Fatal and the																
Estal and desired																
.4-1 ' "						Feature Selection	on and Classifica	tion								
-4-1																
ı otal samples d	listribution: {2.0:	5372, 1.0: 1485, 3	3.0: 1317}													
Training sample	es distribution: {2	2.0: 4310, 1.0: 115	7, 3.0: 1072}													
Training sample	s distribution af	ter Oversampling:	{1.0, 4315), (2.0,	4310), (3.0, 4082)}											
Feature Select	ction: PCA . CI	assifier: SVM. Le	ad: 10 days. All f	eatures with 10 d	ays history, Datase	et: lead10 Hist 1	0.csv. Oversamp	ling with Adasyn()							
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	,				-,,,		,		,							
Reduced number	or of footures: 4					Reduced number	r of footures: 0					Doduced number	er of features: 12			
Classes	Precision	Recall	F1-Score	Support Samp		Classes	Precision	Recall	F1-Score	Support Sample		Classes	Precision	Recall	F1-Score	Support Samples
						Classes Class 1	0.44						0.44			
Class 1												Class 1				
Class 2	0.					Class 2	0.72					Class 2	0.72			
Class 3		23 0.7				Class 3	0.22					Class 3	0.22			
Overall	0.	46 0.5	55 0	.4 16	35	Overall	0.46	0.54	0.39	1635	5	Overall	0.46	0.54	0.39	9 1635
Balanced Accura						Balanced Accura	ncy: 54.49					Balanced Accur	acy: 54.47			
Accuracy: 38.90)					Accuracy: 36.7						Accuracy: 37.68				
Number of Corre	ectly predicted s	samples: 636				Number of Corre	ctly predicted san	nples: 600				Number of Corre	ectly predicted sar	mples: 616		
Confusion Matrix	ix:	[[225 35 68]				Confusion Matrix	:	[[223 34 71]				Confusion Matri	K:	[[223 34 71]		
		[285 229 548]						[274 186 602]						[274 207 581]		
		[15 48 182]]						[14 40 191]]						[14 45 186]]		
		[]]														
Reduced number	er of features: 1	8				Reduced number	r of features: 20					Reduced number	er of features: 24			
Classes	Precision	Recall	F1-Score	Support Samp		Classes		Recall	F1-Score	Support Sample		Classes	Precision Precision	Recall	F1-Score	Support Samples
Class 1																
	0.					Class 1	0.44					Class 1	0.44			
Class 2 Class 3		72 0 22 0.7	.2 0.3			Class 2 Class 3	0.71 0.22					Class 2 Class 3	0.71			
verall	0.	46 0.5	54 0	.4 16	35	Overall	0.46	0.54	0.39	1635	5	Overall	0.46	0.54	0.4	4 1635
Balanced Accura						Balanced Accura						Balanced Accur				
Accuracy: 36.94	1					Accuracy: 36.94						Accuracy: 37.86				
Number of Corre	ectly predicted s	samples: 604				Number of Corre	ctly predicted san	nples: 604				Number of Corre	ectly predicted sar	mples: 619		
Confusion Matrix	ix:	[[223 36 69]				Confusion Matrix	C:	[[223 34 71]				Confusion Matri	x:	[[223 38 67]		
		[274 215 573]						[274 194 594]						[274 213 575]		
		[14 49 182]]						[14 44 187]]						[14 48 183]]		
								-								
	ction: PCA CI	assifier: RandomE	orest Lead: 10	lavs All features	with 10 days history	Dataset: lead	10 Hist 10 csv	Oversamnling wit	h Adasyn()							
2 Feature Selec	0.1011. 1 0/1 , 0/	acomor. ramacimi	oroot, Loud. To	Jayo, 7 iii loatarot	with to days motory	, Datacot. Ioua	10_1110(_10.004,	o roroumping mi	171000511()							
2. Feature Selec																
2. Feature Selec																
	er of features: 4					Reduced number	r of features: 9					Reduced number	or of features: 12			
Reduced numbe			E1 Sears	Support Co.		Reduced number		Pacall	E1 Soors	Support Com-1-			er of features: 12	Pacall	E1 Spars	Support Comple
Reduced numbe	Precision	Recall	F1-Score	Support Samp	les	Classes	Precision	Recall	F1-Score	Support Sample	es (Classes	Precision	Recall	F1-Score	Support Samples
Reduced numbe Classes Class 1	Precision 0.	Recall 0.6	67 0.5	54 3	les 28	Classes Class 1	Precision 0.44	0.67	0.54	328	es (Classes Class 1	Precision 0.44	0.67	0.54	4 328
Reduced numbe Classes Class 1 Class 2	Precision 0.	Recall 44 0.6	0.9 21 0.9	32 32 10	les 28 52	Classes Class 1 Class 2	Precision 0.44 0.7	0.67 0.18	0.54	328 9 1062	es 1 3 1	Classes Class 1 Class 2	Precision 0.44	0.67	0.54	4 328 2 1062
Reduced numbe Classes Class 1 Class 2 Class 3	Precision 0. 0. 0.	Recall 0.6 71 0.2 21 0.7	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45	Classes Class 1 Class 2 Class 3	0.44 0.7 0.21	0.67 0.18 0.76	0.54 0.29 0.33	4 328 9 1062 3 245	es (1) (2) (2) (3) (4) (5) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Classes Class 1 Class 2 Class 3	0.44 0.7 0.21	0.67 0.21 0.71	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced numbe Classes Class 1 Class 2 Class 3	Precision 0. 0. 0.	Recall 44 0.6	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45	Classes Class 1 Class 2	Precision 0.44 0.7	0.67 0.18 0.76	0.54 0.29 0.33	4 328 9 1062 3 245	es (1) (2) (2) (3) (4) (5) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4	Classes Class 1 Class 2	Precision 0.44	0.67 0.21 0.71	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall	0. 0. 0. 0.	Recall 0.6 71 0.2 21 0.7	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 35	Classes Class 1 Class 2 Class 3 Overall	0.44 0.7 0.21 0.45	0.67 0.18 0.76	0.54 0.29 0.33	4 328 9 1062 3 245	2 (1) 5 (1)	Classes Class 1 Class 2 Class 3 Overall	0.44 0.7 0.21	0.67 0.21 0.71	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced numbe Classes Class 1 Class 2 Class 3 Overall	0. 0. 0. 0. acy: 53.51	Recall 0.6 71 0.2 21 0.7	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 52 45 35	Classes Class 1 Class 2 Class 3 Overall Balanced Accura	0.44 0.7 0.21 0.45	0.67 0.18 0.76	0.54 0.29 0.33	4 328 9 1062 3 245	28	Classes Class 1 Class 2 Class 3 Overall Balanced Accur	Precision 0.44 0.7 0.21 0.45 acy: 53.11	0.67 0.21 0.71	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced numbe Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92	0. 0. 0. 0. aracy: 53.51	Recall 44 0.6 71 0.2 21 0.7 46 0.8	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 35	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51	Precision 0.44 0.7 0.21 0.45 acy: 53.62	0.67 0.18 0.76 0.54	0.54 0.29 0.33	4 328 9 1062 3 245	28	Classes Class 1 Class 2 Class 3 Overall	Precision 0.44 0.7 0.21 0.45 acy: 53.11	0.67 0.21 0.71	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced numbe Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92	0. 0. 0. 0. aracy: 53.51	Recall 44 0.6 71 0.2 21 0.7 46 0.8	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 35	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51	0.44 0.7 0.21 0.45	0.67 0.18 0.76 0.54	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur. Accuracy: 37.55	Precision 0.44 0.7 0.21 0.45 acy: 53.11	0.61 0.21 0.71 0.53	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced numbe Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 37.92	0. 0. 0. 0. aracy: 53.51	Recall 44 0.6 71 0.2 21 0.7 46 0.8	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 35	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51	Precision 0.44 0.7 0.21 0.45 acy: 53.62	0.67 0.18 0.76 0.54	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur. Accuracy: 37.55	Precision 0.44 0.7 0.21 0.45 acy: 53.11	0.61 0.21 0.71 0.53	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92 Number of Corre	Precision 0. 0. 0. 0. 2. 2. 2. 2. 2. 2. 3.51	Recall 44 0.6 71 0.2 21 0.7 46 0.8	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51	Precision 0.44 0.7 0.21 0.45 acy: 53.62	0.67 0.18 0.76 0.54	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1 5 1 6 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur. Accuracy: 37.55	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.61 0.21 0.71 0.53	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92 Number of Corre	Precision 0. 0. 0. 0. 2. 2. 2. 2. 2. 2. 3.51	Recall 44 0.8 71 0.2 21 0.3 46 0.8 samples: 620	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre	Precision 0.44 0.7 0.21 0.45 ccy: 53.62 cctty predicted san	0.67 0.18 0.76 0.54 nples: 597	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1 5 1 1 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corre	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.67 0.21 0.71 0.53 mples: 614	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92 Number of Corre	Precision 0. 0. 0. 0. 2. 2. 2. 2. 2. 2. 3.51	Recall 44 0.6 71 0.7 21 0.7 46 0.8 samples: 620 [[221 35 72] [263 222 577]	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre	Precision 0.44 0.7 0.21 0.45 occ: 53.62 oct/y predicted san	0.67 0.18 0.76 0.54 hples: 597 [[221 33 74] [263 191 608]	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1 5 1 1 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corre	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.67 0.21 0.71 0.53 mples: 614 [[221 36 71] [263 218 581]	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced numbe Classes Class 1 Class 2 Class 3	Precision 0. 0. 0. 0. 2. 2. 2. 2. 2. 2. 3.51	Recall 44 0.8 71 0.2 21 0.3 46 0.8 samples: 620	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre	Precision 0.44 0.7 0.21 0.45 occ: 53.62 oct/y predicted san	0.67 0.18 0.76 0.54 nples: 597	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1 5 1 1 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corre	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.67 0.21 0.71 0.53 mples: 614	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accurracy: 37.92 Number of Corre	Precision 0. 0. 0. 0. 2. 2. 2. 2. 2. 2. 3.51	Recall 44 0.6 71 0.7 21 0.7 46 0.8 samples: 620 [[221 35 72] [263 222 577]	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre	Precision 0.44 0.7 0.21 0.45 occ: 53.62 oct/y predicted san	0.67 0.18 0.76 0.54 hples: 597 [[221 33 74] [263 191 608]	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1 5 1 1 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corre	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.67 0.21 0.71 0.53 mples: 614 [[221 36 71] [263 218 581]	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92 Number of Corre	Precision 0. 0. 0. 0. 2. 2. 2. 2. 2. 2. 3.51	Recall 44 0.6 71 0.7 21 0.7 46 0.8 samples: 620 [[221 35 72] [263 222 577]	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre	Precision 0.44 0.7 0.21 0.45 occ: 53.62 oct/y predicted san	0.67 0.18 0.76 0.54 hples: 597 [[221 33 74] [263 191 608]	0.54 0.29 0.33	4 328 9 1062 3 245	2 1 5 1 5 1 1 1	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corre	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.67 0.21 0.71 0.53 mples: 614 [[221 36 71] [263 218 581]	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 37.92 Number of Corre Confusion Matrix	Precision 0. 0. 0. 0. 0. vacy: 53.51 2 ectly predicted s	Recall 44 0.6 71 0.2 21 0.3 46 0.8 samples: 620 [[221 35 72] [263 222 577] [13 55 177]]	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 35	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre Confusion Matrix	Precision 0.44 0.7 0.21 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	0.67 0.18 0.76 0.54 hples: 597 [[221 33 74] [263 191 608]	0.54 0.29 0.33	4 328 9 1062 3 245	ss	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corr Confusion Matri	Precision 0.44 0.7 0.21 0.45 0.45 0.21 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	0.67 0.21 0.71 0.53 mples: 614 [[221 36 71] [263 218 581]	0.54 0.32 0.33	4 328 2 1062 3 245
Reduced number Classes Class 1 Class 2 Class 3 Overall Balanced Accuracy: 37.92 Number of Corre	Precision 0. 0. 0. 0. 0. vacy: 53.51 2 ectly predicted s	Recall 44 0.6 71 0.2 21 0.3 46 0.8 samples: 620 [[221 35 72] [263 222 577] [13 55 177]]	0.9 21 0.3 72 0.3	34 3 32 10 33 2	les 28 32 45 55	Classes Class 1 Class 2 Class 3 Overall Balanced Accura Accuracy: 36.51 Number of Corre	Precision 0.44 0.7 0.21 0.45 0.45 0.45 0.45 0.45 0.45 0.45 0.45	0.67 0.18 0.76 0.54 hples: 597 [[221 33 74] [263 191 608]	0.54 0.29 0.33	4 328 9 1062 3 245	15 3 3 4 2 2 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	Classes Class 1 Class 2 Class 3 Overall Balanced Accur Accuracy: 37.55 Number of Corr Confusion Matri	Precision 0.44 0.7 0.21 0.45 acy: 53.11 ectly predicted said	0.67 0.21 0.71 0.53 mples: 614 [[221 36 71] [263 218 581]	0.54 0.32 0.33	4 328 2 1062 3 245

[263 202 597] [254 240 568] [263 1 [13 49 183]] [13 49 183]] [13 5 [13 5 5]] [13 49 183]] [13 49 183]] [13 5 5] [13 60 174]] [13 5 5] [13 60 174]] [13 5 5] [13 60 174]] [13 6	0.53 :: 600 11 33 74] 3199 600] 52 180]] Eall F1-Score 0.68 0.19 0.76 0.54	Support Samples 0.53 328 0.3 1062 0.34 245 0.39 1635
Balanced Accuracy: 53.70 Balanced Accuracy: 53.20 Accuracy: 53.20 Accuracy: 53.20 Accuracy: 38.65 Number of Correctly predicted samples: 605 Number of Correctly predicted samples: 632 Number of Correctly predicted samples: 633 N	E: 600 1 33 74] 3 199 600] 5 2 180]] F1.Score 0.68 0.19 0.76 0.54 E: 606 3 31 74] 4 197 591]	Support Samples 0.53 328 0.3 1062 0.34 245
Accuracy; 38.65 Number of Correctly predicted samples: 606 Number of Correctly predicted samples: 632 Number of Correctly predicted samples: 632 Confusion Matrix: [221 33 74] [263 202 507] [13 49 183]] 3. Feature Selection: SelectFromModel , Classifler: SVM, Lead: 10 days, All features with 10 days history, Datasect lead 10_Hist_10.cev, Oversampling with Adasynr) Reduced number of features: 8 Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall O.44 O.68 O.53 O.32 Class 1 O.44 O.68 O.55 O.39 Datasect lead 10_Hist_10.cev, Oversampling with Adasynr) Reduced number of features: 8 Classes Precision Recall F1-Score Support Samples Classes Recall F1-Score Support Samples Confusion Matrix F1-Score Recall Confusion Matrix F1-Score Support Samples Classes Recall F1-Score Support	1 33 74] 3 199 600] 5 2 180]] F1.Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Accuracy; 38.65 Number of Correctly predicted samples: 606 Number of Correctly predicted samples: 632 Number of Correctly predicted samples: 632 Confusion Matrix: [221 33 74] [263 202 507] [13 49 183]] 3. Feature Selection: SelectFromModel , Classifler: SVM, Lead: 10 days, All features with 10 days history, Datasect lead 10_Hist_10.cev, Oversampling with Adasynr) Reduced number of features: 8 Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall O.44 O.68 O.53 O.32 Class 1 O.44 O.68 O.55 O.39 Datasect lead 10_Hist_10.cev, Oversampling with Adasynr) Reduced number of features: 8 Classes Precision Recall F1-Score Support Samples Classes Recall F1-Score Support Samples Confusion Matrix F1-Score Recall Confusion Matrix F1-Score Support Samples Classes Recall F1-Score Support	1 33 74] 3 199 600] 5 2 180]] F1.Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Number of Correctly predicted samples: 605 Number of Correctly predicted samples: 632 Number of Correctly predicted samples: 632 Confusion Matrix [221 33 74] Confusion Matrix [221 33 74] Confusion Matrix [224 240 588] [13 49 183]] [13 49 183]] Confusion Matrix [224 240 588] [11 60 174]] Confusion Matrix [225 242 40 588] [13 49 183]] [13 49 183]] [13 49 183]] Confusion Matrix [221 32 73] Confusion Matrix [221 34 73] Confusion Matrix [221 34 73] Confusion Matrix [223 32 7	1 33 74] 3 199 600] 5 2 180]] F1.Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Number of Correctly predicted samples: 605 Number of Correctly predicted samples: 632 Number of Correctly predicted samples: 632 Confusion Matrix [221 33 74] Confusion Matrix [221 33 74] Confusion Matrix [224 240 588] [13 49 183]] [13 49 183]] Confusion Matrix [224 240 588] [11 60 174]] Confusion Matrix [225 242 40 588] [13 49 183]] [13 49 183]] [13 49 183]] Confusion Matrix [221 32 73] Confusion Matrix [221 34 73] Confusion Matrix [221 34 73] Confusion Matrix [223 32 7	1 33 74] 3 199 600] 5 2 180]] F1.Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
263 202 597	8 199 600] 52 180]] F1-Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
263 202 597	8 199 600] 52 180]] F1-Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
[263 240 588] [13 49 183]] [14 49 183]] [15 49 183]] [15 49 183]] [16 5] [17 49 183]] [17 5] [18 49 183]] [19 5] [19 5] [19 5] [19 6] [52 180]] 52 180]] F1-Score 0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
The control of teatures The control of t	0.68 0.19 0.76 0.54 0.54 0.68 0.19 0.76 0.54	0.53 328 0.3 1062 0.34 245
Reduced number of features: 4 Classes Precision Recall F1-Score Support Samples Classes Recall F1-Score Support Samples Class Clas	0.68 0.19 0.76 0.54 0.54 0.68 0.19 0.76 0.54	0.53 328 0.3 1062 0.34 245
Reduced number of features: 4 Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 2 0.71 0.18 0.29 1062 Class 2 0.72 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 245 Class 3 0.22 0.72 0.34 0.66 0.55 0.39 1635 Overall 0.46 0.54 0.54 0.54 0.58 0.54 0.54 0.54 0.54 0.54 0.54 0.54 0.54	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Reduced number of features: 4 Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 2 0.71 0.18 0.29 1062 Class 2 0.72 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 245 Class 3 0.22 0.72 0.34 0.66 0.55 0.39 1635 Overall 0.46 0.54 0.54 0.54 0.58 0.54 0.54 0.54 0.54 0.54 0.54 0.54 0.54	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Reduced number of features: 4 Classes Precision Class 1 0.44 0.68 0.53 3.28 Class 1 0.44 0.68 0.53 3.28 Class 1 0.44 0.68 0.53 3.28 Class 1 0.44 0.68 0.53 0.72 0.73 0.19 0.3 1062 Class 2 0.77 0.18 0.29 1062 Class 3 0.22 0.77 0.18 0.29 1062 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.72 Class 3 0.22 0.77 0.34 0.68 0.55 0.39 1635 Overall 0.46 0.55 0.39 1635 Overall 0.46 0.54 0.39 1635 Overall 0.46 0.56 0.57 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Confusion Matrix: [[223 32 73] [274 199 589] [114 42 189]] Reduced number of features: 20 Class 8 Precision Recall F1-Score Support Samples Class 9 Precision Recall F1-Score Support Samples Reduced number of features: 12 Reduced nu	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Reduced number of features: 4 Classes Precision Recall F1-Score Support Samples Class 1	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Reduced number of features: 4 Classes Precision Class 1 0.44 0.68 0.53 3.28 Class 1 0.44 0.68 0.53 3.28 Class 1 0.44 0.68 0.53 3.28 Class 1 0.44 0.68 0.53 0.72 0.73 0.19 0.3 1062 Class 2 0.77 0.18 0.29 1062 Class 3 0.22 0.77 0.18 0.29 1062 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.72 Class 3 0.22 0.77 0.34 0.68 0.55 0.39 1635 Overall 0.46 0.55 0.39 1635 Overall 0.46 0.54 0.39 1635 Overall 0.46 0.56 0.57 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Confusion Matrix: [[223 32 73] [274 199 589] [114 42 189]] Reduced number of features: 20 Class 8 Precision Recall F1-Score Support Samples Class 9 Precision Recall F1-Score Support Samples Reduced number of features: 12 Reduced nu	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.67 0.54 328 Class 2 0.72 Class 2 0.73 0.19 0.3 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.72 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 245 Class 3 0.22 Overall 0.46 0.55 0.39 1635 Overall 0.46 0.54 0.39 1635 Overall 0.46 Balanced Accuracy: 54.62 Balanced Accuracy: 53.82 Balanced Accuracy: 53.82 Balanced Accuracy: 54.15 Accuracy: 37.06 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 611 Confusion Matrix: [123 46 186]] [13 4	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.67 0.54 328 Class 1 0.44 Class 2 0.73 0.79 0.73 0.79 0.3 1062 Class 2 0.77 0.34 245 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.77 0.36 0.39 1635 Overall 0.46 0.55 0.39 1635 Overall 0.46 0.54 0.39 1635 Overall 0.46 0.56 0.59 0.39 1635 Overall 0.46 0.54 0.59 1635 Overall 0.46 0.55 0.39 0.22 0.77 0.53 0.22 0.77 0.53 0.22 0.75 0.53 0.22 0.75 0.53 0.22 0.75 0.53 0.22 0.75 0.55 0.39 0.55 0.39 0.55 0.39 0.55 0.39 0.55 0.59 0.59 0.59 0.59 0.59 0.59 0.5	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.67 0.54 328 Class 2 0.72 Class 2 0.73 0.19 0.3 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.72 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 245 Class 3 0.22 Overall 0.46 0.55 0.39 1635 Overall 0.46 0.54 0.39 1635 Overall 0.46 Balanced Accuracy: 54.62 Balanced Accuracy: 53.82 Balanced Accuracy: 53.82 Balanced Accuracy: 54.15 Accuracy: 37.06 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 611 Confusion Matrix: [123 46 186]] [13 4	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.67 0.54 328 Class 1 0.44 Class 2 0.73 0.19 0.3 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.72 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 245 Class 1 0.44 0.68 0.53 328 Class 2 0.71 0.18 0.29 1062 Class 2 0.71 0.18 0.29 0.29 1062 Class 2 0.71 0.18 0.29 0.29 0.29 0.71 0.71 0.18 0.29 0.29 0.71 0.71 0.71 0.71 0.72 0.72 0.72 0.72 0.72 0.72 0.72 0.72	0.68 0.19 0.76 0.54 6: 606 3 31 74] 4 197 591]	0.53 328 0.3 1062 0.34 245
Class 2 0.73 0.19 0.3 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.72 Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 245 Class 3 0.22 0.77 0.76 0.34 245 Class 3 0.22 0.77 0.76 0.34 245 Class 2 0.77 0.76 0.34 245 Class 2 0.77 0.76 0.34 245 Class 2 0.77 0.77 0.77 0.77 0.77 0.77 0.77 0.	0.19 0.76 0.54 0:606 3 31 74] 4 197 591]	0.3 1062 0.34 245
Class 3 0.22 0.77 0.34 245 Class 3 0.22 0.76 0.34 0.39 1635 Overall 0.46 0.54 0.54 0.54 0.54 0.54 0.54 0.54 0.54	0.76 0.54 6: 606 3 31 74] 4 197 591]	0.34 245
Overall 0.46 0.55 0.39 1635 Overall 0.46 0.54 0.39 1635 Overall 0.46 Balanced Accuracy: 54.62 Balanced Accuracy: 53.82 Balanced Accuracy: 54.15 Accuracy: 37.07 Accuracy: 37.07 Accuracy: 37.07 Accuracy: 37.06 Number of Correctly predicted samples: 600 Confusion Matrix: [[223 32 73] Confusion Matrix: [[221 34 73] Confusion Matrix: [[223 193 606] Confusion Matrix: [[224 193 806] [[274 19 589] [274 19	0.54 6: 606 3 31 74] 4 197 591]	
Balanced Accuracy: 54.62 Accuracy: 37.37 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Confusion Matrix: [[223 32 73] Confusion Matrix: [[221 34 73] Confusion Matrix: [[223 14 73] Confusion Matrix: [[223 14 73] Confusion Matrix: [[224 14 42 189]] [13 46 186]] [14 42 189]] Reduced number of features: 16 Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Class Precision Recall F1-Score Support Samples C	3 31 74] 4 197 591]	1635
Accuracy: 37.37 Accuracy: 37.06 Number of Correctly predicted samples: 611 Number of Correctly predicted samples: 600 Number of Samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Samples: 600 Number of Correctly predicted samples: 600 Number of Samples: 600 Numbe	3 31 74] 4 197 591]	
Accuracy: 37.37 Accuracy: 37.06 Number of Correctly predicted samples: 611 Number of Correctly predicted samples: 600 Number of Samples: 600 Number of Correctly predicted samples: 600 Number of Correctly predicted samples: 600 Number of Samples: 600 Number of Correctly predicted samples: 600 Number of Samples: 600 Numbe	3 31 74] 4 197 591]	
Number of Correctly predicted samples: 611 Confusion Matrix: [223 32 73]	3 31 74] 4 197 591]	
Confusion Matrix: [[223 32 73] Confusion Matrix: [[221 34 73] Confusion Matrix: [[227 4 199 589] [263 193 606] [274 199 589] [263 193 606] [274 19 4 4 2 189]] Reduced number of features: 16 Reduced number of features: 20 Reduced number of features:	3 31 74] 4 197 591]	
[274 199 589] [263 193 606] [274 19 589] [274 199 589] [283 193 606] [274 19 589] [14 42 189]] [13 46 186]] [13 46 186]] [14 42 189]] [14 42 189]] [15 4 42 189]] [15 4 42 189]] [15 4 42 189]] [16 4 42 189]] [17 4 42 189]] [18 4 186]]	1 197 591]	
[274 199 589] [263 193 606] [274 19 589] [14 42 189]] [14 42 189]] [14 42 189]] [15 4 48 186]] [16 4 48 186]] [17 4 48 186]] [18 4 48 186]]	1 197 591]	
Reduced number of features: 16 Reduced number of features: 20 Reduced number of features: 20 Reduced number of features: 24 Reduced number of features: 25 Reduced number of features: 26 Reduced number of features: 26 Reduced number of features: 27 Reduced number of features: 28 Reduced number of features: 29 Reduced number of features: 20		
Reduced number of features: 16 Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71	45 186]]	
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71		
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.68 0.53 328 Class 1 0.44 Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71		
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.68 0.53 328 Class 1 0.44 Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71		
Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall F1-Score Support Samples Classes Precision Recall Class 1 0.44 0.68 0.53 328 Class 1 0.44 Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71		
Class 1 0.44 0.68 0.53 328 Class 1 0.44 0.68 0.53 328 Class 1 0.44 Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71		
Class 2 0.72 0.19 0.29 1062 Class 2 0.71 0.18 0.29 1062 Class 2 0.71	call F1-Score	Support Samples
	0.68	0.53 328
Class 2 0.22 0.76 0.24 245 Class 3 0.22 0.75 0.24 245	0.18	0.28 1062
Glass 3 0.22 0.70 0.34 243 Glass 3 0.22 0.75 0.34 245 Glass 3 0.22	0.77	0.34 245
Overall 0.46 0.54 0.39 1635 Overall 0.45 0.54 0.39 1635 Overall 0.46	0.54	0.38 1635
Balanced Accuracy: 54.15 Balanced Accuracy: 53.82 Balanced Accuracy: 54.21		
Accuracy: 37.06 Accuracy: 36.57 Accuracy: 36.57		
Number of Correctly predicted samples: 602 Number of Correctly predicted samples: 602	: 598	
Confusion Matrix: [[223 33 72] Confusion Matrix: [[223 32 73] Confusion Matrix: [[223 32 73]	3 33 72]	
	1 186 602]	
	42 189]]	
[14-4]		
A Feedure Calculate Calculate Calculate Feedure Feedure Feedure Calculate Feedure Ca		
4. Feature Selection: SelectFromModel, Classifier: Random Forest, Lead: 10 days, All features with 10 days history, Dataset: lead10_Hist_10.csv, Oversampling with Adasyn()		
Deliver and the state of the st		
Reduced number of features: 4 Reduced number of features: 8 Reduced number of features: 12	-11 54.0	S
Classes Precision Recall F1-Score Support Samples Classes P1-Score Suppo		Support Samples
Class 1 0.44 0.68 0.53 328 Class 1 0.43 0.7 0.53 328 Class 1 0.44		0.54 328
Class 2 0.7 0.19 0.29 1062 Class 2 0.71 0.21 0.32 1062 Class 2 0.71	0.2	0.31 1062
Class 3 0.21 0.73 0.33 245 Class 3 0.22 0.72 0.34 245 Class 3 0.21		0.33 245
Overall 0.45 0.53 0.39 1635 Overall 0.46 0.54 0.4 1635 Overall 0.46	0.53	0.39 1635
Balanced Accuracy: 53.23 Balanced Accuracy: 54.12 Balanced Accuracy: 53.47		
Accuracy: 38.7 Accuracy: 38.35 Accuracy: 37.43		
Number of Correctly predicted samples: 627 Number of Correctly predicted samples: 627		

Confusion Matrix		[[223 34 71]			Confusion Matrix		228 36 64]			Confusion Matrix	C	[[221 34 73]			
		[274 198 590]				[2	281 223 558]					[263 212 587]			
		[14 52 179]]				1	16 53 176]]					[13 53 179]]			
.					5										
Reduced number					Reduced number					Reduced number					
Classes		Recall		Support Samples			lecall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	
Class 1	0.44	0.68	0.53	328	Class 1	0.44	0.67	0.54	328	Class 1	0.44	0.67	0.54	328	
Class 2	0.72	0.19	0.3	1062	Class 2	0.7	0.2	0.31	1062	Class 2	0.71	0.21	0.32	1062	
Class 3	0.21	0.75	0.33	245	Class 3	0.22	0.74	0.34	245	Class 3	0.21	0.72	0.33	3 245	
Overall	0.46				Overall	0.45	0.54			Overall	0.46				
Balanced Accura	ov: 53 95				Balanced Accura	ov: 53.79				Balanced Accura	20V: 53 54				
	icy. 33.63					cy. 33.76									
Accuracy: 36.94					Accuracy: 37.43					Accuracy: 37.98					
Number of Corre	ctly predicted sam	ples: 604			Number of Correct	ctly predicted samp	les: 612			Number of Corre	ectly predicted san	nples: 621			
Confusion Matrix		[[224 30 74]			Confusion Matrix	: [[221 38 69]			Confusion Matrix	C:	[[221 34 73]			
		[270 197 595]					263 209 590]					[263 223 576]			
		[16 46 183]]					13 50 182]]					[13 55 177]]			
												- "			
Feature Select	tion: Select K-Bes	t features, Class	ifier: SVM, Lead:	10 days, All featu	ures with 10 days history, Dataset	: lead10_Hist_10.cs	sv, Oversampl	ing with Adasyn()							
Reduced number	r of features: 4				Reduced number	of features: 8				Reduced number	r of features: 12				
Classes		Recall	F1-Score	Support Samples			tecall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	
				Support Samples				F1-Score	Support Samples				F1-Score	Support Samples	
Class 1	0.44	0.53			Class 1	0.4	0.7			Class 1	0.42				
Class 2	0.73	0.18	0.28	1062	Class 2	0.72	0.24	0.36	1062	Class 2	0.73	0.27			
Class 3	0.19	0.77	0.31	245	Class 3	0.22	0.64	0.33	245	Class 3	0.22	0.63	0.33	3 245	
Overall	0.46	0.49	0.36	1635	Overall	0.45	0.53	0.4	1635	Overall	0.46	0.53	0.41	1635	
Balanced Accura	rcv: 49 13				Balanced Accura	cv: 52 57				Balanced Accura	acv: 52 99				
Accuracy: 33.58	10,10				Accuracy: 39.2	oy. 02.01				Accuracy: 40.92					
Number of Corre	ctly predicted sam	ipies: 549			Number of Correc	ctly predicted samp	les: 641			Number of Corre	ectly predicted san	npies: 669			
Confusion Matrix		[[174 31 123]			Confusion Matrix		228 35 65]			Confusion Matrix	C.	[[226 39 63]			
		[199 187 676]				[3	315 256 491]					[290 289 483]			
		[20 37 188]]				1	25 63 157]]					[25 66 154]]			
						·									
Reduced number	r of features: 16				Reduced number	of features: 20				Reduced number	r of features: 24				
Classes		Recall	F1-Score	Support Samples			ecall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	
														Support Samples	
Class 1	0.43				Class 1	0.44	0.68			Class 1	0.44				
Class 2	0.73				Class 2	0.71	0.19			Class 2	0.71				
Class 3	0.22			245	Class 3	0.22	0.75			Class 3	0.22				
Overall	0.46	0.54	0.4	1635	Overall	0.46	0.54	0.39	1635	Overall	0.46	0.54	0.39	1635	
Balanced Accura	acy: 54.03				Balanced Accura	cy: 53.96				Balanced Accura	acy: 54.1				
Accuracy: 38.59					Accuracy: 37.31					Accuracy: 37.37					
	ctly predicted sam	inles: 631				ctly predicted samp	les: 610				ectly predicted san	nnles: 611			
Tamber of Colle	out producted sall	.p.00. 00 I			Number of Correct	on, producted sallip				Number of Colle	ony producted Sall	p.00. 011			
		mans or										roos o			
Confusion Matrix		[[225 33 70]			Confusion Matrix		223 35 70]			Confusion Matrix	C.	[[223 35 70]			
		[282 230 550]				[2	274 204 584]					[274 204 584]			
		[18 51 176]]]	14 48 183]]					[14 47 184]]			
S Feature Select	tion: Select K-Pos	t features Class	ifier: Random For	est Lead: 10 day	s, All features with 10 days history,	Dataset: lead10	Hist 10 cev	Oversampling with	n Adasyn()						
Catale Geleci	Ocioci N-Des	Coduces, OldSS	or. Ivandoni i-on	co., Loud. 10 day	o, leatures with to days instory,	, Datasot. Icau IU_	o 10.cov, 1	o roroumping with	ausyn()						
Reduced number					Reduced number					Reduced number					
Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision R	tecall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	
Class 1	0.44	0.67	0.54	328	Class 1	0.44	0.67	0.54	328	Class 1	0.44	0.67	0.54	328	

Class 2	0.71	0.2	0.31	1062	Class 2	2	0.69	0.2	0.32	1062	C	Class 2	0.72	0.22	0.34	1062	
Class 3	0.21	0.73	0.33	245	Class 3	3	0.21	0.72	0.33	245	C	Class 3	0.22	0.71	0.33	245	
Overall	0.46	0.53	0.39	1635	Overal	I	0.45	0.53	0.39	1635	C	Overall	0.46	0.54	0.4	1635	
Balanced Accura	acy: 53.47				Balanc	ed Accuracy: 53.22					В	Balanced Accura	icy: 53.58				
Accuracy: 37.43					Accura	icy: 37.55					А	Accuracy: 38.47					
Number of Corre	ectly predicted san	nples: 612			Numbe	er of Correctly predicte	d samples: 61	4			N	Number of Corre	ctly predicted san	nples: 629			
Confusion Matrix	c.	[[221 34 73]			Confus	sion Matrix:	[[221 4	0 67]			C	Confusion Matrix	:	[[221 35 72]			
		[263 212 587]					[263 21	7 582]						[263 233 566]			
		[13 53 179]]					[13 56	176]]						[13 57 175]]			
Reduced numbe	er of features: 16				Reduc	ed number of features	20				F	Reduced number	r of features: 24				
Classes	Precision	Recall	F1-Score	Support Samples	Classe	s Precision	Recall		F1-Score	Support Samples	C	Classes	Precision	Recall	F1-Score	Support Samples	
Class 1	0.44	0.67	0.54	328	Class 1	1	0.44	0.67	0.54	328	C	Class 1	0.44	0.67	0.54	328	
Class 2	0.7	0.19	0.3	1062	Class 2	2	0.71	0.2	0.31	1062	C	Class 2	0.71	0.2	0.31	1062	
Class 3	0.21	0.74	0.33	245	Class 3	3	0.21	0.73	0.33	245	C	Class 3	0.21	0.73	0.33	245	
Overall	0.45	0.53	0.39	1635	Overal	I	0.46	0.53	0.39	1635	C	Overall	0.46	0.54	0.39	1635	
Balanced Accura	acy: 53.36				Balanc	ed Accuracy: 53.47					В	Balanced Accura	icy: 53.6				
Accuracy: 36.82					Accura	icy: 37.43					A	Accuracy: 37.49					
Number of Corre	ectly predicted san	nples: 602			Numbe	Number of Correctly predicted same			Number of Corre			ctly predicted san	nples: 613				
Confusion Matrix	c.	[[221 34 73]			Confus	sion Matrix:	[[221 3	4 73]			C	Confusion Matrix		[[221 34 73]			
		[263 200 599]					[263 21	2 587]						[263 212 587]			
		[13 51 181]]					[13 53	179]]						[13 52 180]]			