An abstract 3D composition featuring several geometric shapes on a dark blue background. There are two brown cubes, one dark blue cube, and one dark blue cylinder. Two bright yellow spheres are also present. The shapes are arranged in a dynamic, overlapping manner, with some casting soft shadows on the surface below. A thin white horizontal line is positioned above the main text.

Prediction of subway usage by time according to weather

2023.08.09

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Team Joeun Day

1. Subject Change

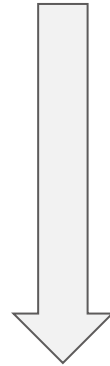
1. Analysis Datasets

1. Multi Layer Perceptron

1. Conclusion

Original Subject:

Prediction of subway usage by time according to weather



Ttukseom Park

**Analysis of influence differences of weather variables and
prediction of usage according to station characteristics**

Euljiro 1(il)-ga VS Ttukseom Park

Dataset #1. Current Time Stamp Weather Data

Features: Rain, Wind, Humidity, Sensible Temp, Hour-5

Dataset #2. All features

Features: Rain, Wind, Humidity, Sensible Temp, Hour, Rain(hour), Wind(hour), Humidity(hour), Sensible Temp(hour), , Rain(week), Wind(week), Humidity(week), Sensible Temp(week)-15

Dataset #3. Correlation Top 8 features

Features: Attribute statisticsTop 8 of 15 features-8

Part 2 Datasets

- DataSet #1 (Current Time Stamp Weather Data) : Linear Correlation

Linear Correlation	Euljiro 1(il)-ga		Ttukseom Park	
Features	Boarding	Exiting	Boarding	Exiting
Humidity	-0.191	0.122	0.156	-0.114
Sensible temp	-0.134	-0.079	0.056	0.179
Rain	-0.044	0.011	-0.040	-0.073
Wind	0.163	-0.119	-0.141	0.153
Hour	0.516	-0.580	-0.459	0.487

- **DataSet #1 (Current Time Stamp Weather Data)
: Random Forest Attributes Statics(splits level 0)**

	Euljiro 1(il)-ga		Ttukseom Park	
Random Forest	Boarding	Exiting	Boarding	Exiting
Features	#splits (level0)	#splits (level0)	#splits (level0)	#splits (level0)
Rain	0	0	0	0
Wind	162	445	329	423
Humidity	299	312	427	135
Sensible temp	440	140	136	324
Hour	599	603	608	618
R ²	0.759	0.959	0.863	0.854
MAE	775.018	396.592	74.631	71.092
MSE	1946236.952	489039.201	14457.959	14324.413
RMSE	1395.076	699.313	120.241	119.685

Part 2 Datasets

- DataSet #1 (Current Time Stamp Weather Data): MLR Score

MLR	Euljiro 1(il)-ga		Ttukseom Park	
values	Boarding	Exiting	Boarding	Exiting
R^2	0.251	0.326	0.182	0.278
MAE	1522.161	1506.774	229.589	187.214
MSE	6053378.996	8050308.859	86376.052	70881.223
RMSE	2460.362	2837.307	293.898	266.235

Part 2 Datasets

- All models using DataSet #1 (Current Time Stamp Weather Data)

	Euljiro 1(il)-ga		Ttukseom Park	
Linear Correlation	Boarding	Exiting	Boarding	Exiting
Humidity	-0.191	0.122	0.156	-0.114
Sensible temp	-0.134	-0.079	0.056	0.179
Rain	-0.044	0.011	-0.040	-0.073
Wind	0.163	-0.119	-0.141	0.153
Hour	0.516	-0.580	-0.459	0.487
Random Forest	#splits (level0)	#splits (level0)	#splits (level0)	#splits (level0)
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MLR	5 Variables			
R ²	0.251	0.326	0.182	0.278
MAE	1522.161	1506.774	229.589	187.214
MSE	6053378.996	8050308.859	86376.052	70881.223
RMSE	2460.362	2837.307	293.898	266.235

Part 2

Datasets

- DataSet #2 (All features): Linear Correlation

Linear Correlation	Euljiro 1(il)-ga		Ttukseom Park	
Features	Boarding	Exiting	Boarding	Exiting
Rain	0.028	0.011	0.040	0.073
Wind	0.183	0.119	0.141	0.153
Humidity	0.141	0.122	0.156	0.114
Sensible_temp	0.048	0.079	0.056	0.179
Hour	0.612	0.58	0.459	0.487
Rain(hour)	0.033	0.014	0.041	0.074
Wind(hour)	0.269	0.169	0.160	0.228
Humidity(hour)	0.243	0.198	0.192	0.199
Sensible_temp(hour)	0.086	0.099	0.052	0.214
Usage(hour)	0.644	0.51	0.641	0.332
Rain(week)	0.030	0.016	0.012	0.043
Wind(week)	0.193	0.13	0.138	0.181
Humidity(week)	0.154	0.142	0.224	0.077
Sensible_temp(week)	0.053	0.083	0.030	0.154
Usage(week)	0.975	0.993	0.889	0.849

- DataSet #2 (All features): Linear Correlation

Linear Correlation	Euljiro 1(il)-ga		Ttukseom Park	
Features	Boarding	Exiting	Boarding	Exiting
Rain	0.028	0.011	0.040	0.073
Wind	0.183	0.119	0.141	0.153
Humidity	0.141	0.122	0.156	0.114
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Usage(week)	0.975	0.993	0.889	0.849

Part 2 Datasets

- **DataSet #2 (All features)**
: Random Forest Attributes Statics (Splits level 0)

	Euljiro 1(il)-ga		Ttukseom Park	
Random Forest	tree depth: 10 number of model: 1500			
Features	Boarding	Exiting	Boarding	Exiting
Rain	0	1	4	4
Wind	89	68	53	65
Humidity	62	51	114	22
Sensible_temp	11	8	34	63
Hour	252	215	256	283
Rain(hour)	5	1	1	3
Wind(hour)	177	150	93	190
Humidity(hour)	128	175	140	64
Sensible_temp(hour)	35	36	21	150
Usage(hour)	213	278	248	211
Rain(week)	3	2	0	0
Wind(week)	124	103	68	119
Humidity(week)	71	105	175	11
Sensible_temp(week)	17	11	7	24
Usage(week)	313	296	286	291

-DataSet #2(All variables), #3 (Top 8 variables) : MLR & Random Forest Score

	Euljiro 1(il)-ga Boarding		Euljiro 1(il)-ga Exiting	
	15 variables			
	MLR	Random Forest	MLR	Random Forest
R^2	0.949	0.968	0.984	0.986
MAE	256.465	271.369	188.545	245.759
MSE	463428.246	288197.650	193202.858	170837.378
RMSE	680.756	536.840	439.548	413.325
	8 variables			
R^2	0.948	0.976	0.984	0.989
MAE	250.907	230.990	188.821	204.479
MSE	471987.413	211695.463	193339.998	128374.148
RMSE	687.013	460.104	439.704	358.293

**-DataSet #2(All variables), #3 (Top 8 variables)
: MLR & Random Forest Score**

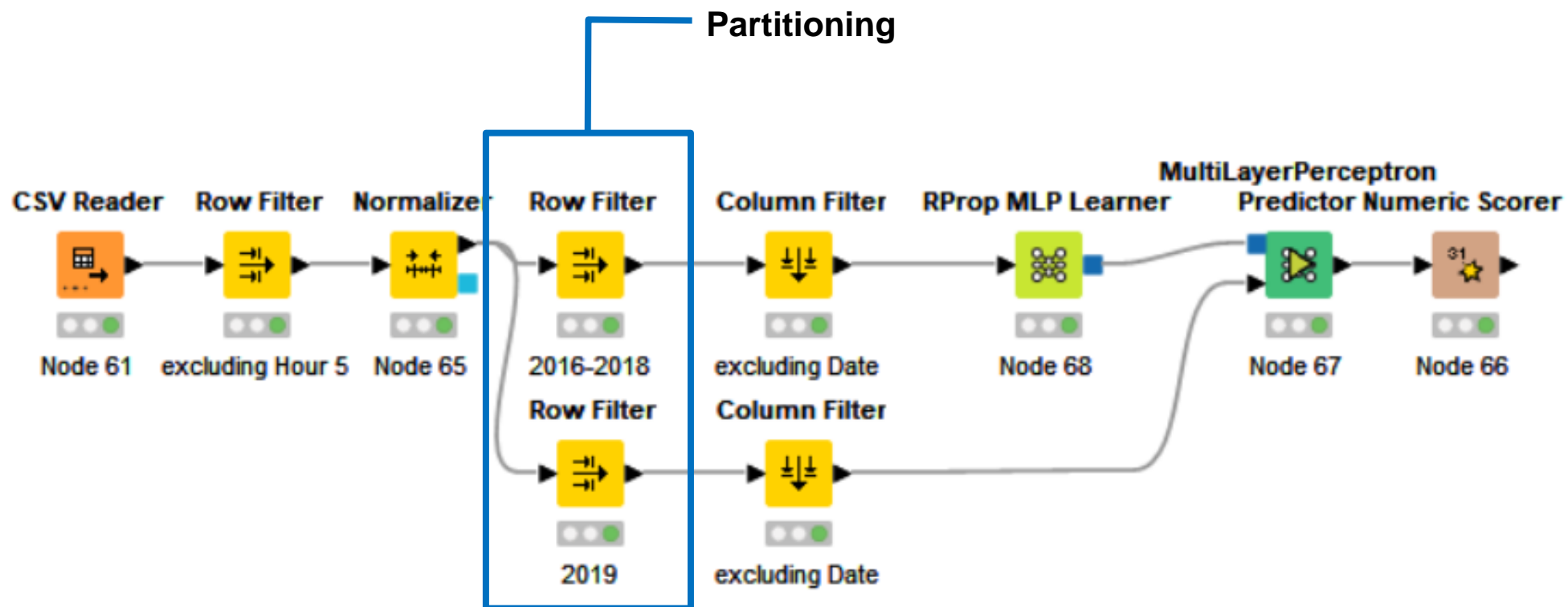
	Ttukseom Park Boarding		Ttukseom Park Exiting	
	15 variables			
	MLR	Random Forest	MLR	Random Forest
R^2	0.836	0.927	0.798	0.899
MAE	82.976	53.481	83.666	60.393
MSE	17360.718	7703.532	21294.975	10677.527
RMSE	131.760	87.770	145.928	103.332
	8 variables			
R^2	0.827	0.931	0.822	0.899
MAE	84.815	51.595	79.238	57.304
MSE	18224.725	7313.890	17471.379	9888.176
RMSE	134.999	85.521	132.179	99.439

Part 2 Datasets

- All models Using DataSet #2(All variables) & DataSet #3(Top 8 variables)

	Euljiro 1(il)-ga Boarding		Euljiro 1(il)-ga Exiting	
	15 variables			
	MLR	Random Forest	MLR	Random Forest
R^2	0.949	0.968	0.984	0.986
MAE	256.465	271.369	188.545	245.759
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	15 variables			
	MLR	Random Forest	MLR	Random Forest
R^2	0.836	0.927	0.798	0.899
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RMSE	134.999	85.521	132.179	99.439

Part 3 Multi Layer Perceptron



Part 3

Multi Layer Perceptron : Euljiro 1(il)-ga

	Euljiro 1(il)-ga Boarding			Euljiro 1(il)-ga Exiting		
Max_iter	HL	HN	R-squared	HL	HN	R-squared
100	3	32	0.935	3	32	0.984
	3	14	0.966	3	16	0.983
	5	8	0.949	4	32	0.984
	5	16	0.952	5	32	0.983
500	3	32	0.984	3	32	0.988
	3	16	0.975	3	24	0.984
	5	32	0.962	5	32	0.988
	2	32	0.976	5	24	0.99
1000	3	32	0.968	3	32	0.989
	3	16	0.982	3	16	0.988
	4	18	0.969	5	16	0.989
	5	32	0.961	5	24	0.991

Max_iter = Maximum number of iterations

HL = Number of hidden layers

HN = Number of hidden neurons per layer

Part 3 Multi Layer Perceptron : Ttukseom Park

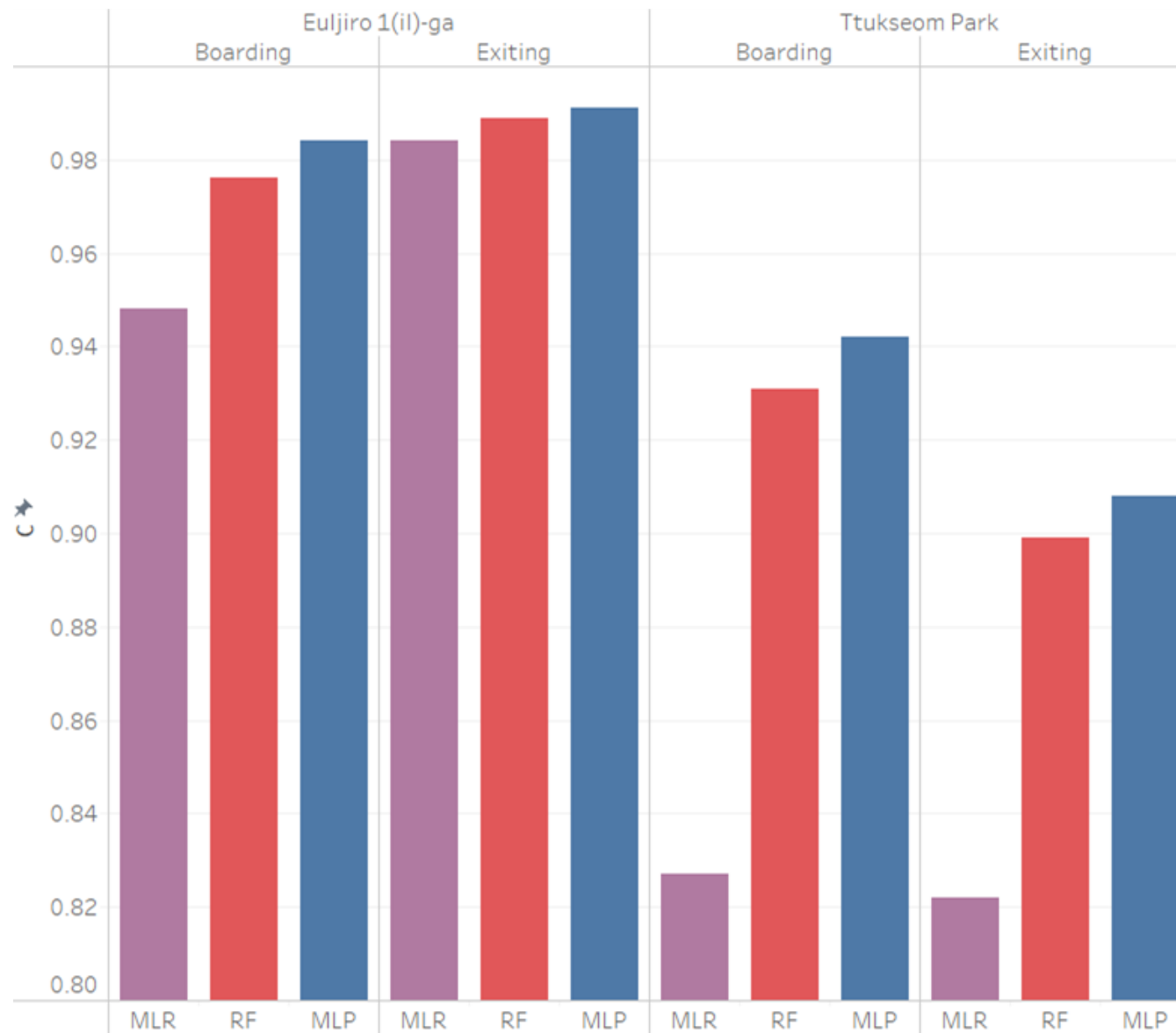
	Ttukseom Park Boarding			Ttukseom Park Exiting		
Max_iter	HL	HN	R-squared	HL	HN	R-squared
100	3	32	0.905	3	32	0.853
	3	24	0.893	5	32	0.858
	5	32	0.899	5	16	0.864
	5	16	0.879	6	16	0.83
500	3	32	0.931	3	32	0.895
	3	16	0.934	3	16	0.885
	3	20	0.928	5	24	0.907
	5	24	0.813	6	14	0.841
1000	3	32	0.829	3	32	0.897
	3	16	0.94	3	20	0.908
	3	15	0.942	5	16	0.895
	5	8	0.928	3	18	0.902

Max_iter = Maximum number of iterations

HL = Number of hidden layers

HN = Number of hidden neurons per layer

Part 4 Conclusion-compared algorithm



Max_iter = Maximum number of iterations

HL = Number of hidden layers

HN = Number of hidden neurons per layer

(Max_iter/HL/HN)

Euljiro 1(il)-ga		Ttukseom Park	
Boarding	Exiting	Boarding	Exiting
500/3/32	1000/5/24	1000/3/15	1000/3/20

A 3D rendered scene on a dark blue background. In the center, a large, semi-transparent orange cube is illuminated from below, casting a warm glow. To its left and slightly behind, a smaller, solid blue cube is visible. Below the main orange cube, a dark grey rectangular prism lies on its side. To the right of the main cube, a small black cylinder stands upright. Two bright yellow circles are positioned around the text: one to the left and one above and to the right. A small, stylized carrot icon is located to the right of the text.

Thank you