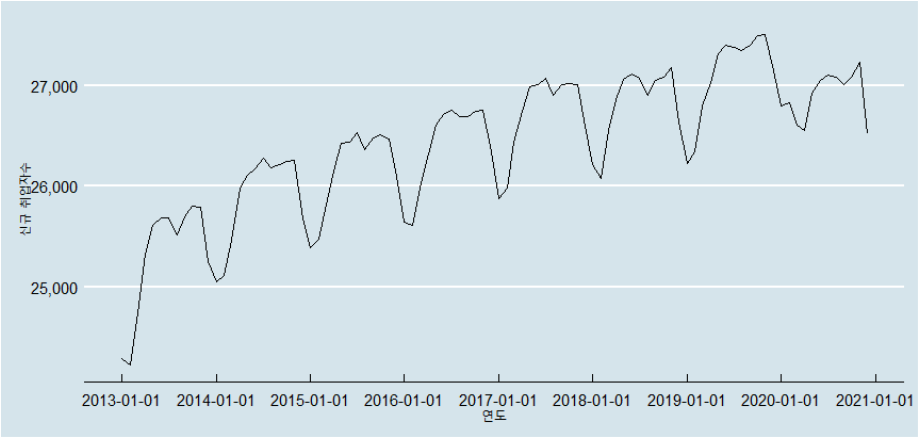

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(Peak) .

1.2.5 (Uncertainty)

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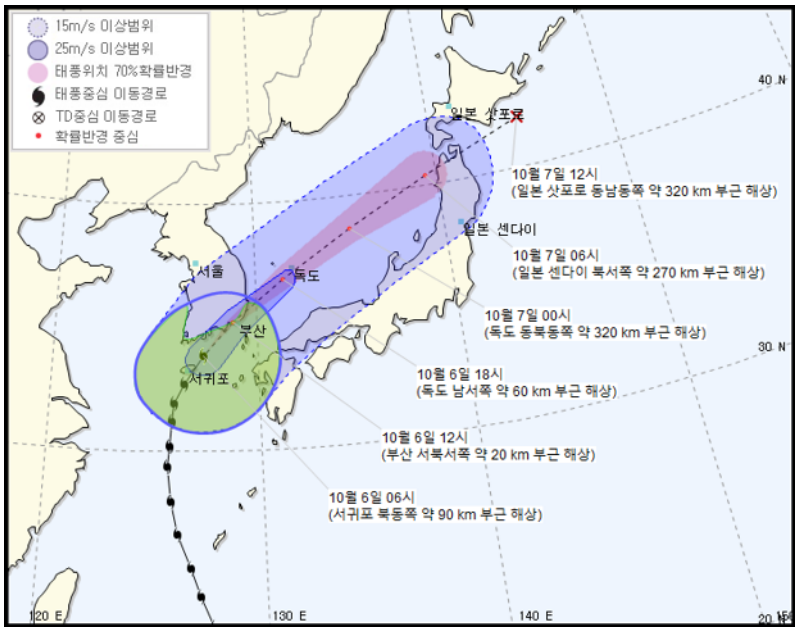
[2] . , .
70% . 70% .
70% 70% 70% .
. ‘ ’ .

[2]https://www.weather.go.kr/HELP/html/help_tpi001.jsp



. (Probability Distribution) .

(forecast distribution) “ (hat)” $\hat{x}$

. .

. .

.

Chapter 2

author: [1]

Placeholder

2.1 /

2.1.1 date

2.1.2 POSIXct, POSIXlt data class

2.1.3 yearmon, yearqtr class

2.1.4 ,

2.2 (Object)

2.2.1 ts : R base(stats)

2.2.2 xts

2.2.3 tsibble

2.3 Import

2.3.1

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2.3.2 CSV

2.3.3

2.3.3.1 -

Chapter 3

author: [1]

Placeholder

3.1 data.frame : ggplot2

3.2 xts : xts

3.3 ts : forecast

3.4 tsibble : feasts

3.5 data.frame : timetk

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Chapter 4

Handling

Placeholder

4.1 ? :

4.2 ? :

4.3 ? :

4.4 , , ? : Grouping

4.5 , , , ? : OHLC

4.6 3 , 5 ? : Rolling

4.7 ? : Filtering(Subsetting)

4.8 , ,

4.9 ,

4.10 , ,

4.11 , , Plot

Chapter 5

forecasting Part I -

Placeholder

5.1 (Stationary), (Non-Stationary)

5.2 (Lag) (Difference)

5.3 ACF PACF

5.4 (fitted value) (residuals)

5.5 (White Noise)

5.6 (Decomposition)

5.7

5.8

Chapter 6

forecasting Part II -

Placeholder

6.1

6.2 (Naive)

6.3 (Seasonal Naive)

6.4 Random Walk

6.5 Regression

6.5.1 forecast::tslm()

6.5.2 timetk::plot_time_series_regression

6.6 (Exponential Smoothing)

6.6.1 (Simple Exponentail Smoothing Model)

6.6.1.1 forecast::ses()

6.6.2 (Holt)

6.6.2.1 forecast::holt()

6.6.3 - (Holt-Winter)

6.6.3.1 forecast::hw()

6.6.4 ETS

6.7 ARIMA

6.7.1 (AutoRegressive Model)

6.7.2 (Moving Average Model)

6.7.3 ARIMA

6.7.3.1

6.7.3.2 ACF, PACF

6.7.3.3

6.7.3.4 ARIMA

6.7.4 Seasonal ARIMA

6.8 TBATS

6.9 prophet

6.10 (Neural Network)

Chapter 7

forecasting Part III - Framework

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7.1

7.1.1 MAE(Means Absolute Error)

7.1.2 RMSE(Root Means Squaread Error)

7.1.3 MPE

7.1.4 MAPE

7.2 fable framework

7.2.1

7.2.2

7.2.3

7.3 modeltime framework

7.3.1

7.3.2

7.3.3

7.4 R Markdown

This is an R Markdown document. Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see http://rmarkdown.rstudio.com.

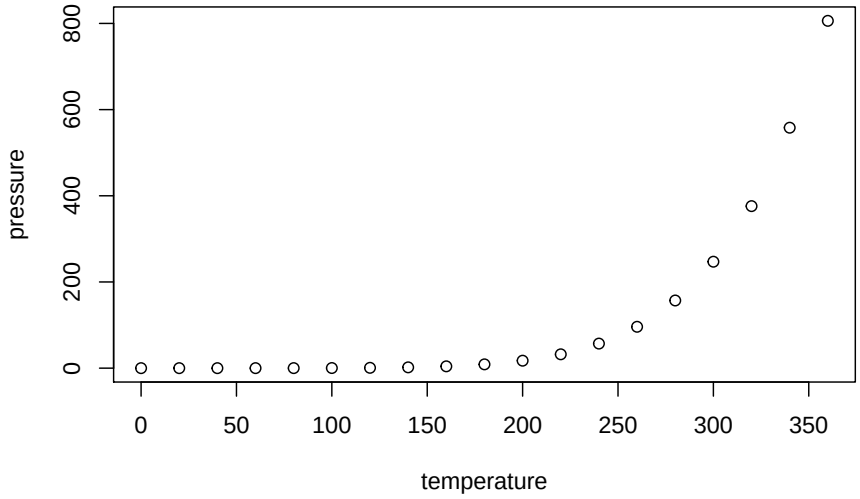
When you click the **Knit** button a document will be generated that includes both content as well as the output of any embedded R code chunks within the document. You can embed an R code chunk like this:

```
summary(cars)
```

```
##      speed           dist       
##  Min.   : 4.0   Min.   :  2.00  
##  1st Qu.:12.0   1st Qu.: 26.00  
##  Median :15.0   Median : 36.00  
##  Mean   :15.4   Mean   : 42.98  
##  3rd Qu.:19.0   3rd Qu.: 56.00  
##  Max.   :25.0   Max.   :120.00
```

7.5 Including Plots

You can also embed plots, for example:



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.