

Project2_2L_NN(Forestfires)

April 3, 2022

***** Exploratory Data Analysis *****

----- Displaying head -----

	X	Y	month	day	FFMC	DMC	DC	ISI	temp	RH	wind	rain	area
0	7	5	mar	fri	86.2	26.2	94.3	5.1	8.2	51	6.7	0.0	0.0
1	7	4	oct	tue	90.6	35.4	669.1	6.7	18.0	33	0.9	0.0	0.0
2	7	4	oct	sat	90.6	43.7	686.9	6.7	14.6	33	1.3	0.0	0.0
3	8	6	mar	fri	91.7	33.3	77.5	9.0	8.3	97	4.0	0.2	0.0
4	8	6	mar	sun	89.3	51.3	102.2	9.6	11.4	99	1.8	0.0	0.0

----- Dimensions of dataset -----

(517, 13)

----- Contents of dataset -----

<class 'pandas.core.frame.DataFrame'>

RangeIndex: 517 entries, 0 to 516

Data columns (total 13 columns):

#	Column	Non-Null Count	Dtype
0	X	517 non-null	int64
1	Y	517 non-null	int64
2	month	517 non-null	object
3	day	517 non-null	object
4	FFMC	517 non-null	float64
5	DMC	517 non-null	float64
6	DC	517 non-null	float64
7	ISI	517 non-null	float64
8	temp	517 non-null	float64
9	RH	517 non-null	int64
10	wind	517 non-null	float64
11	rain	517 non-null	float64
12	area	517 non-null	float64

dtypes: float64(8), int64(3), object(2)

memory usage: 52.6+ KB

None

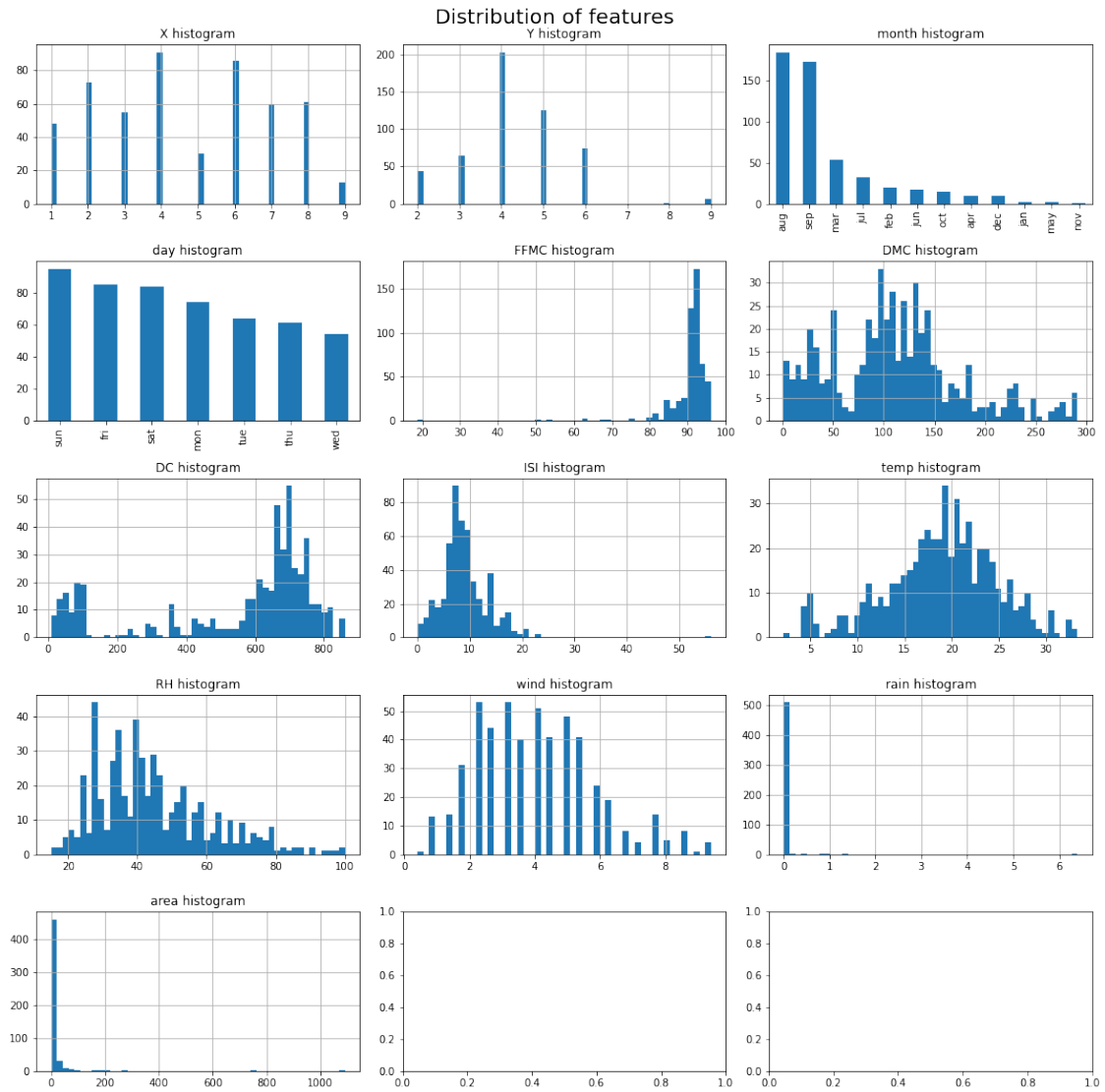
----- Summary of Numerical feature -----

	Feature_name	datatype	Count	min	quartile1	Mean	Median	\
0	X	int64	517	1.0	3.0	4.669246	4.00	
1	Y	int64	517	2.0	4.0	4.299807	4.00	
2	FFMC	float64	517	18.7	90.2	90.644681	91.60	
3	DMC	float64	517	1.1	68.6	110.872340	108.30	
4	DC	float64	517	7.9	437.7	547.940039	664.20	
5	ISI	float64	517	0.0	6.5	9.021663	8.40	
6	temp	float64	517	2.2	15.5	18.889168	19.30	
7	RH	int64	517	15.0	33.0	44.288201	42.00	
8	wind	float64	517	0.4	2.7	4.017602	4.00	
9	rain	float64	517	0.0	0.0	0.021663	0.00	
10	area	float64	517	0.0	0.0	12.847292	0.52	

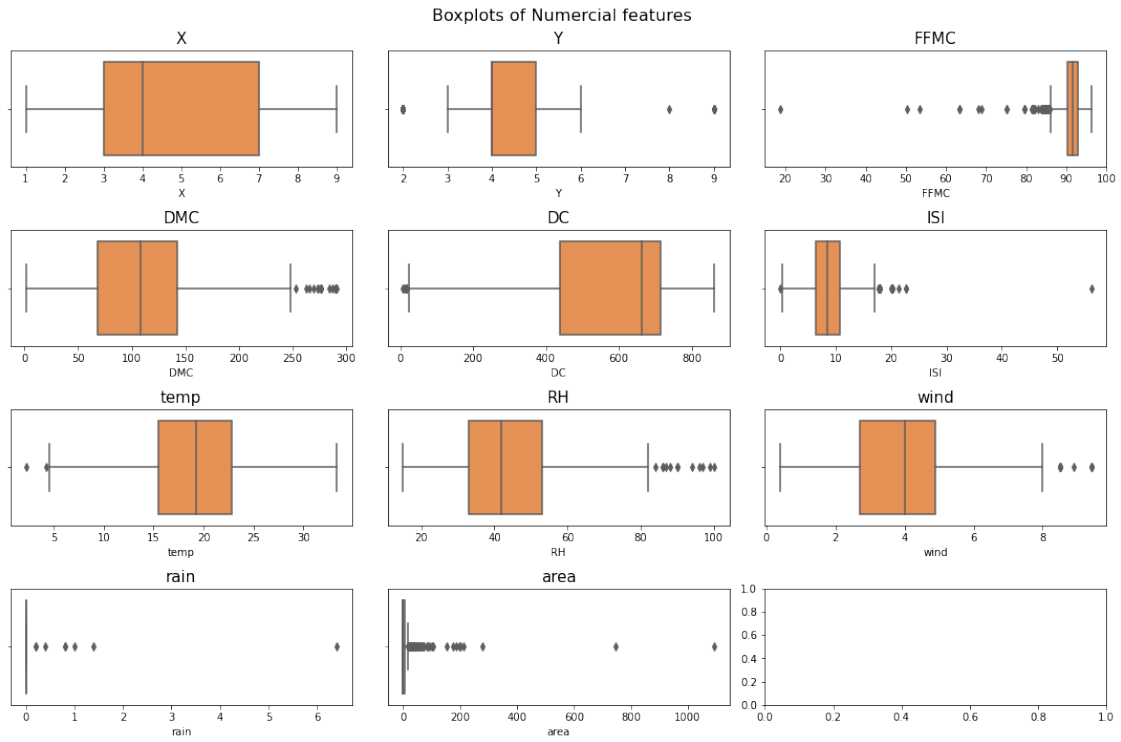
	quartile3	max	Std dev	Skewness	Kurtosis	Range	IQR	\
0	7.00	9.00	2.31	0.04	-1.17	8.00	4.00	
1	5.00	9.00	1.23	0.42	1.42	7.00	1.00	
2	92.90	96.20	5.52	-6.58	67.07	77.50	2.70	
3	142.40	291.30	64.05	0.55	0.20	290.20	73.80	
4	713.90	860.60	248.07	-1.10	-0.25	852.70	276.20	
5	10.80	56.10	4.56	2.54	21.46	56.10	4.30	
6	22.80	33.30	5.81	-0.33	0.14	31.10	7.30	
7	53.00	100.00	16.32	0.86	0.44	85.00	20.00	
8	4.90	9.40	1.79	0.57	0.05	9.00	2.20	
9	0.00	6.40	0.30	19.82	421.30	6.40	0.00	
10	6.57	1090.84	63.66	12.85	194.14	1090.84	6.57	

	skewness comment	outlier comment
0	Fairly symmetric(positive)	No outliers
1	Fairly symmetric(positive)	Has outliers
2	High negative skewed	Has outliers
3	Moderate positive skewed	Has outliers
4	High negative skewed	Has outliers
5	High positive skewed	Has outliers
6	Fairly symmetric(negative)	Has outliers
7	Moderate positive skewed	Has outliers
8	Moderate positive skewed	Has outliers
9	High positive skewed	Has outliers
10	High positive skewed	Has outliers

None

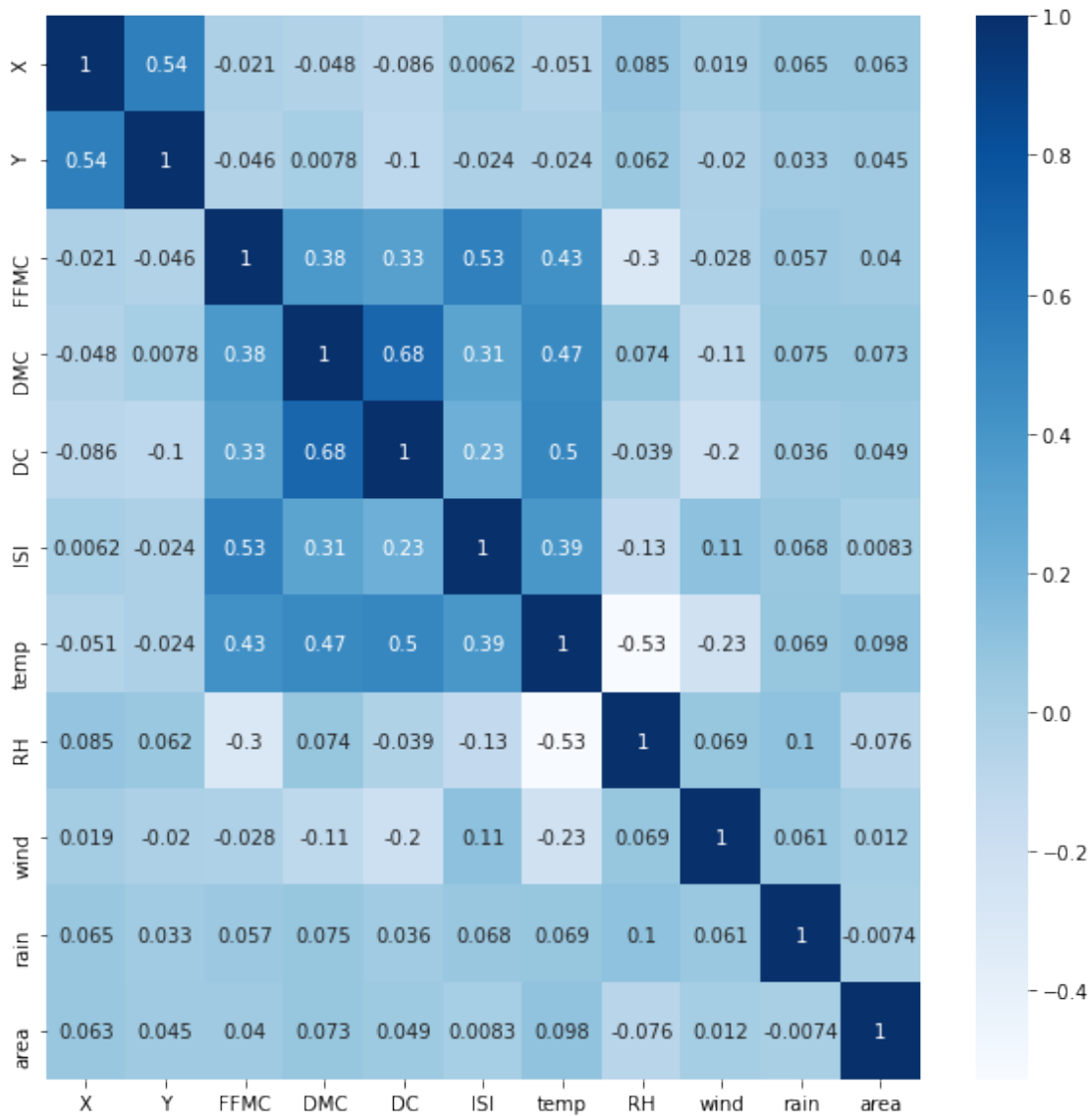


None



[7]: <AxesSubplot:>

Correlation Matrix of features



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[10]:
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	X	Y	month	day	FFMC	DMC	DC	ISI	temp	RH	wind	rain
0	7	5	2	5	86.2	26.2	94.3	5.1	8.2	51	6.7	0.0
1	7	4	9	2	90.6	35.4	669.1	6.7	18.0	33	0.9	0.0
2	7	4	9	6	90.6	43.7	686.9	6.7	14.6	33	1.3	0.0
3	8	6	2	5	91.7	33.3	77.5	9.0	8.3	97	4.0	0.2
4	8	6	2	0	89.3	51.3	102.2	9.6	11.4	99	1.8	0.0
..
512	4	3	7	0	81.6	56.7	665.6	1.9	27.8	32	2.7	0.0

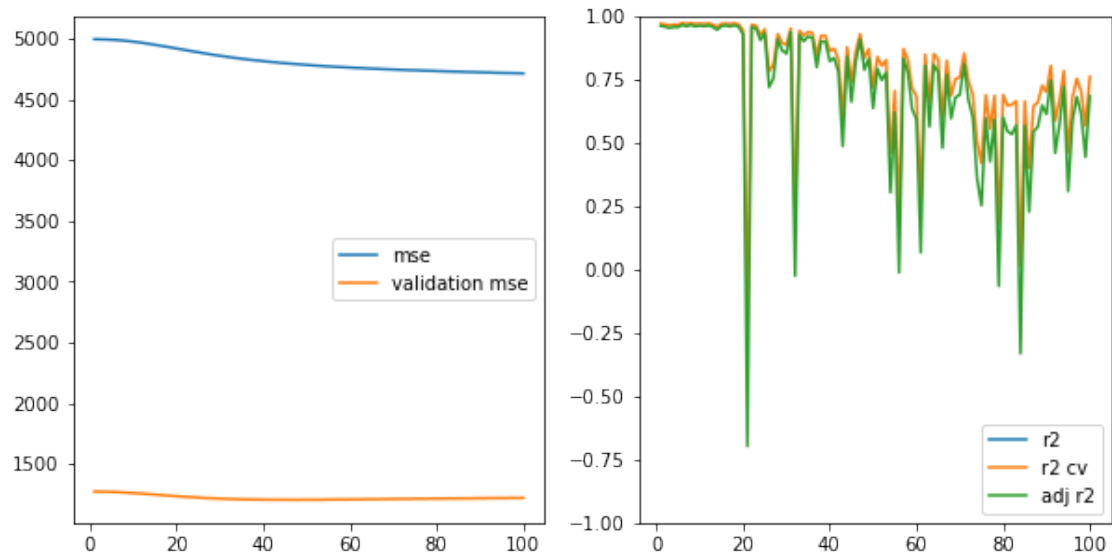
513	2	4	7	0	81.6	56.7	665.6	1.9	21.9	71	5.8	0.0
514	7	4	7	0	81.6	56.7	665.6	1.9	21.2	70	6.7	0.0
515	1	4	7	6	94.4	146.0	614.7	11.3	25.6	42	4.0	0.0
516	6	3	10	2	79.5	3.0	106.7	1.1	11.8	31	4.5	0.0

[517 rows x 12 columns]

[14]: ['X', 'Y', 'month', 'FFMC', 'DMC', 'temp', 'RH', 'wind', 'rain']

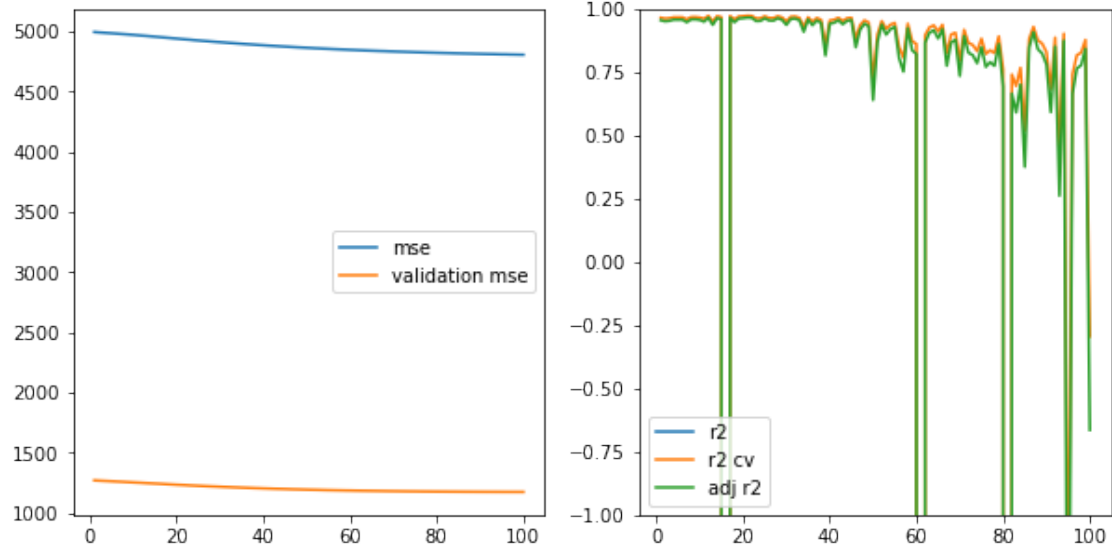
Building Neural nets with relu activation function

2L Neural net with relu activation function



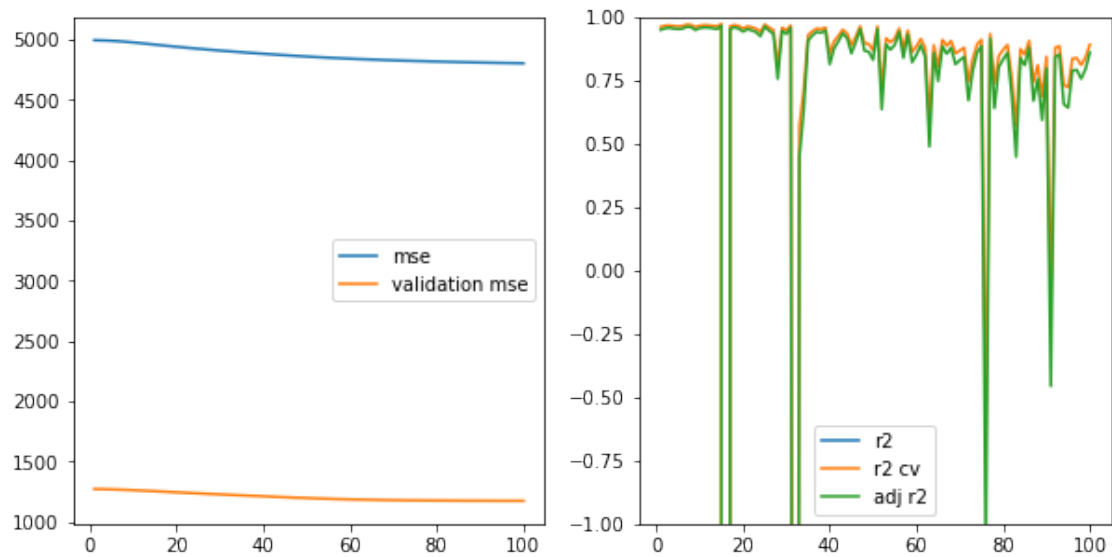
Building Neural nets with sigmoid activation function

2L Neural net with sigmoid activation function



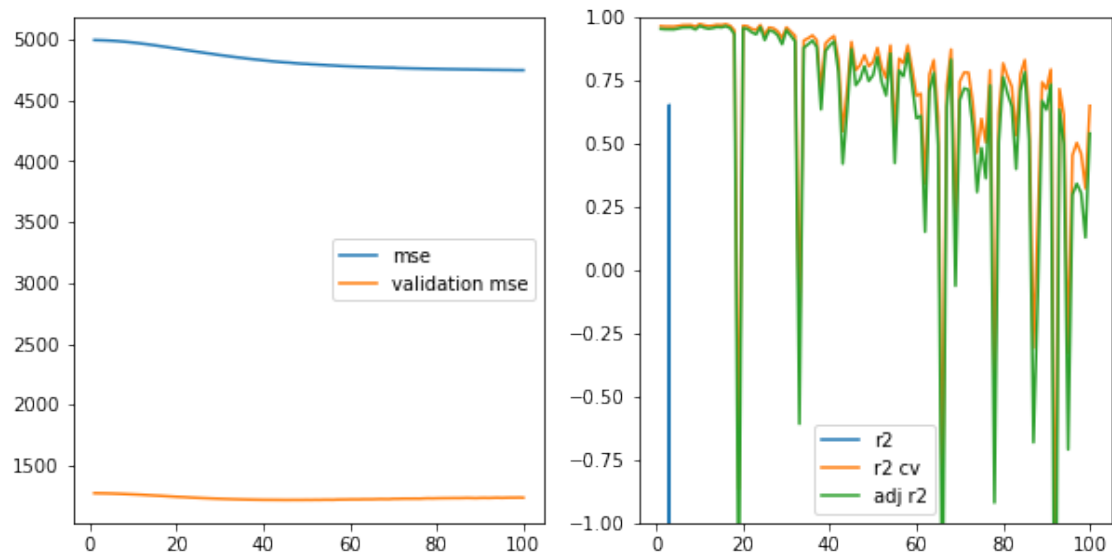
Building Neural nets with tanh activation function

2L Neural net with tanh activation function



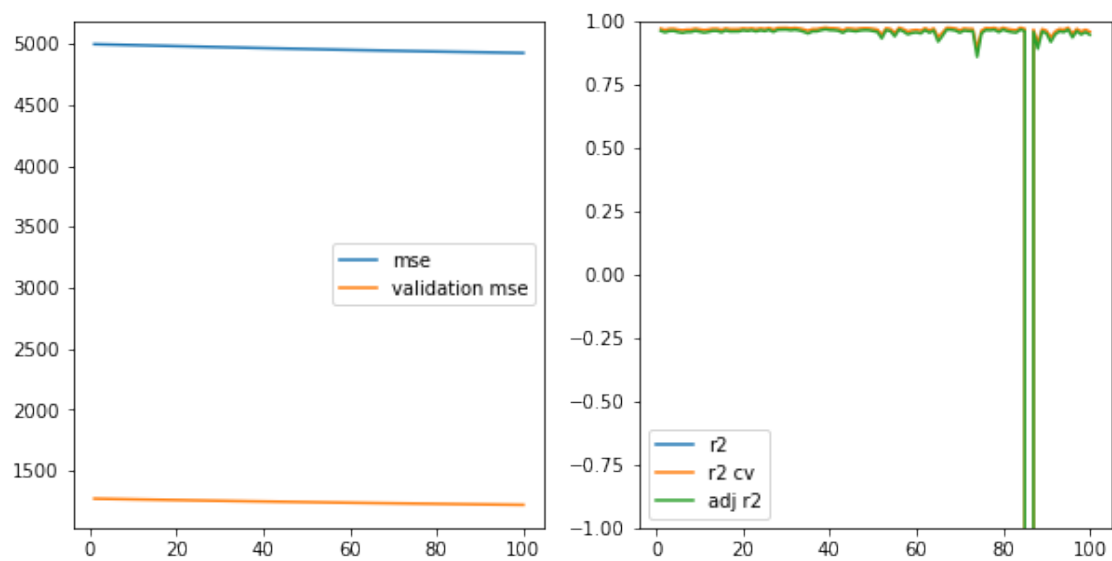
Building Neural nets with elu activation function

2L Neural net with elu activation function



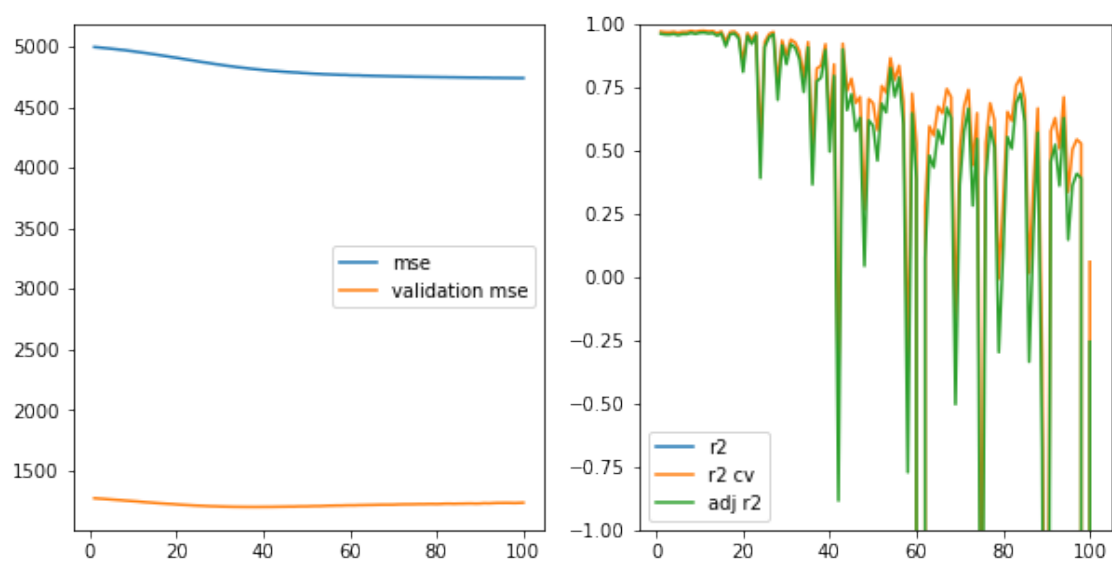
Building Neural nets with softmax activation function

2L Neural net with softmax activation function



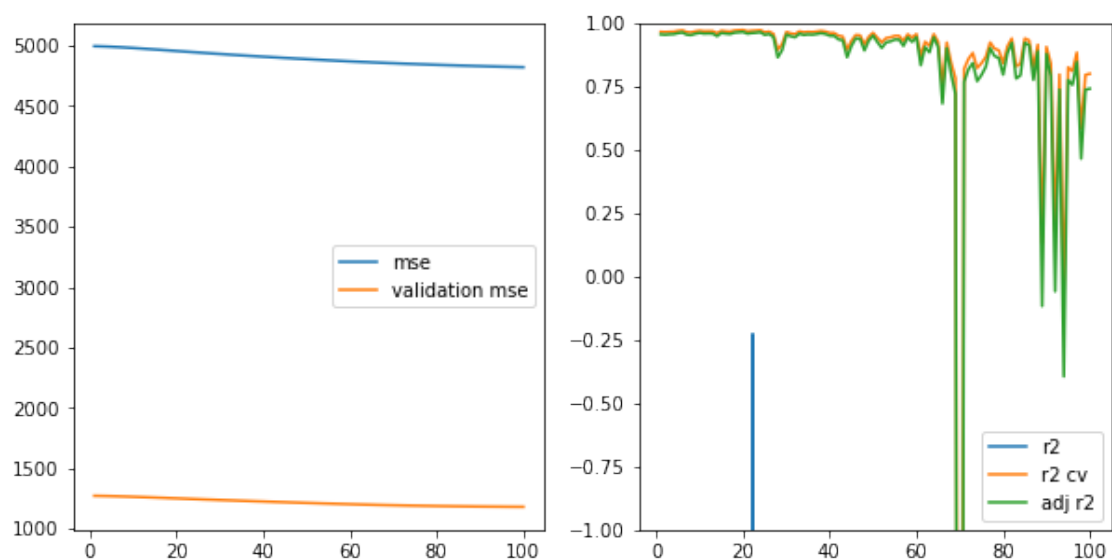
Building Neural nets with softplus activation function

2L Neural net with softplus activation function



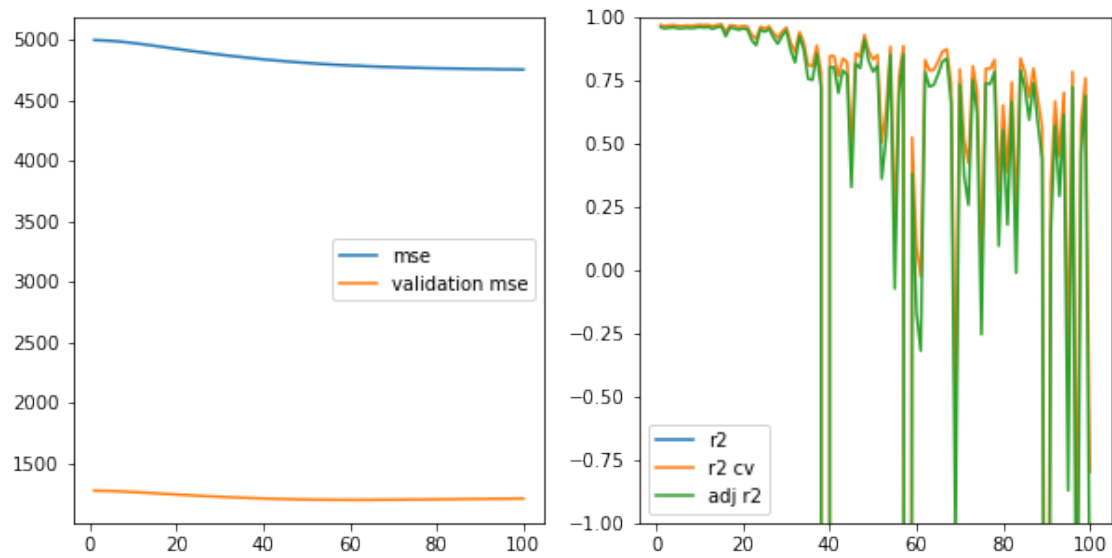
Building Neural nets with softsign activation function

2L Neural net with softsign activation function



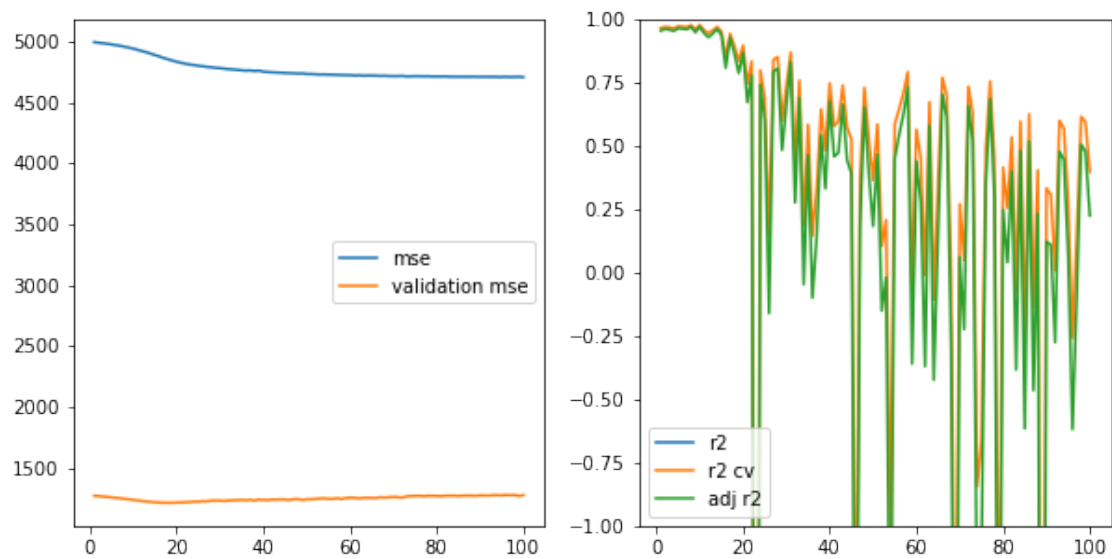
Building Neural nets with selu activation function

2L Neural net with selu activation function



Building Neural nets with exponential activation function

2L Neural net with exponential activation function



***** R2 scores of various activation functions

R2 for NN using relu activation is 4.3919389038635686
Adj R2 for NN using relu activation is 2.219028424405922
R2 CV for NN using relu activation is 4.669681934838421

R2 for NN using sigmoid activation is 0.5287317196093211
Adj R2 for NN using sigmoid activation is -1.7319789231268423
R2 CV for NN using sigmoid activation is 0.32866108983747866

R2 for NN using tanh activation is 0.3654513710303231
Adj R2 for NN using tanh activation is -1.8989701887189847
R2 CV for NN using tanh activation is 0.268259098458401

R2 for NN using elu activation is 2.024162103525473
Adj R2 for NN using elu activation is -0.20256148503075
R2 CV for NN using elu activation is 3.3931133396183033

R2 for NN using softmax activation is -2.166195896534484
Adj R2 for NN using softmax activation is -4.488154894182994
R2 CV for NN using softmax activation is -2.4696558962475024

R2 for NN using softplus activation is 4.347849413930128
Adj R2 for NN using softplus activation is 2.1739369006103626
R2 CV for NN using softplus activation is 4.880089474592165

R2 for NN using softsign activation is -0.08969800916152071
Adj R2 for NN using softsign activation is -2.3644638730061063
R2 CV for NN using softsign activation is -0.026300960352587666

R2 for NN using selu activation is 1.721086803948968
Adj R2 for NN using selu activation is -0.5125248595976517
R2 CV for NN using selu activation is 1.7547439625367645

R2 for NN using exponential activation is 6.194725206280971
Adj R2 for NN using exponential activation is 4.06278714278735
R2 CV for NN using exponential activation is 7.623265563628623

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[NbConvertApp] Writing 154230 bytes to Project2_2L_NN(Forestfires).pdf