

Feature Selection and Classification														
Total samples distribution: {2.0: 5372, 1.0: 1485, 3.0: 1317}														
Training samples distribution: {2.0: 4310, 1.0: 1157, 3.0: 1072}														
Training samples distribution after Oversampling: {1.0, 4315}, (2.0, 4310), (3.0, 4082) }														
1. Feature Selection: PCA , Classifier: SVM, Lead: 10 days, All features with 10 days history, Dataset: lead10_Hist_10.csv, Oversampling with Adasyn()														
Reduced number of features: 4					Reduced number of features: 8					Reduced number of features: 12				
Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.43	0.69	0.53	328	Class 1	0.44	0.68	0.53	328	Class 1	0.44	0.68	0.53	328
Class 2	0.73	0.22	0.33	1062	Class 2	0.72	0.18	0.28	1062	Class 2	0.72	0.19	0.31	1062
Class 3	0.23	0.74	0.35	245	Class 3	0.22	0.78	0.34	245	Class 3	0.22	0.76	0.34	245
Overall	0.46	0.55	0.4	1635	Overall	0.46	0.54	0.39	1635	Overall	0.46	0.54	0.39	1635
Balanced Accuracy: 54.82					Balanced Accuracy: 54.49					Balanced Accuracy: 54.47				
Accuracy: 38.90					Accuracy: 36.7					Accuracy: 37.68				
Number of Correctly predicted samples: 636					Number of Correctly predicted samples: 600					Number of Correctly predicted samples: 616				
Confusion Matrix:		[[225 35 68] [285 229 548] [15 48 182]]			Confusion Matrix:		[[223 34 71] [274 186 602] [14 40 191]]			Confusion Matrix:		[[223 34 71] [274 207 581] [14 45 186]]		
Reduced number of features: 16					Reduced number of features: 20					Reduced number of features: 24				
Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328	Class 1	0.44	0.68	0.53	328	Class 1	0.44	0.68	0.53	328
Class 2	0.72	0.2	0.32	1062	Class 2	0.71	0.18	0.29	1062	Class 2	0.71	0.2	0.31	1062
Class 3	0.22	0.74	0.34	245	Class 3	0.22	0.76	0.34	245	Class 3	0.22	0.75	0.34	245
Overall	0.46	0.54	0.4	1635	Overall	0.46	0.54	0.39	1635	Overall	0.46	0.54	0.4	1635
Balanced Accuracy: 54.19					Balanced Accuracy: 54.19					Balanced Accuracy: 54.25				
Accuracy: 36.94					Accuracy: 36.94					Accuracy: 37.86				
Number of Correctly predicted samples: 604					Number of Correctly predicted samples: 604					Number of Correctly predicted samples: 619				
Confusion Matrix:		[[223 36 69] [274 215 573] [14 49 182]]			Confusion Matrix:		[[223 34 71] [274 194 594] [14 44 187]]			Confusion Matrix:		[[223 38 67] [274 213 575] [14 48 183]]		
2. Feature Selection: PCA , Classifier: RandomForest, Lead: 10 days, All features with 10 days history, Dataset: lead10_Hist_10.csv, Oversampling with Adasyn()														
Reduced number of features: 4					Reduced number of features: 8					Reduced number of features: 12				
Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	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	0.21	0.32	1062	Class 2	0.7	0.18	0.29	1062	Class 2	0.7	0.21	0.32	1062
Class 3	0.21	0.72	0.33	245	Class 3	0.21	0.76	0.33	245	Class 3	0.21	0.71	0.33	245
Overall	0.46	0.54	0.4	1635	Overall	0.45	0.54	0.39	1635	Overall	0.45	0.53	0.39	1635
Balanced Accuracy: 53.51					Balanced Accuracy: 53.62					Balanced Accuracy: 53.11				
Accuracy: 37.92					Accuracy: 36.51					Accuracy: 37.55				
Number of Correctly predicted samples: 620					Number of Correctly predicted samples: 597					Number of Correctly predicted samples: 614				
Confusion Matrix:		[[221 35 72] [263 222 577] [13 55 177]]			Confusion Matrix:		[[221 33 74] [263 191 608] [13 47 185]]			Confusion Matrix:		[[221 36 71] [263 218 581] [13 57 175]]		
Reduced number of features: 16					Reduced number of features: 20					Reduced number of features: 24				
Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples	Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.67	0.54	328	Class 1	0.45	0.66	0.54	328	Class 1	0.44	0.67	0.54	328

Class 2	0.71	0.19	0.3	1062
Class 3	0.21	0.75	0.33	245
Overall	0.46	0.54	0.39	1635

Balanced Accuracy: 53.70
 Accuracy: 38.65
 Number of Correctly predicted samples: 606

Confusion Matrix: [[221 33 74]
 [263 202 597]
 [13 49 183]]

Class 2	0.71	0.23	0.34	1062
Class 3	0.21	0.71	0.33	245
Overall	0.46	0.53	0.4	1635

Balanced Accuracy: 53.36
 Accuracy: 38.65
 Number of Correctly predicted samples: 632

Confusion Matrix: [[218 39 71]
 [254 240 568]
 [11 60 174]]

Class 2	0.7	0.19	0.3	1062
Class 3	0.21	0.73	0.33	245
Overall	0.45	0.53	0.39	1635

Balanced Accuracy: 53.20
 Accuracy: 36.70
 Number of Correctly predicted samples: 600

Confusion Matrix: [[221 33 74]
 [263 199 600]
 [13 52 180]]

3. Feature Selection: SelectFromModel , Classifier: SVM, Lead: 10 days, All features with 10 days history, Dataset: lead10_Hist_10.csv, Oversampling with Adasyn()

Reduced number of features: 4				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328
Class 2	0.73	0.19	0.3	1062
Class 3	0.22	0.77	0.34	245
Overall	0.46	0.55	0.39	1635

Balanced Accuracy: 54.62
 Accuracy: 37.37
 Number of Correctly predicted samples: 611

Confusion Matrix: [[223 32 73]
 [274 199 589]
 [14 42 189]]

Reduced number of features: 8				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.67	0.54	328
Class 2	0.71	0.18	0.29	1062
Class 3	0.22	0.76	0.34	245
Overall	0.46	0.54	0.39	1635

Balanced Accuracy: 53.82
 Accuracy: 36.7
 Number of Correctly predicted samples: 600

Confusion Matrix: [[221 34 73]
 [263 193 606]
 [13 46 186]]

Reduced number of features: 12				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328
Class 2	0.72	0.19	0.3	1062
Class 3	0.22	0.76	0.34	245
Overall	0.46	0.54	0.39	1635

Balanced Accuracy: 54.15
 Accuracy: 37.06
 Number of Correctly predicted samples: 606

Confusion Matrix: [[223 31 74]
 [274 197 591]
 [14 45 186]]

Reduced number of features: 16				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328
Class 2	0.72	0.19	0.29	1062
Class 3	0.22	0.76	0.34	245
Overall	0.46	0.54	0.39	1635

Balanced Accuracy: 54.15
 Accuracy: 37.06
 Number of Correctly predicted samples: 606

Confusion Matrix: [[223 33 72]
 [274 197 591]
 [14 45 186]]

Reduced number of features: 20				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328
Class 2	0.71	0.18	0.29	1062
Class 3	0.22	0.75	0.34	245
Overall	0.45	0.54	0.39	1635

Balanced Accuracy: 53.82
 Accuracy: 36.82
 Number of Correctly predicted samples: 602

Confusion Matrix: [[223 32 73]
 [274 195 593]
 [14 47 184]]

Reduced number of features: 24				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328
Class 2	0.71	0.18	0.28	1062
Class 3	0.22	0.77	0.34	245
Overall	0.46	0.54	0.38	1635

Balanced Accuracy: 54.21
 Accuracy: 36.57
 Number of Correctly predicted samples: 598

Confusion Matrix: [[223 33 72]
 [274 186 602]
 [14 42 189]]

4. Feature Selection: SelectFromModel, Classifier: Random Forest, Lead: 10 days, All features with 10 days history, Dataset: lead10_Hist_10.csv, Oversampling with Adasyn()

Reduced number of features: 4				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.68	0.53	328
Class 2	0.7	0.19	0.29	1062
Class 3	0.21	0.73	0.33	245
Overall	0.45	0.53	0.39	1635

Balanced Accuracy: 53.23
 Accuracy: 36.7
 Number of Correctly predicted samples: 600

Reduced number of features: 8				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.43	0.7	0.53	328
Class 2	0.71	0.21	0.32	1062
Class 3	0.22	0.72	0.34	245
Overall	0.46	0.54	0.4	1635

Balanced Accuracy: 54.12
 Accuracy: 38.35
 Number of Correctly predicted samples: 627

Reduced number of features: 12				
Classes	Precision	Recall	F1-Score	Support Samples
Class 1	0.44	0.67	0.54	328
Class 2	0.71	0.2	0.31	1062
Class 3	0.21	0.73	0.33	245
Overall	0.46	0.53	0.39	1635

Balanced Accuracy: 53.47
 Accuracy: 37.43
 Number of Correctly predicted samples: 612

Class 2					0.71	0.2	0.31	1062	Class 2					0.69	0.2	0.32	1062	Class 2					0.72	0.22	0.34	1062										
Class 3					0.21	0.73	0.33	245	Class 3					0.21	0.72	0.33	245	Class 3					0.22	0.71	0.33	245										
Overall					0.46	0.53	0.39	1635	Overall					0.45	0.53	0.39	1635	Overall					0.46	0.54	0.4	1635										
Balanced Accuracy: 53.47										Balanced Accuracy: 53.22										Balanced Accuracy: 53.58																
Accuracy: 37.43										Accuracy: 37.55										Accuracy: 38.47																
Number of Correctly predicted samples: 612										Number of Correctly predicted samples: 614										Number of Correctly predicted samples: 629																
Confusion Matrix:					[[221 34 73] [263 212 587] [13 53 179]]					Confusion Matrix:					[[221 40 67] [263 217 582] [13 56 176]]					Confusion Matrix:					[[221 35 72] [263 233 566] [13 57 175]]											
Reduced number of features: 16										Reduced number of features: 20										Reduced number of features: 24																
Classes	Precision	Recall	F1-Score	Support Samples						Classes	Precision	Recall	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	0.7	0.19	0.3	1062						Class 2	0.71	0.2	0.31	1062						Class 2	0.71	0.2	0.31	1062												
Class 3	0.21	0.74	0.33	245						Class 3	0.21	0.73	0.33	245						Class 3	0.21	0.73	0.33	245												
Overall	0.45	0.53	0.39	1635						Overall	0.46	0.53	0.39	1635						Overall	0.46	0.54	0.39	1635												
Balanced Accuracy: 53.36										Balanced Accuracy: 53.47										Balanced Accuracy: 53.6																
Accuracy: 36.82										Accuracy: 37.43										Accuracy: 37.49																
Number of Correctly predicted samples: 602										Number of Correctly predicted samples: 612										Number of Correctly predicted samples: 613																
Confusion Matrix:					[[221 34 73] [263 200 599] [13 51 181]]					Confusion Matrix:					[[221 34 73] [263 212 587] [13 53 179]]					Confusion Matrix:					[[221 34 73] [263 212 587] [13 52 180]]											