LOG FILE

Experiments On Car Dataset

Finding best parameters for,

1) ***RANDOM FOREST***

#	Cross Validation Fold	Parameter 1 n_estimators	Parameter 2 criterion	Parameter 3 Max features	Parameter 4 random_state	Parameter 5 bootstrap	Average Accuracy (%)
1.	10	10	entropy	auto	20	True	93.98
2.	10	40	gini	log2	30	False	95.83
3.	10	20	entropy	sqrt	15	True	94.68
4.	**10**	**40**	**gini**	**log2**	**10**	**False**	**97.69**
5.	10	30	entropy	auto	30	True	95.60
6.	10	20	gini	sqrt	40	True	95.37
7.	10	40	entropy	log2	10	False	96.30
8.	10	10	gini	sqrt	20	False	94.68

2) ***BAGGING***

#	Cross Validation Fold	Parameter 1 base_estimator	Parameter 2 max_samples	Parameter 3 n_estimators	Parameter 4 bootstrap	Average Accuracy (%)
1.	10	Decision Tree	0.5	20	false	96.3
2.	10	Decision Tree	0.7	5	true	96.1
3.	10	Logistic Regression	0.7	20	false	86.3
4.	10	Multinomial NB	0.3	20	false	95.5
5.	10	KNN	0.9	20	false	92.1
6.	10	KNN	0.5	5	true	92.1
7.	**10**	**Decision Tree**	**0.9**	**30**	**false**	**97.45**
8.	10	SVC	0.9	15	true	89.5
9.	10	SVC	0.7	50	true	88.2

10.	10	Multinomial NB	0.5	50	false	84.0

3) ***ADABOOST***

#	Cross Validation Fold	Parameter1 base_estimator	Parameter 2 n_estimators	Parameter 3 learning_rate	Parameter 4 algorithm	Average Accuracy (%)
1.	**10**	**Decision Tree**	**100**	**1.5**	**SAMME.R**	**97.0**
2.	10	Decision Tree	50	0.5	SAMME.R	96.5
3.	**10**	**Decision Tree**	**150**	**0.5**	**SAMME**	**97.0**
4.	10	MultinomialNB	50	0.5	SAMME	87.5
5.	10	MultinomialNB	50	0.5	SAMME.R	83.3
6.	10	MultinomialNB	150	0.5	SAMME.R	82.2
7.	10	Logistic Regression	50	0.5	SAMME	87.0
8.	10	Logistic Regression	100	1.5	SAMME.R	82.8

4) ***KNN***

#	Cross Validation Fold	Parameter 1: n_neighbors	Parameter 2: weights	Parameter 3: algorithm	Parameter 4: leaf_size	Parameter 5: p	Average Accuracy (%)
1.	10	20	uniform	kd_tree	30	2	90.05
2.	10	30	distance	auto	20	1	86.11
3.	10	15	uniform	brute	10	2	90.74
4.	**10**	**10**	**distance**	**ball_tree**	**15**	**1**	**95.60**
5.	10	20	distance	auto	20	1	89.81
6.	10	40	uniform	kd_tree	15	3	78.01
7.	10	15	distance	brute	30	5	92.59
8.	10	20	uniform	ball_tree	10	1	88.19

5) ***GRADIENT BOOSTING***

#	Cross Validation Fold	Parameter 1 random_state	Parameter 2 n_estimators	Parameter 3 max_features	Parameter 4 learning_rate	Parameter 5 criterion	Average Accuracy (%)
1.	10	10	20	log2	0.1	mse	84.95
2.	10	30	50	sqrt	0.5	mae	94.68
3.	**10**	**20**	**100**	**sqrt**	**1.0**	**friedman_mse**	**98.84**
4.	10	40	60	log2	0.5	mse	97.92
5.	10	20	30	auto	0.3	mae	79.40
6.	10	30	70	sqrt	0.005	friedman_mse	68.52
7.	10	10	10	auto	1.0	mse	98.61
8.	10	40	40	sqrt	0.8	friedman_mse	97.45

6) ***SVM***

#	Cross Validation Fold	Parameter 1 kernel	Parameter 2 gamma	Parameter 3 cost	Parameter 4 degree	Parameter 5 coef0	Average Accuracy (%)
1.	**10**	**poly**	**0.1**	**100**	**5**	**0.1**	**99.8**
2.	**10**	**poly**	**0.5**	**1000**	**3**	**0.5**	**99.8**
3.	**10**	**poly**	**0.1**	**100**	**5**	**0.5**	**99.8**
4.	10	rbf	0.1	100	-	-	99.6
5.	10	rbf	0.1	10	-	-	99.3
6.	10	sigmoid	1.0	1000	-	0.1	63.5
7.	10	sigmoid	0.001	1000	-	0.5	92.2
8.	10	linear	0.5	10	-	-	93.5
9.	10	linear	1.0	100	-	-	93.8
10.	10	rbf	1.0	10	-	-	92.4

7) ***NEURAL-NET***

#	Cross Validation Fold	Parameter 1 hidden_layer_sizes	Parameter 2 activation	Parameter 3 solver	Parameter 4 alpha	Parameter 5 max_iter	Average Accuracy (%)
1.	**10**	**(100, 50, 20)**	**tanh**	**lbfgs**	**1.0**	**300**	**99.9**
2.	10	(100, 50, 20)	logistic	lbfgs	0.01	100	97.2
3.	10	(100, 150, 100, 50)	tanh	lbfgs	1.0	200	94.4
4.	10	(50, 25)	relu	lbfgs	0.05	200	99.8
5.	10	(50, 25)	logistic	sgd	0.05	200	70.0
6.	10	(50, 100, 50)	tanh	lbfgs	0.5	300	99.8
7.	10	(30)	relu	adam	0.1	200	70.3
8.	**10**	**(100, 150, 100, 50)**	**relu**	**lbfgs**	**1.0**	**500**	**99.9**
9.	10	(100, 150, 100, 50)	tanh	adam	0.5	200	90.7
10.	**10**	**(100, 50, 20)**	**logistic**	**lbfgs**	**0.05**	**500**	**99.9**

8) ***PERCEPTRON***

#	Cross Validation Fold	Parameter 1 penalty	Parameter 2 random_state	Parameter 3 alpha	Parameter 4 eta0	Parameter 5 shuffle	Average Accuracy (%)
1.	10	None	40	0.01	1	True	86.11
2.	10	None	60	0.00001	4	True	88.89
3.	10	l1	30	0.00001	6	False	88.19
4.	10	l1	80	0.03	3	False	78.24
5.	10	l2	100	0.5	9	True	68.75
6.	10	l2	20	0.2	1	True	70.14
7.	10	elasticnet	60	0.0004	2	False	85.19
8.	**10**	**None**	**200**	**0.00001**	**16**	**False**	**91.12**

9) ***NAIVE BAYES***:

#	Cross Validation Fold	Parameter 1 alpha	Parameter 2 binarize	Parameter 3 fit_prior	Average Accuracy (%)
1	10	1.0	0.0	True	90.28
2	10	1.0	3.0	True	70.83
3	10	3.0	3.0	True	72.85
4	10	0.5	0.0	True	87.27
5	10	0.0	0.0	False	24.31
6	10	10.0	0.5	False	70.37
7	10	10.0	0.0	True	87.27
8	**10**	**0.001**	**0.0**	**True**	**92.79**

10) ***DEEP LEARNING***

#	Cross Validation Fold	Parameter 1 hidden layer sizes	Parameter 2 alpha	Parameter 3 Solver	Parameter 4 activation	Average Accuracy (%)
1.	10	(100,90,85,80,70,60,55,40,20)	0.5	lbfgs	tanh	93.0
2.	10	(200, 150, 100, 50, 25, 12)	1.0	lbfgs	relu	92.0
3.	**10**	**(300,200,100,80,60,40,20)**	**1.0**	**sgd**	**logistic**	**98.0**
4.	10	(200, 150, 100, 50, 25, 12)	0.005	adam	tanh	96.7
5.	10	(300,200, 150, 100,80,60,40,20, 10)	0.001	lbfgs	relu	96.9

11) ***DECISION TREE***:

#	Cross Validation Fold	Parameter 1 criterion	Parameter 2 min_samples_split	Parameter 3 max_depth	Parameter 4 splitter	Average Accuracy (%)
1.	**10**	**entropy**	**2**	**50**	**random**	**97.37**
2.	10	entropy	3	30	best	97.29
3.	10	gini	2	20	best	96.68
4.	10	gini	2	40	random	84.5
5.	10	gini	3	20	random	88.0
6.	10	entropy	15	20	best	93.9
7.	10	gini	3	50	random	96.6
8.	10	entropy	10	10	random	84.8
9.	10	gini	15	20	best	81.9
10.	10	entropy	10	100	best	79.6

12) ***LOGISTIC REGRESSION***

#	Cross Validation Fold	Parameter 1 penalty	Parameter 2 C	Parameter 3 solver	Parameter 4 multi_class	Parameter 5 max_iter	Average Accuracy (%)
1.	**10**	**l2**	**10**	**lbfgs**	**multinomial**	**400**	**94.13**
2.	10	l2	0.5	sag	multinomial	200	89.5
3.	10	l2	100	lbfgs	multinomial	500	93.8
4.	10	l2	5	lbfgs	ovr	100	88.8
5.	10	l2	100	sag	ovr	100	89.1
6.	10	l2	0.5	'newton-cg	ovr	100	86.7
7.	10	l2	5	lbfgs	multinomial	300	93.3
8.	10	l1	5	liblinear	ovr	200	89.0
9.	10	l1	10	saga	ovr	400	89.0
10.	10	l1	0.5	saga	ovr	300	87.1