

Project2_XL_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

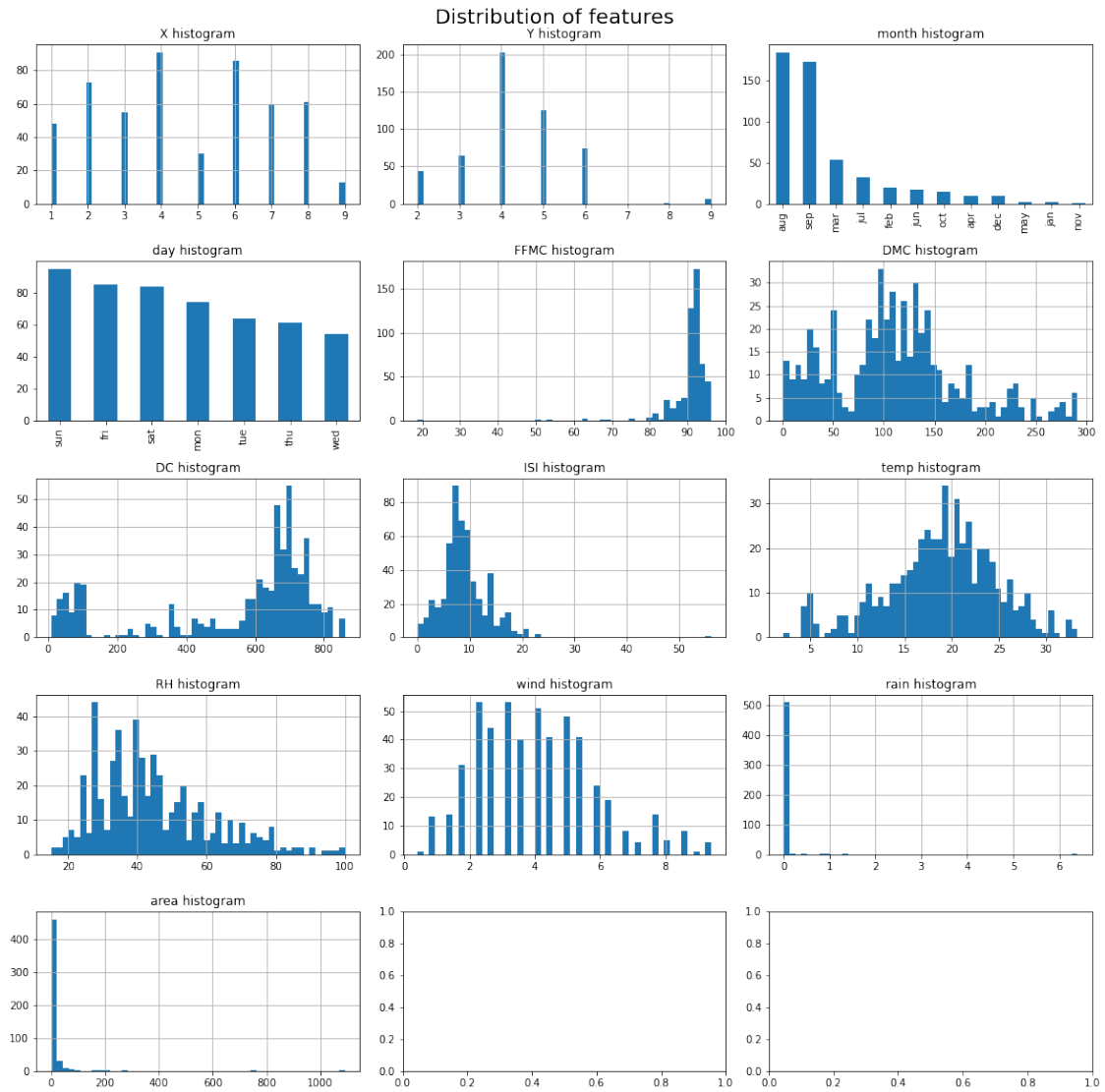
----- Summary of Numerical feature -----

	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	

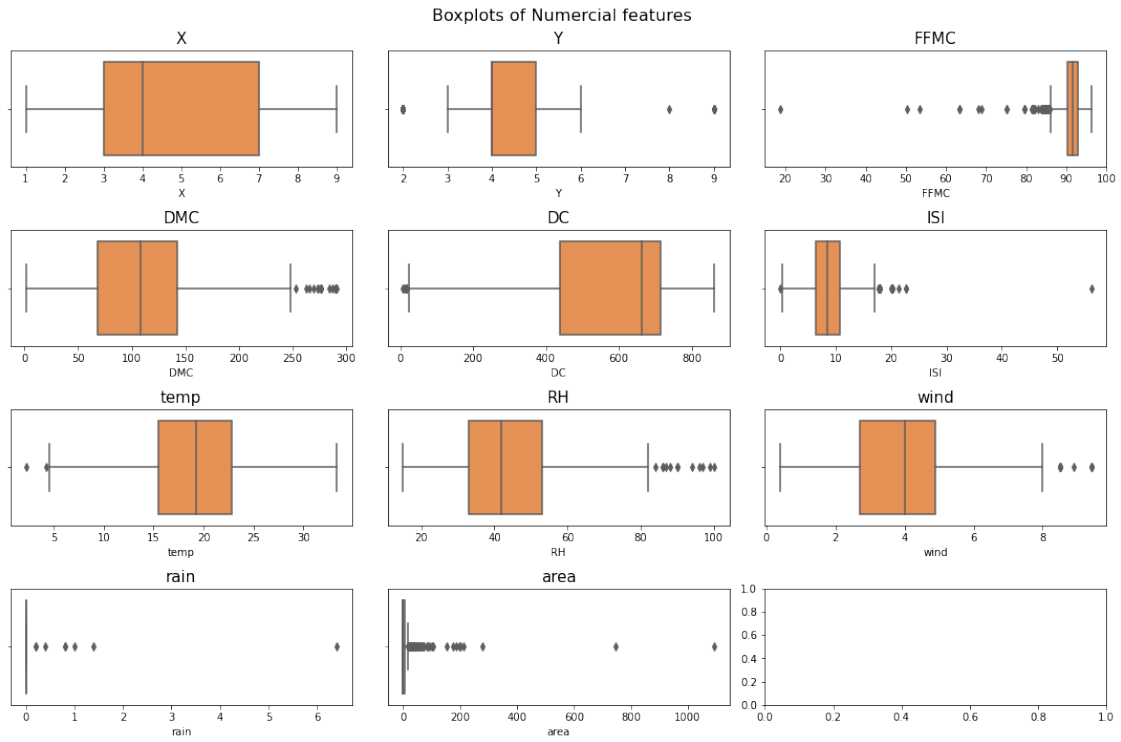
	quartile3	max	Std dev	Skewness	Kurtosis	Range	IQR	\
0	7.00	9.00	2.31	0.04	-1.17	8.00	4.00	
1	5.00	9.00	1.23	0.42	1.42	7.00	1.00	
2	92.90	96.20	5.52	-6.58	67.07	77.50	2.70	
3	142.40	291.30	64.05	0.55	0.20	290.20	73.80	
4	713.90	860.60	248.07	-1.10	-0.25	852.70	276.20	
5	10.80	56.10	4.56	2.54	21.46	56.10	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 outilers
2	High negative skewed	Has outilers
3	Moderate positive skewed	Has outilers
4	High negative skewed	Has outilers
5	High positive skewed	Has outilers
6	Fairly symmetric(negative)	Has outilers
7	Moderate positive skewed	Has outilers
8	Moderate positive skewed	Has outilers
9	High positive skewed	Has outilers
10	High positive skewed	Has outilers

None

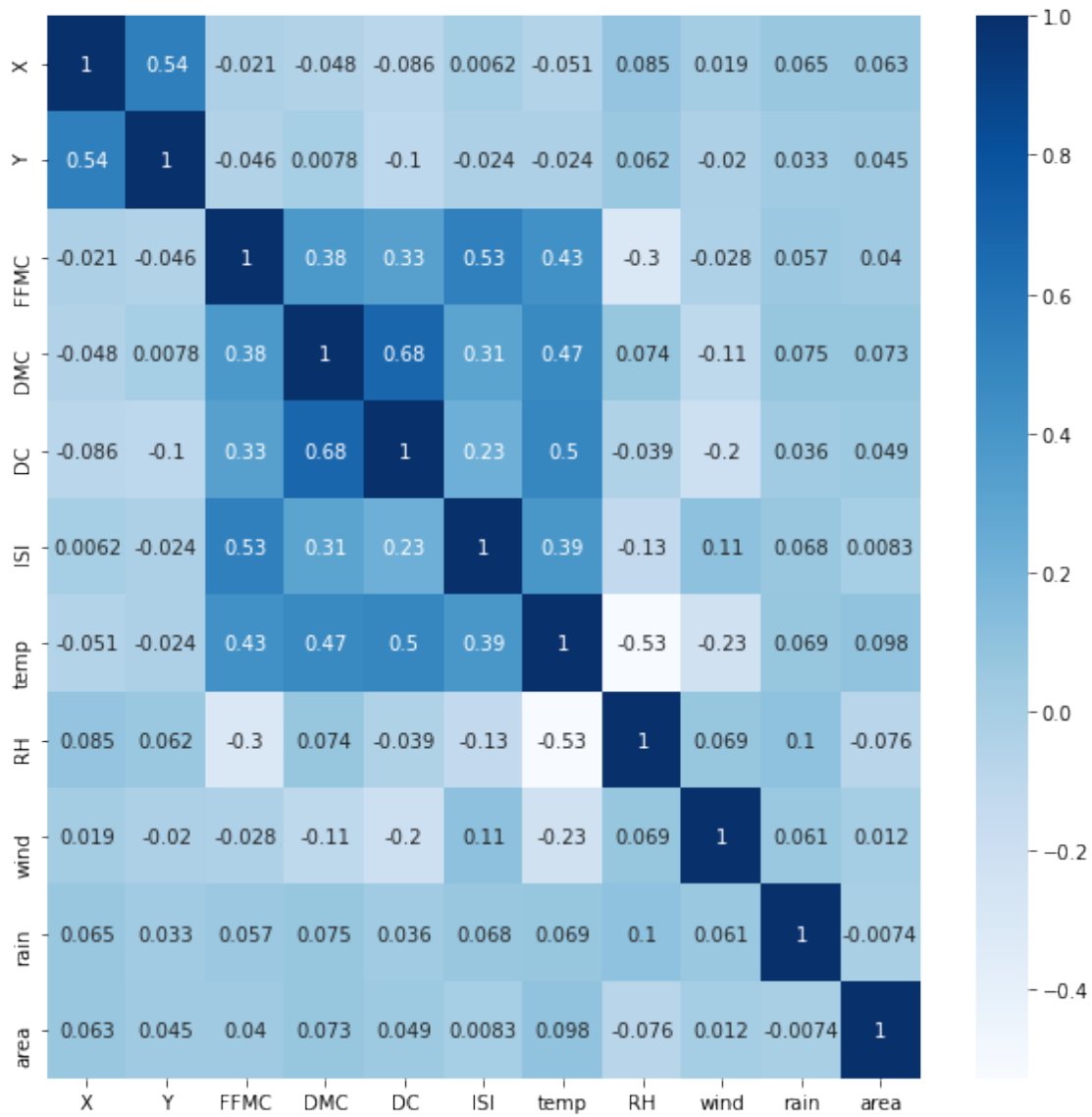


None



[7]: <AxesSubplot:>

Correlation Matrix of features



```
[10]:
```

	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

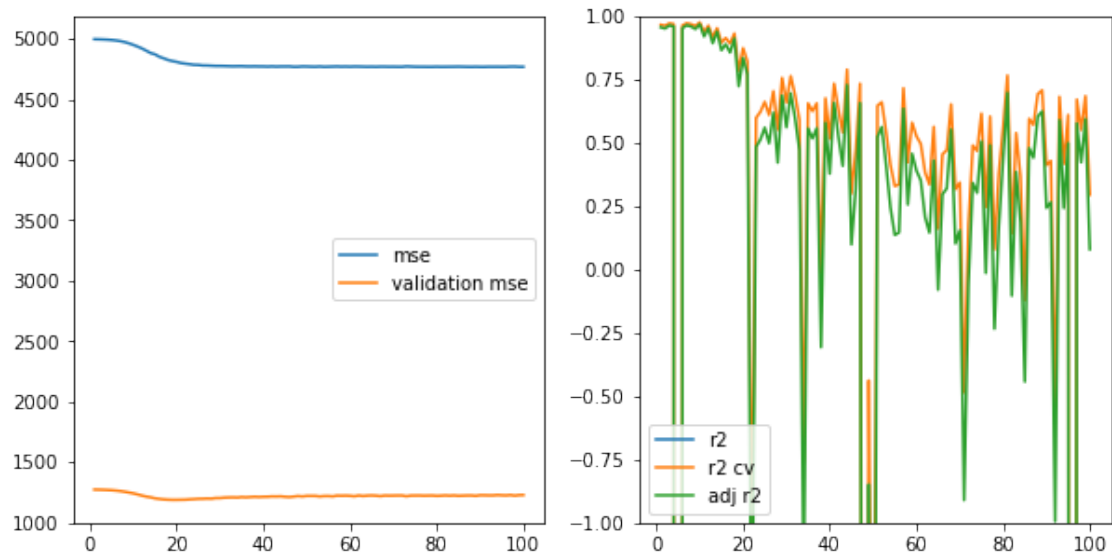
513	2	4	7	0	81.6	56.7	665.6	1.9	21.9	71	5.8	0.0
514	7	4	7	0	81.6	56.7	665.6	1.9	21.2	70	6.7	0.0
515	1	4	7	6	94.4	146.0	614.7	11.3	25.6	42	4.0	0.0
516	6	3	10	2	79.5	3.0	106.7	1.1	11.8	31	4.5	0.0

[517 rows x 12 columns]

[13]: ['X', 'Y', 'temp', 'rain']

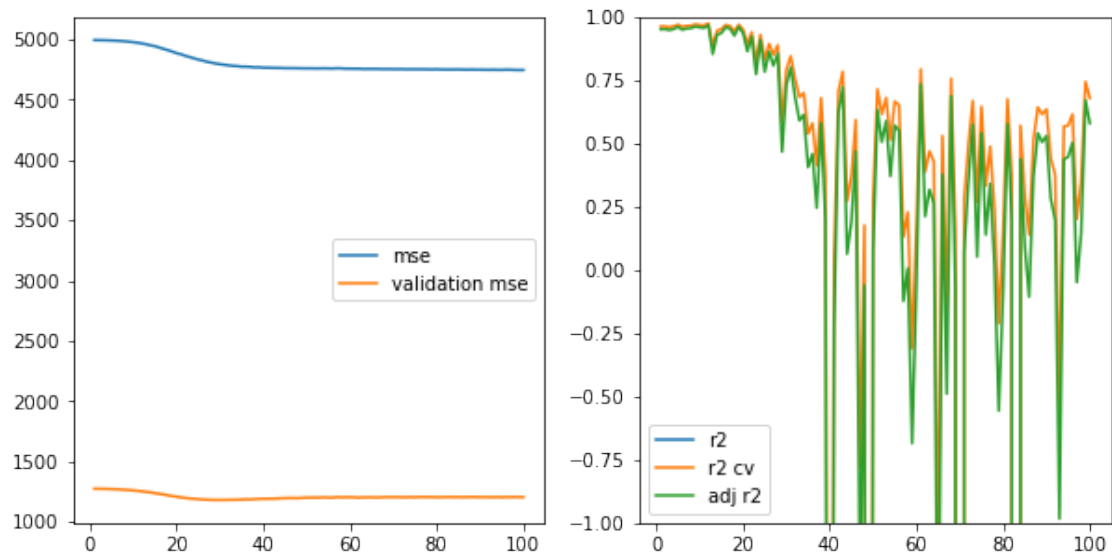
Building Neural nets with linear activation function

2L Neural net with linear activation function



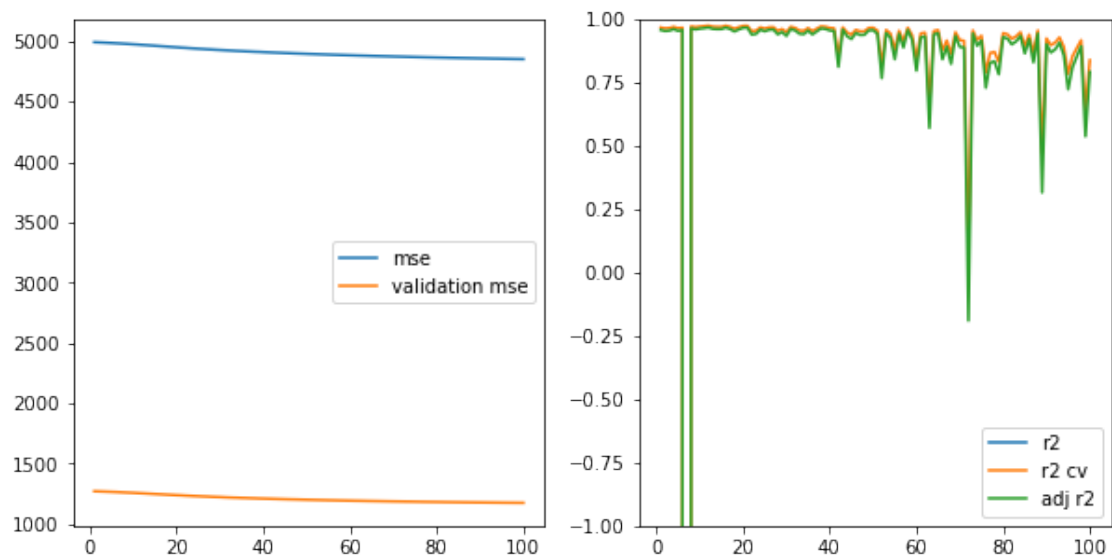
Building Neural nets with relu activation function

2L Neural net with relu activation function



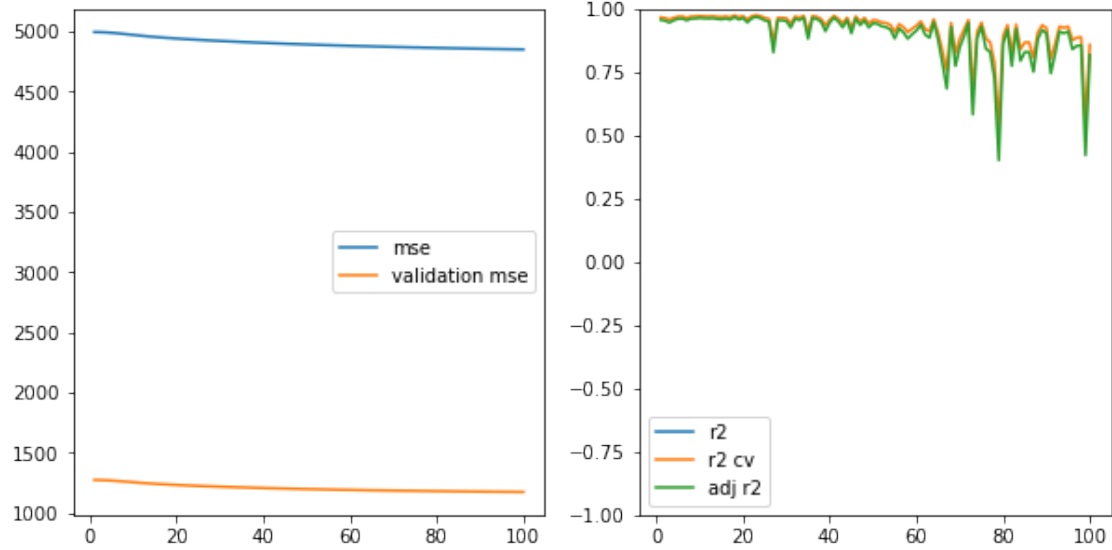
Building Neural nets with sigmoid activation function

2L Neural net with sigmoid activation function



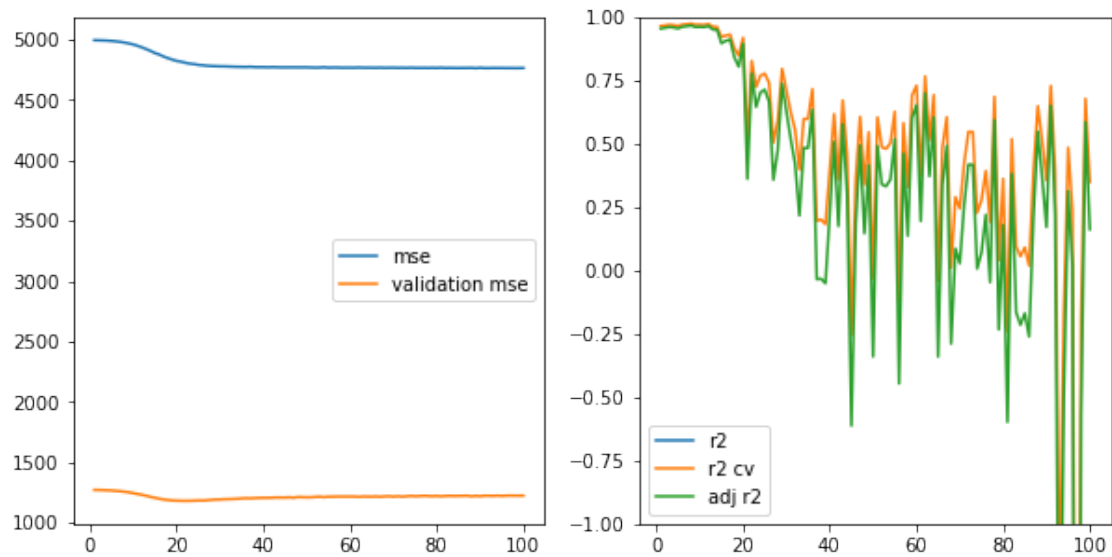
Building Neural nets with tanh activation function

2L Neural net with tanh activation function



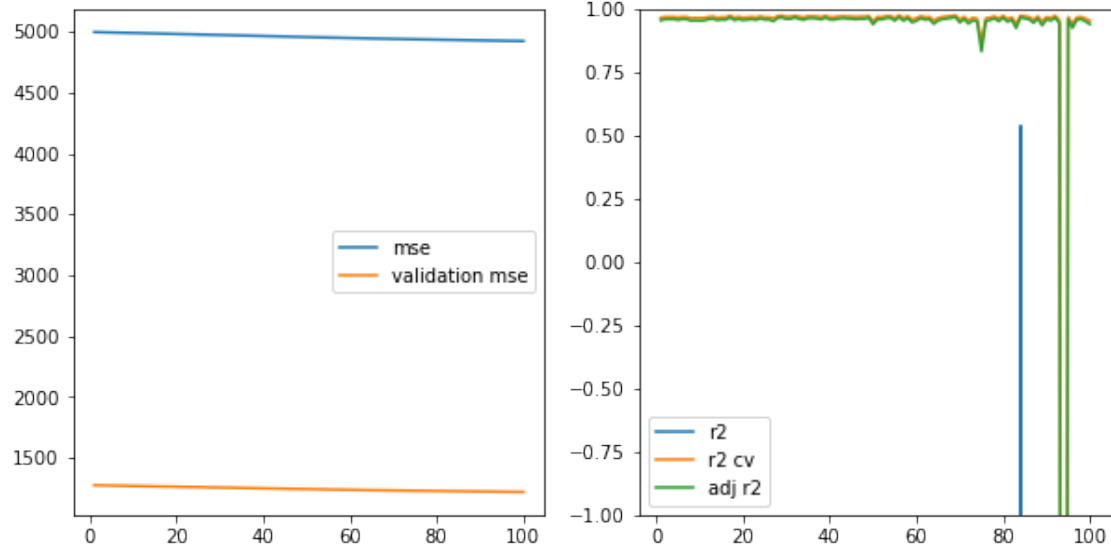
Building Neural nets with elu activation function

2L Neural net with elu activation function



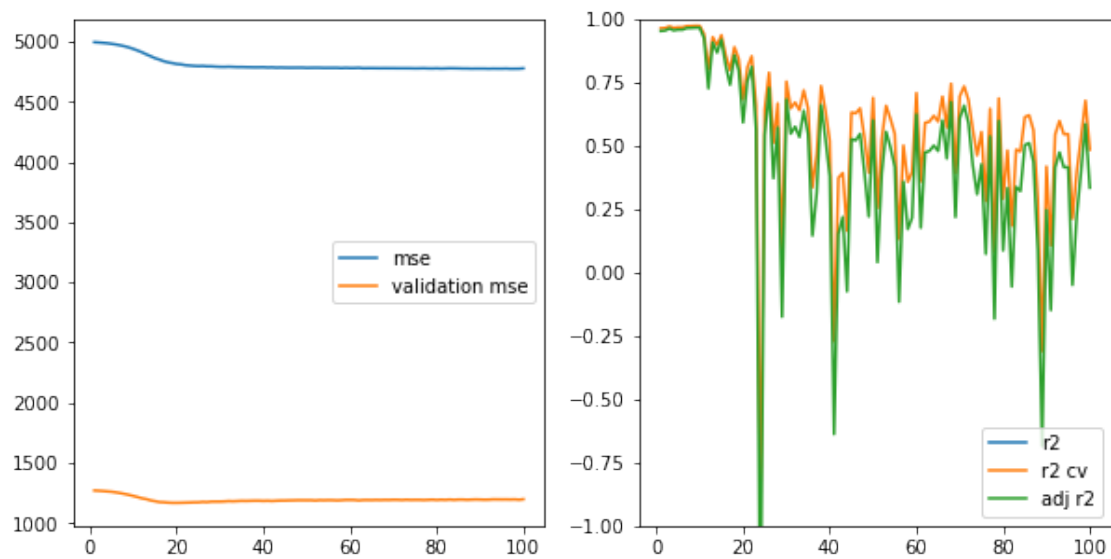
Building Neural nets with softmax activation function

2L Neural net with softmax activation function



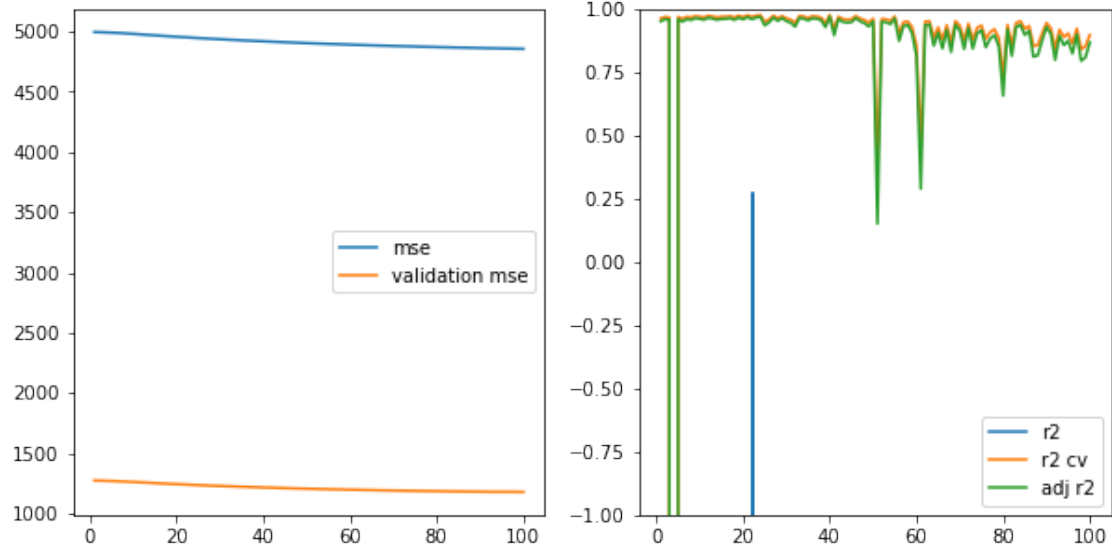
Building Neural nets with softplus activation function

2L Neural net with softplus activation function



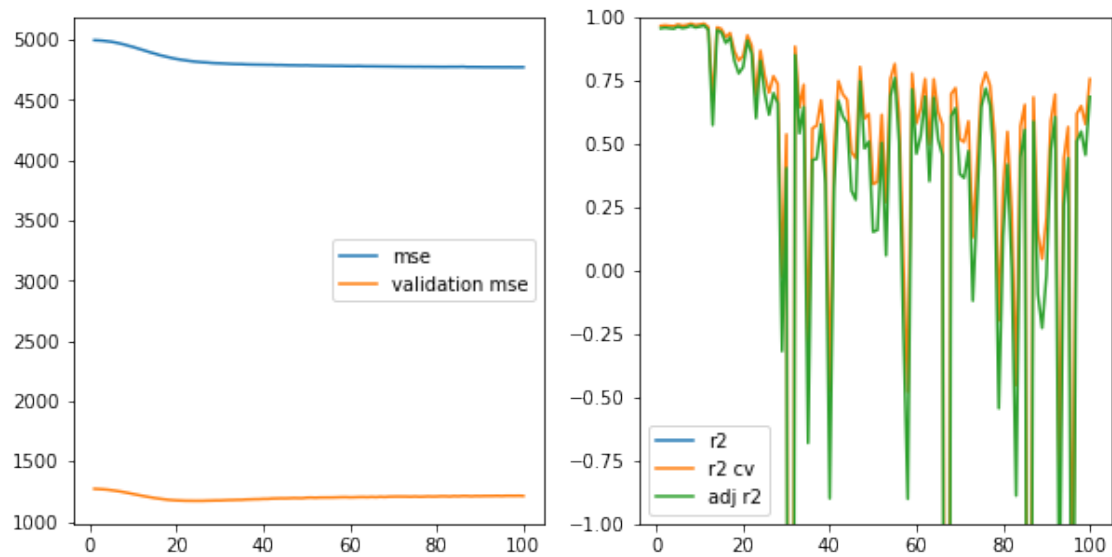
Building Neural nets with softsign activation function

2L Neural net with softsign activation function



Building Neural nets with selu activation function

2L Neural net with selu activation function



***** R2 scores of various activation functions

R2 for NN using linear activation is -0.27382765692047784
Adj R2 for NN using linear activation is -1.1164648641214914
R2 CV for NN using linear activation is -0.15832803905586612

R2 for NN using relu activation is 3.1454178830827684
Adj R2 for NN using relu activation is 2.33151383168011
R2 CV for NN using relu activation is 3.6257828614105314

R2 for NN using sigmoid activation is -0.5471635419606935
Adj R2 for NN using sigmoid activation is -1.3920976893721404
R2 CV for NN using sigmoid activation is -0.7895369669964403

R2 for NN using tanh activation is -0.5990465129790845
Adj R2 for NN using tanh activation is -1.4444166517436186
R2 CV for NN using tanh activation is -0.7907190413529275

R2 for NN using elu activation is 2.1018323166064334
Adj R2 for NN using elu activation is 1.279158638594713
R2 CV for NN using elu activation is 2.89819639660015

R2 for NN using softmax activation is -2.095882672338689
Adj R2 for NN using softmax activation is -2.953831266223883
R2 CV for NN using softmax activation is -2.431401955407164

R2 for NN using softplus activation is 2.868168216547462
Adj R2 for NN using softplus activation is 2.0519343360142495
R2 CV for NN using softplus activation is 2.9139581498036082

R2 for NN using softsign activation is -0.5652697697931419
Adj R2 for NN using softsign activation is -1.410356070379648
R2 CV for NN using softsign activation is -0.9041557447527548

R2 for NN using selu activation is 1.7438777252562931
Adj R2 for NN using selu activation is 0.9181960254685317
R2 CV for NN using selu activation is 1.6430316085793817