[2]:	<pre>import matplot]</pre>															
27.	<pre>import seaborn df = pd.read_cs df</pre>	sv("mobile														
.].	0 842 1 1021 2 563	2 0 L 1 3 1	2.2 0.5 0.5	0 1 1 0 1 2	four_g int_m 0 1 1	m_dep 7 0.6 53 0.7 41 0.9	188 136 145	2 3 5	20 905 1263	756 2549 1988 2631 1716 2603	9 17 11	7 3 2	19 7 9	0 1 1	0 1 1 0 1 0	1 2 2
	3 615 4 1823 1995 794	L 1	2.5 1.2 0.5	0 0 0 13 1 0	0 1 	10 0.8 44 0.6 2 0.8	131 141 106	6 2 6	1216 1208 1222	1786 2769 1212 1411 1890 668	16 8 	2	15 	1 1 1	0 0 1 0 1 0	2 1
	1996 1965 1997 1911 1998 1512	5 1 L 0	2.6 0.9 0.9	1 0 1 0 1 1 0 4	0 1 1	39 0.2 36 0.7 46 0.1	187 108 145	4 8 5	915 868 336	1965 2032 1632 3057 670 869	11 9	10	16 5	1 1 1	1 1 1 1 1 1 1 1	2 3 0
	1999 510 2000 rows × 21 colu		2.0	1 5	1	45 0.9	168	6	483	754 3919	19	4	2	1	1 1	3
	df.shape (2000, 21)	2()														
]:	df.isnull().sum battery_power blue clock_speed dual_sim	0 0 0 0														
	fc four_g int_memory m_dep mobile_wt n_cores	0 0 0 0 0														
	pc px_height px_width ram sc_h	0 0 0 0														
	sc_w talk_time three_g touch_screen wifi price_range	0 0 0 0 0														
]: [dtype: int64 df.isnull().sum															
]:	<pre>x = df[['batter y = df['price_r print(type(x))</pre>		'px_height'	,'px_widtl	h','ram']]											
	<pre>print(type(y)) <class 'pandas.c="" 'pandas.c<="" <class="" pre=""></class></pre>			>												
]:	battery_power p 0 842	ox_height p	x_width ram 756 2549	_												
	 1 1021 563 615 1821 	905 1263 1216 1208	1988 2631 1716 2603 1786 2769 1212 1411													
]: []]:	y.head() 0 1 1 2															
	1 2 2 2 3 2 4 1 Name: price_rang	ge, dtype:	int64													
]:[print(x.shape) (2000, 4)															
] :	<pre>print(y.shape) (2000,) from sklearn.mo</pre>	odel_seler	tion import	train_te	st_split											
]:[# Split data ir x_train, x_test	nto traini	ng and test	data.		/,test_size=0	Đ.25)									
]: [<pre>print(x_train.s print(x_test.sh print(y_train.s print(y_test.sh</pre>	nape) shape)														
	(1500, 4) (500, 4) (1500,) (500,)	таре ј														
	Building Logistic Reg		l import Lo	gisticReg	ression											
	<pre>m1 = LogisticRe m1.fit(x_train, C:\Users\anant\A STOR: TOTAL NO.</pre>	y_train) <mark>Anaconda1\</mark>	.lib\site-pa		learn\line	ar_model_lo	gistic.py:8	14: Conver	genceWarn	ing: lbfgs f	ailed to	converd	ge (statı	us=1):		
	STOP: TOTAL NO. Increase the nur https://scil Please also refe https://scil	of ITERAT mber of it kit-learn. er to the kit-learn.	erations (morg/stable/documentationg/stable/	ED LIMIT. max_iter) 'modules/p on for al 'modules/l	or scale tl reprocessi ternative :	he data as s ng.html solver optio	hown in: ns:					9				
]:]: [<pre>n_iter_i = _c! LogisticRegress: ypred_m1 = m1.p</pre>	neck_optim ion()	nize_result(
	[3 2 3 0 3 1 1 1 1 1 2 3 3 0 2 3 0 3 1 0 0 2 3 3 2 1 0 1 0 2 1 3	1 3 3 1 0 1 2 1 1 2 2 0 0 1 2	1 3 2 0 1 3 1 3 3 0 2 2	3 1 3 2 2 3	1 3 1 2 2 3 3 3 3 2 1 0	2 2 1 0 3 1 9 2 1 0 3 1	3 0 3 0 0 1 1 2									
	1 3 3 0 2 2 2 3 0 1 2 3 2 1 2 0 3 3 1 1 3 0 1 2 3 0 0 1 2 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 3 2 3 3 0 0 1 1 1 1 3 2 3 3 0 0 1 1 1 1 3 2 3 3 0 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	3 0 3 1 3 9 2 3 1 0 2 0 0 3 1 9 3 2 3 2 1 3 2 2 1	1 2 0 0 1 3 3 0 1 1 0 0 0 1 2 2 0 0 3 0 1 3 0 2 0 0 1 2 1 1	3 0 3 1 3 1 3 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1	1 2 3 3 2 3 3 1 3 0 0 3 1 0 3 2 1 3 2 3 0 2 3 0 3 0 1 1 2 0	2 1 0 0 3 3 2 0 1 1 3 0 1 2 2 2 2 3 0 3 3 3 2 2 0 2 0 0 0 0	2 0 3 2 1 2 1 2 1 1 1 2 0 1 0 0 2 1 1 1									
	0 0 0 3 0 0 0 2 0 2 2 3 1 1 3 3 0 0 0 1 2 2 3 1 2 1 3 2 0 1 3 1 2 2 3 1 3 1 3 1 2 2 3 1 3 1 3 1 2 2 3 1 3 1	1 3 2 0 2 2 1 1 2 0 9 2 1 2 1	2 1 0 2 3 2 0 0 0 1 3 1 2 0 2 1 0 1	2 1 1 1 3 1 0 3 0 1 2 3 0 2	3 1 1 0 2 3 2 3 3 3 2 3	1 1 1 3 0 3 3 0 2 1 0 0	1 0 0 2 1 0 3 2									
	<pre>#Accuracy. print('Training print('Testing Training Score (</pre>	Score', m	1.score(x_t													
]: [Testing Score 0 from sklearn.me		ort confusi	on_matrix,	, classific	cation_repor	t									
]: [cation_rep)											
	[0 132 7 [0 1 124 [0 0 4 13	0] 2]	recall f	-1-score 0.98	support											
	1 2 3 accuracy	0.96 0.92 0.98	0.95 0.98 0.96	0.95 0.95 0.97	139 127 114 500											
]:[<pre>macro avg weighted avg test1 = pd.Data</pre>	0.96 0.96 aFrame()	0.96 0.96	0.96 0.96	500 500											
] : [] : []	test1['price_ra	ange'] = y	_test													
]:	test1['logistic	c_pred'] =	y_test													
	1548 2	3	3													
	1655 3 463 0 1767 3 	3 0 3 	3													
			•													
	132 2 1089 1 1973 3	2 1	L													
	1089 1	1 3	L 3 0													
Ę	1089 1 1973 3 901 0 1859 0	as o o ns ighbors)	L 3 0	hborsClass	sifier											
; ; ;]: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest ne	ighbors) eighbors i	mport KNeig	ors = 21)												
	1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest ne from sklearn.ne m2 = KNeighbors m2.fit(x_train, KNeighborsClass: ypredkn_m2 = m2 print('Training print('Testing	ighbors) eighbors i sclassifie y_train) ifier(n_ne	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t) 2.score(x_t)	ors = 21) train, y_1	train))											
]: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest new from sklearn.new m2 = KNeighbors m2.fit(x_train, KNeighborsClass: ypredkn_m2 = m2 print('Training print('Training print('Testing) Training Score 0 from sklearn.me cm = confusion_	ighbors) eighbors i sClassifie y_train) ifier(n_ne) 2.predict(y_Score', Score', 9.94266666	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667	ors = 21) train, y_tes est ,y_tes on_matrix	train)) st))	ication_repo	rt									
]: []: []: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest ne from sklearn.ne m2 = KNeighbors m2.fit(x_train, KNeighborsClass: ypredkn_m2 = m2 print('Training print('Testing Training Score 0 from sklearn.me cm = confusion_ print(cm) print(classific) [[115 5 0 [7 122 10	ighbors) eighbors i sclassifie y_train) ifier(n_ne 2.predict(y_score', Score', m 0.94266666 .924 etrics imp matrix(y_ cation_rep 0] 0]	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred	ors = 21) train, y_tes est ,y_tes on_matrix kn_m2)	train)) st)) , classifi	ication_repo	rt									
]: []: []: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest new sklearn.new sklearn.ne	ighbors) eighbors i sclassifie y_train) ifier(n_ne 2.predict(y_score', score', m 0.94266666 .924 etrics imp matrix(y_ eation_rep 0] 0] 5] 66]] recision 0.94 0.94	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_ref1-score 0.95 0.91	train)) st)) , classifi m2)) support 120 139	ication_repo	rt									
]: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest ne from sklearn.ne m2 = KNeighbors m2.fit(x_train, KNeighborsClass: ypredkn_m2 = m2 print('Training print('Training print('Testing Training Score 0 from sklearn.me cm = confusion_ print(cm) print(classific [[115 5 0 [7 122 10 [0 3 119 [0 0 8 10 print(cm) print(cm) print(cm) print(cm) print(classific	ighbors) eighbors i sClassifie y_train) ifier(n_ne 2.predict(y_score', score', m 0.94266666 .924 etrics imp matrix(y_ cation_rep 0] 0] 5] 06] precision 0.94	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96	ors = 21) train, y_tes on_matrix kn_m2) ypredkn_r	train)) st)) , classifi m2)) support 120	ication_repo	rt									
]: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest new sklearn.new sklearn.mew sklearn.me	ighbors) eighbors i sclassifie y_train) ifier(n_ne) 2.predict(y_score', score', score', matrix(y_ cation_rep 0] 0] 5] 06]] recision 0.94 0.94 0.87 0.95	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.93 0.92	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repor	rt									
]: []: []: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest new of the sklearn.new of	ighbors) eighbors i sclassifie y_train) ifier(n_ne 2.predict(y_score', score', m 0.94266666 .924 etrics imp _matrix(y_ cation_rep 0] 0] 5] 06] frecision 0.94 0.94 0.87 0.95 0.93 0.93 0.93	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 i kn_pred 3 2 2 2	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repo	rt									
]: []: []: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest new of the sklearn.new of the sklearn.me of the skle	ighbors) eighbors i sclassifie y_train) ifier(n_ne c.predict(y_score', score', matrix(y_ cation_rep 0] 0] 5] 0[0] 5] 0[0] 1] 1 = ypred logistic_pred 3	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 i kn_pred 3 2 2 3 3 0 3 3	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repor										
]: []: []: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest neares	ighbors) eighbors i sclassifie y_train) ifier(n_ne) 2.predict(y_score', Score', m 0.942666666 .924 etrics imp matrix(y_ eation_rep 0] 0] 5] 06]] recision 0.94 0.94 0.87 0.95 0.93 0.93 0.93	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 kn_pred 3 0.92 kn_m2 i kn_pred 3 0.92 kn_m2 i kn_pred 3 0.93 0.92	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repor										
]: []: []: [1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest near from sklearn.near m2 = KNeighbors m2.fit(x_train, KNeighborsClass: ypredkn_m2 = m2 print('Training print('Testing Training Score 0 from sklearn.me cm = confusion print(cm) print(classific [[115 5 0 [7 122 10 [0 3 119 [0 0 8 10	ighbors) eighbors i sclassifie y_train) ifier(n_ne) core', Score', Score', matrix(y_ cation_rep 0] 0] 5] 66]] recision 0.94 0.94 0.87 0.95 0.93 0.93 0.93	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 kn_pred 3 0.92 kn_m2 1 kn_pred 3 0.92 1 1	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repor										
	1089 1 1973 3 901 0 1859 0 500 rows × 2 column KNN (K - nearest new sklearn.new sklearn.ne	ighbors) eighbors i sclassifie y_train) ifier(n_ne) core', score', score', score', ation_rep 0] 0] 5] 66]] recision 0.94 0.94 0.87 0.95 0.93 0.93 0.93	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 i kn_pred 3 3 0.92 kn_m2 i kn_pred 3 3 0.92 kn_m2	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repor										
	1089	ighbors) eighbors i sclassifie y_train) ifier(n_ne) core', Score', Score', score', ation_rep 0] 0] 5] 6[] recision 0.94 0.94 0.87 0.95 0.93 0.93 0.93 1] = ypred logistic_pred ighbors i sclassifie y_train) ifier(n_ne) core i imp import import l='linear' y_train)	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f	ors = 21) train, y_fest on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93	train)) st)) , classifi m2)) support 120 139 127 114 500 500	ication_repor										
	1973	ighbors) sighbors ighbors igh	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f	ors = 21) train, y_test on_matrix kn_m2) ypredkn_r fl-score 0.95 0.91 0.90 0.94 0.92 0.93 0.92	train)) , classifi m2)) support	ication_repor										
	1089	ighbors) sighbors i sclassifie y_train) ifier(n_ne 2.predict(y_score', score', m 0.94266666 .924 etrics imp matrix(y_ eation_rep 0] 0] 5] 6[]] recision 0.94 0.87 0.95 0.93 0.93 1] = ypred logistic_pred ighbors i core in the service of the service	mport KNeig mport KNeig r (n_neighb sighbors=21) x_test) m2.score(x_t se66666667 ort confusitest, ypred ort(y_test, recall f	ors = 21) train, y_fest, y_test on_matrix kn_m2) ypredkn_r f1-score 0.95 0.91 0.90 0.94 0.92 0.93 0.92 svm_s1)	train)) st)) support 120 139 127 114 500 500 500 500	ication_report										
	1089	ighbors) eighbors i classifie y_train) ifier(n_ne) classifie y_train) ifier(n_ne) classifie y_train) ifier(n_ne) classifie y_train) classifie on classifie y_train) classifie on classifie y_train classifie y_train classifie on classifie y_train classifie y_train classifie on classifie y_train classifie on classifie y_train classifie on classifie y_train classifie y_train classifie y_train classifie y_train classifie y_train classifie on classifie y_train clas	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.93 0.93 0.93 0.93 0.92 kn_m2 i kn_pred 3 2 3 0 3 0 3 2 1 3 0 0 3 2 1 3 0 0 3 2 1 1 3 0 0 0 SVC	rain, y_test rain, y_test on_matrix kn_m2) ypredkn_r -1-score 0.95 0.91 0.90 0.94 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_	train)) st)) , classifi m2)) support	ication_report										
	1089	ighbors) eighbors i classifie y_train) ifier(n_ne classifie y_train) ifier(n_ne classifie y_train) ifier(n_ne classifie y_train) classifie y_train classifi	mport KNeig mport KNeig r (n_neighb sighbors=21) x_test) m2.score(x_t se66666667 ort confusitest, ypred ort(y_test, recall f	rain, y_test rain, y_test on_matrix kn_m2) ypredkn_r -1-score 0.95 0.91 0.90 0.94 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_	train)) st)) , classifi m2)) support	ication_report										
	1089	ighbors) eighbors i classifie y_train) ifier(n_ne y_train) ifier(n_ne y_train) ifier(n_ne y_train) 0.94266666 924 etrics imp matrix(y_ cation_rep 0] 0] 5] 06]] recision 0.94 0.94 0.95 0.93 0.93 classifie y_train) classifie y_train 0.94 0.94 0.95 0.93 0.93 classifie y_train 0.94 0.94 0.94 0.95 0.93 0.93 classifie y_train 0.94 0.94 0.95 0.95 0.93 0.93 classifie y_train 0.94 0.94 0.95 0.95 0.93 0.93 classifie y_train 1.00 0.94 0.94 0.95 0.93 0.93 classifie y_train 1.00 0.94 0.91 0.91 0.91 0.91 0.91 0.91 0.91 0.91	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 666666667 ort confusi test, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.92 kn_m2 i kn_pred 3 2 3 0 3 0 3 0 9 5 VC recall f 0.96 0.88 0.94 0.93 O SVC recall f 0.96 0.94 0.98 test, ypred ort(y_test,	ors = 21) train, y_test on_matrix kn_m2) ypredkn_r fl-score 0.95 0.91 0.90 0.94 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_ fl-score 0.98 0.92	train)) st)) (classifing) support 120 139 127 114 500 500 500 500 rain)) st))	ication_report										
	1089	ighbors) eighbors i sclassifie y_train) ifier(n_ne cyredict(y_score', m 0.94266666 0.924 etrics imp matrix(y_ etrics imp matrix(y_ cation_rep 0] 0] 5] 66]] recision 0.94 0.87 0.95 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 i kn_pred 3 0.92 kn_m2 i kn_pred 3 0.92 i kn_pred 3 0.93 0.92 kn_pred 3 0.93 0.92 i kn_pred 3 0.93 0.93 0.94 0.93 i classification of the second of the seco	rain, y_test, y_test svm_s1) ypredkn_r rain, y_test 0.95 0.91 0.90 0.94 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_ rain, y_test svm_s1) ypredsvm_s rain, y_test svm_s1)	train)) st)) (classifing) support 120 139 127 114 500 500 500 139 127 114 500 500 139 127 114 500 500	ication_report										
	1089	ighbors) sighbors i sclassifie y_train) ifier(n_ne c.predict(gscore', m 0.94266666 0.924 strics imp matrix(y_ cation_rep 0] 0] 5] 6[] recision 0.94 0.97 0.95 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 i kn_pred 3 2 3 0.93 0.92 kn_m2 d kn_pred 3 2 3 0 0 3 0 0 SVC recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	rain, y_test, y_test svm_s1) ypredkn_r rain, y_test 0.95 0.91 0.90 0.94 0.92 0.93 0.92 svm_s1) ypredsvm_ rain, y_test 0.96 0.96 0.96 0.96 0.96 0.96 0.96	train)) st)) (classifing) support 120 139 127 114 500 500 500 139 127 114 500 500 139 127 114 500 500	ication_report										
	1089	ighbors) sighbors i sclassifie y_train) ifier(n_ne y_train) ifier(n_ne y_train) ifier(s_predict) score', m 0.94266666 0.944 0.87 0.95 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.9	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m2.score(x_test) m3.0.93 m9.92 kn_m2 kn_pred m2 kn_pred m3.2 m3.3 m.2 m3.3 m.3 m3.3 m.3 m3.3 m3	rain, y_test, y_test svm_s1) ypredsvm_ rain, y_test 0.95 0.91 0.90 0.94 0.92 0.93 0.92 rain, y_test 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	train)) st)) (classifing) support 120 139 127 114 500 500 500 139 127 114 500 500 139 127 114 500 500	ication_report										
	1089	ighbors) Prighbors ighbors ig	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.93 0.93 0.92 kn_m2 i kn_pred 3 0.93 0.92 kn_m2 i kn_pred 3 0.93 0.92 kn_m2 i kn_pred 3 0.93 0.93 0.92 kn_m2 i kn_pred 3 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.	ors = 21) train, y_test on_matrix kn_m2) ypredkn_r ypredkn_r 0.95 0.91 0.90 0.94 0.92 0.93 0.92 svm_s1) ypredsvm_ f1-score 0.98 0.94 0.97 0.96 0.96 0.96 0.96 0.96 on_matrix n_m2) ypredkn_r and	train)) st)) (classifing) support 120 139 127 114 500 500 500 139 127 114 500 500 139 127 114 500 500	ication_report										
	1089	ighbors) sighbors i sclassifie y_train) ifier(n_ne classifie y_train) ifier(n_ne classifie y_train) ifier(n_ne classifie y_train) ifier(n_ne classifie y_train) classifier classifie y_train classifie y_train classifie y_train classifie class	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_test) 2.score(x_test) 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.94 0.93 0.92 kn_m2 i kn_pred 3 2 3 0 0 3	ors = 21) train, y_test on_matrix kn_m2) ypredkn_r ypredkn_r 0.95 0.91 0.90 0.94 0.92 0.93 0.92 svm_s1) ypredsvm_ rain, y_test 0.95 0.94 0.97 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	train)) st)) (classifing) support 120 139 127 114 500 500 500 139 127 114 500 500 139 127 114 500 500	ication_repo!										
	1089	ighbors) righbors i classifie y_train) ifier(n_ne classifie y_train) classifie y_train 0.94266666 0.924 ctrics imp cation_rep 0.94 0.94 0.95 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93	mport KNeig r (n_neighb sighbors=21) x_test) m2.score(x_ 2.score(x_ 2.score(x_ 2.score(x_ 1.666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.98 0.93 0.93 0.92 kn_m2 i kn_pred 3 3 2 2 3 3 0 0 3 3 2 1 3 3 0 0 5 VC rC=1) SVC recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	rain, y_test, y_test, y_test, y_test svm_s1) ypredkn_r 0.92 0.93 0.92 0.93 0.92 svm_s1) ypredsvm_ rain, y_test 0.95 0.94 0.92 0.93 0.92 rain, y_test 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	train)) st)) , classifi m2)) support	ication_repo										
	1089	ighbors ighbor	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 666666667 ort confusi test, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 i kn_pred 3 2 2 3 3 0 0 3 2 2 1 3 0 0 3 3 2 2 1 1 3 0 0 0 SVC recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	ors = 21) train, y_test on_matrix kn_m2) ypredkn_r o.95 0.91 0.90 0.94 0.92 0.93 0.92 svm_s1) ypredsvm_ rain, y_test 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	train)) support 120 139 127 114 500 500 500 rain)) st)) support 120 139 127 114 500 500 500 strain))	ication_repo!										
	1089	ighbors) eighbors i calcasifie y_train) ifier(n_ne calcasifie y_train) ifier(n_ne calcasifie y_train) ifier(n_ne calcasifie y_train) cation_rep 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t 2.score(x_t 666666667 ort confusitest, ypred ort(y_test, recall f	rain, y_test, y_test, y_test svm_s1) ypredsvm_ rain, y_test 0.95 0.90 0.94 0.92 0.93 0.92 svm_s1) ypredsvm_ fl-score 0.98 0.95 0.94 0.97 0.96 0.96 0.96 0.96 0.96 rain, y_test and	train)) support 120 139 127 114 500 500 500 rain)) st)) support 120 139 127 114 500 500 500 strain))	ication_repo!										
	1973	ighbors) ighbors i i	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 recall f 0.96 0.88 0.94 0.93 0.92 kn_m2 recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	rain, y_test, y_test rain, y_test on_matrix kn_m2) ypredkn_r 0.95 0.91 0.90 0.94 0.92 0.93 0.92 svm_s1) ypredsvm_ rain, y_test 0.96 0.96 vm_pred 3 2 3 0 3 2 1 3 0 0 0 0 a=0.00001 train, y_test y_test y_test rbf_s2)	train)) st)) support 120 139 127 114 500 500 500 rain)) st)) support 120 139 127 114 500 500 500 train)) est))	ication_report										
	1089	ighbors) ighbors i i	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t recall f 0.96 0.88 0.94 0.93 0.93 0.92 kn_m2 recall f 0.96 0.88 0.94 0.93 0.92 kn_m2 recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	rain, y_test, y_test, y_test, y_test svm_s1) ypredsvm_ rain, y_test 0.95 0.91 0.90 0.92 0.93 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_ rain, y_test 0.96 0.96 0.96 rain, y_test 1 3 0 0 3 2 1 3 0 0 3 2 1 3 0 0 0 rain, y_test 1 3 0 0 0 0 rain, y_test 1 3 0 0 0 0 rain, y_test 1 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	train)) st)) support 120 139 127 114 500 500 500 st)) support 120 139 127 114 500 500 500 500	ication_repoi										
	1973	ighbors) ighbors i i	mport KNeig mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 2.score(x_t 2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.88 0.94 0.93 0.92 kn_m2 0.93 0.92 kn_m2 0.93 0.92 kn_m2 0.93 0.92 kn_m2 0.93 0.92 class 3 0.0 0.3 0.0 0.0 SVC ,C=1) (x_test) 1.score(x_t 1.scor	rain, y_test, y_test, y_test, y_test, y_test svm_s1) ypredkn_r fl-score 0.95 0.91 0.90 0.94 0.92 0.93 0.92 0.93 0.92 0.96 0.96 0.96 0.96 rm_pred 3 2 3 0 3 2 1 3 0 0 0 a=0.00001 train, y_test, y_test	train)) st)) support 120 139 127 114 500 500 500 rain)) st)) support 120 139 127 114 500 500 500 support 120 139 127 114 500 500 500	ication_repoi										
	1973	ighbors) sighbors i sighbors i sclassifie y_train) ifier(n_ne cytrain) ifier(n_ne cytrain) ifier(simp cation_rep 0] 0] 5] 0.94266666 0.924 etrics imp cation_rep 0] 0] 5] 06] recision 0.94 0.97 0.95 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.93	mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.98 0.94 0.93 0.92 kn_m2 i kn_pred 3	rain, y_test, y_test, y_test, y_test svm_s1) ypredsvm_ rain, y_test 0.95 0.91 0.90 0.94 0.92 0.93 0.92 0.93 0.92 rain, y_test 0.96 0.96 0.96 rain, y_test 0.96 0.96 0.96 0.96 rain, y_test 0.98 0.99 0.99 0.99 0.99 0.96 0.96 rbf_s2) ypredrbf_ rtrain, y_test rbf_s2) ypredrbf_ rbf_s2) ypredrbf_s2 0.99 0.99 0.99 0.99 0.99	train)) st)) support 120 139 127 114 500 500 500 rain)) st)) support 120 139 127 114 500 500 500 strain)) est))	ication_repo!										
	1973		mport KNeig r (n_neighb eighbors=21) x_test) m2.score(x_t 66666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.98 0.94 0.93 0.92 kn_m2 i kn_pred 3	rain, y_test, y_test, y_test, y_test, y_test rain, y_test on_matrix kn_m2) ypredkn_r fl-score 0.95 0.94 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_ rain, y_test svm_s1) ypredsvm_s rain, y_test svm_s1) ypredsvm_s rain, y_test svm_s1) ypredsvm_s rain, y_test svm_s1) svm_s1) ypredsvm_s rain, y_test svm_s1)	train)) , classifi 120 139 127 114 500 500 500 support 120 139 127 114 500 500 500 support 120 139 127 114 500 500 500	ication_repoi										
	1973	## import ## import ## inear'	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t recall f 0.96 0.88 0.94 0.93 0.92 kn_m2 0.92 kn_m2 0.92 kn_m2 0.92 kn_m2 0.93 0.93 0.92 drot(y_test, recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	rain, y_test, y_test, y_test, y_test, y_test rain, y_test on_matrix kn_m2) ypredkn_r fl-score 0.95 0.94 0.92 0.93 0.92 rm_pred 3 2 3 0 3 2 1 3 0 0 3 3 0 0 3 3 2 1 3 0 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 3 0 3 3 3 0 3 3 3 0 3 3 3 0 3 3 3 0 3 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 3 0 3 0 3 3 0 3 0 3 3 0 0 3 0	train)) st)) support 120 139 127 114 500 500 500 support 120 139 127 144 500 500 500	ication_repoi										
	1973	## inport	mport KNeig r (n_neighb righbors=21) x_test) m2.score(x_t recall f 0.96 0.88 0.94 0.93 0.92 kn_m2 0.92 kn_m2 0.92 kn_m2 0.92 kn_m2 0.93 0.93 0.92 drot(y_test, recall f 0.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	rain, y_test, y_test, y_test, y_test, y_test svm_s1) ypredsvm_ rain, y_test 0.95 0.91 0.90 0.94 0.92 0.93 0.92 rain, y_test 9.95 0.96 0.96 0.96 rain, y_test 9.96 0.96 0.96 rain, y_test 9.96 0.96 0.96 0.96 0.96 0.96 rain, y_test 1.3 0 0 0 rain, y_test 9.96 0.96 0.96 0.96 0.96 0.96 0.96 0.96	train)) st)) support 120 139 127 114 500 500 500	ication_repoi										
	1973	ighbors) ighbors i i	mport KNeig r (n_neighb sighbors=21) x_test) m2.score(x_t 66666667 ort confusi test, ypred ort(y_test, recall f 0.96 0.98 0.93 0.93 0.93 0.93 0.92 kn_m2 i kn_pred 3 3 0.93 0.92 kn_m2 i kn_pred 3 3 0.93 0.93 0.93 0.93 0.93 0.93 0.93 0.9	rain, y_test, y_test, y_test, y_test rain, y_test on_matrix kn_m2) ypredkn_r fl-score 0.95 0.91 0.92 0.93 0.92 0.93 0.92 rain, y_test svm_s1) ypredsvm_ rain, y_test svm_s1) ypredsvm_ fl-score 0.98 0.95 0.94 0.97 0.96 0.96 0.96 rain, y_test strain, y_test rbf_s2) ypredrbf_ fl-score 0.94 0.90 0.95 0.92 0.92 0.92 0.92 0.92 0.92 0.92 0.92	train)) support 120 139 127 114 500 500 500 rain)) support 120 139 127 144 500 500 500 support 120 139 127 144 500 500 500 support 120 139 127 144 500 500 500	ication_repo!										
	1973	ighbors) ighbors i i	mport KNeig r (n_neighb sighbors=21) x_test) m2.score(x_t) 2.score(x_t) 666666667 ort confusitest, ypred ort(y_test, recall f 0.96 0.84 0.93 0.92 kn_m2 i kn_pred 3 2 2 3 3 0 3 2 2 3 3 0 3 3 2 2 1 3 3 0 0 3 3 4 7 7 7 8 8 8 9 9 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 8 9 9 9 9 9 0 9 8 0 9 9 0 9 0	ors = 21) train, y_test, y_test, y_test, y_test, y_test, y_test svm_s1) ypredsvm_ rain, y_test, y_test svm_s1) ypredsvm_ f1-score 0.95 0.94 0.92 0.93 0.92 svm_pred 3 2 3 0 3 2 1 3 0 0 0 a=0.00001 train, y_test, y_test svm_spred f1-score 0.98 0.96 0.96 0.96 svm_pred f1-score 0.98 0.99 0.99 0.99 0.99 0.99 0.99 0.9	train)) support 120 139 127 114 500 500 rain)) support 120 139 127 114 500 500 500 support 120 139 127 114 500 500 500	ication_repoi										