

# ECE1508

## Assignment 9

Iman Tabrizian

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### 1 Tables for changing the number of features

In the table below you can find the required parameters for different models.

Number of features	MLP Model		SVR Model		LSTM Model	
	MSE	NMSE	MSE	NMSE	MSE	NMSE
2	0.0030	1.3362	0.00124	0.53860	0.000929	0.401565
3	0.002478	1.070945	0.0013970	0.603586	0.0009302	0.4018888
4	0.002278	0.984495	0.001482	0.640301	0.0009307	0.402099
5	0.00289005	1.2485928	0.001585	0.685133	0.000932	0.402881
6	0.00228	0.985315	0.001719	0.7426875	0.000960	0.415013
7	0.002970	1.283182	0.0017731	0.766035	0.0009713	0.4196461
8	0.002778	1.20036	0.0018228	0.7875077	0.0009597	0.414649
9	0.00268616	1.1605072	0.0018670	0.8066385	0.00097864	0.4228032
10	0.0029216	1.2622376	0.0018720	0.808783	0.000967	0.4181357

Table 1: Table of Results (for residuals time-series)

Number of features	MLP Model		SVR Model		LSTM Model	
	MSE	NMSE	MSE	NMSE	MSE	NMSE
2	68225.57212	0.171056	27498.95825	0.068946	20502.16173	0.0514035
3	54677.739207	0.1370894	30816.455177	0.077263	20518.6681	0.051444
4	50264.012671	0.126023	32690.94230	0.081963	20529.4436	0.0514719
5	63747.635962	0.159829	34979.8985	0.087702	20569.35681	0.051572
6	50305.83902	0.126128	37918.34910	0.095069	21188.76456	0.0531250
7	65513.63663	0.164257	39110.38633	0.098058	21425.27793	0.053718
8	61285.52556	0.153656	40206.6670	0.100807	21170.1896	0.053078
9	59250.3738	0.1485541	41183.39976	0.1032561	21586.46805	0.054122
10	64444.27925	0.161576	41292.90400	0.103530	21348.16552	0.0535246

Table 2: Table of Results (for original time-series)

Number of Features	MLP Model time (sec)	SVR Model time (sec)	LSTM Model time (sec)
2	0.0001	0.0000	0.0212
3	0.0001	0.0000	0.0215
4	0.0001	0.0000	0.0214
5	0.0002	0.0000	0.0211
6	0.0002	0.0000	0.0211
7	0.0001	0.0000	0.0197
8	0.0001	0.0000	0.0217
9	0.0002	0.0000	0.0203
10	0.0001	0.0000	0.0207

Table 3: Table of Results (training time)

## 2 Tables for changing the number of training and test samples

Number of Training Samples	Number of Test Samples	MLP Model (NMSE)	SVR Model (NMSE)	LSTM Model (NMSE)
100	100	1.689960	1.00217713	0.4138247
300	100	1.2698733	0.727063	0.414500909
500	150	1.43755887	0.6953694	0.42535019
700	100	1.3009608	0.6851336	0.40292855
800	250	1.33861230	0.63293716	0.4201770
1000	250	0.794297	0.63445184	0.42180600
1500	500	0.0002	0.0000	0.0211
1500	500	0.0002	0.0000	0.0211
2000	300	0.0002	0.0000	0.0211
2000	700	0.0002	0.0000	0.0211
2000	1000	0.0002	0.0000	0.0211

Table 4: Table of Results (error for residual time-series)

Number of Training Samples	Number of Test Samples	MLP Model (NMSE)	SVR Model (NMSE)	LSTM Model (NMSE)
100	100	0.2163283	0.1282866	0.0529728
300	100	0.16255385	0.0930699	0.0530593
500	150	0.06214910	0.03006248	0.018388905
700	100	0.1665332	0.087702533	0.05157804
800	250	0.03828910	0.01810426	0.0120185676
1000	250	0.02271976	0.018147593	0.012065161
1500	500	0.0002	0.0000	0.0211
1500	500	0.0002	0.0000	0.0211
2000	300	0.0002	0.0000	0.0211
2000	700	0.0002	0.0000	0.0211
2000	1000	0.0002	0.0000	0.0211

Table 5: Table of Results (error for original time-series)

Number of Training Samples	Number of Test Samples	MLP Model time (sec)	SVR Model time (sec)	LSTM Model time (sec)
100	100	0.0478	0.0046	11.3590
300	100	0.1562	0.0047	13.7445
500	150	0.1715	0.0055	18.3428
700	100	0.0898	0.0066	19.4059
800	250	0.0964	0.0080	23.1421
1000	250	0.0893	0.0087	26.9709
1500	500	0.0002	0.0000	0.0211
1500	500	0.0002	0.0000	0.0211
2000	300	0.0002	0.0000	0.0211
2000	700	0.0002	0.0000	0.0211
2000	1000	0.0002	0.0000	0.0211

Table 6: Table of Results (training time)