Jixing (Jacey) Man CS699 Final Project

## Part 1: Pre-Process and File Organization

There are total of 6 classification method I used to complete the project, see below list for the 6 method I used:

NaiveBayes

Logistic

RandomForest

RandomTree

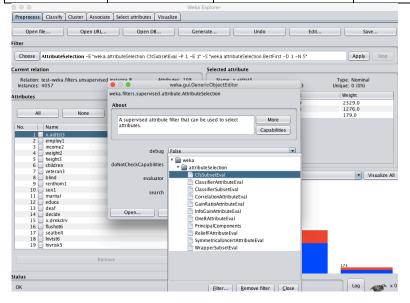
IBK(KNN)

OneR

There are 4 different attributed selection methods I used, and I have saved train/test files accordingly to each method while run the classification algorithms. I will pact all train/test files and also with the train/test file that is re-named to "best-xxx.arff". I actually did not do any pre-processing of the data itself, so there are no extra-step involved here.

See below screenshot of how I selected the attribute selection on weka. I select the filter on the preprocess page, select the method, and hit apply, and do the same for both train and test to reduced-train and reduced-test, and save the files as separate train and test files for each attribute selection method. For example, reduced\_test1.arff and reduced\_train1.arff would be arff files for CfsSubSetEval.

Train/Test Set	Set 1	Set 2	Set 3	Set 4
Attribute Evaluator	CfsSubSetEval	CorrelationAttribut eEval	OneRAttributeEval	ClassifierAttribut eEval
Search Method	GreedyStepwi se	Ranker	Ranker	Ranker



There are 5 different spreadsheet in the zip file, 4 of which are individual results of each selection and their classification methods along attributed selected. Example:



The "Man\_Jixing\_Results\_Summary.xlsx" file is a result summary of recall and confutation matrix of all test run.

The reason why I use recall and Corrected instances as the main performance measure matrix for this project is because for havarth3, the data is focused on whether the person was ever told to have some form of arthritis etc, so I believe it is best to focus on Recall, the true positive rate.

Please see screenshot below for the summary and the excel file for detail.

## Part 2: Result Analysis Table

I have put the table of the accuracy rate of all test run and also the table of each test run's confusion matrix. All other performance measure and selected attributes from weka's output for the 24 models are at the Part 5, the bottom of this document and is also in the supplement excel files, the excel files are much easier to view, so I suggest to look at the excel file for detailed weka output information instead.

The accuracy and recall table RandomForest Overall Accuracy NaiveBayes Logistic RandomTree IBK OneR Average 73.5765 72.0565333 CfsSubSetEval 74.4392 72.1469 68,9426 73.9463 69.2877 Correct Instance Incorrect Instance 26.0537 25.5608 27.8531 30.7123 31.0574 26.4235 27.9434667 CorrelationAttributeEval 70.9884 75.3019 74.1188 64.9988 67.858 73.5765 71.1404 Correct Instance Incorrect Instance 29.0116 24.6981 25.8812 35.0012 32.142 26.4235 28.8596 OneRAttributeEval Correct Instance 70.9884 75.3266 65.7136 67.858 73.5765 71.3376 29.0116 24.6734 25.4375 34.2864 32.142 26.4235 28.6624 Incorrect Instance ClassifierAttributeEval Correct Instance 70.9884 75.2019 75.0308 65.7875 67.858 73,5765 71 4071833 Incorrect Instance 29.0116 24.6981 24,9692 34.2125 32.142 26.4235 28.57615 NaiveBayes Logistic RandomForest OneR Recall RandomTree IBK CfsSubSetEval class2 0.788 0.839 0.837 0.817 0.82 0.935 0.83933333 0.558 0.449 0.344 0.48716667 0.644 0.494 0.434 class1 Weight 0.739 0.744 0.721 0.693 0.689 0.736 0.72033333 CorrelationAttributeEval class2 0.703 0.868 0.889 0.751 0.794 0.935 0.82333333 0.722 0.527 0.451 0.452 0.453 0.344 0.4915 class1 Weight 0.71 0.753 0.741 0.65 0.697 0.736 0.7145 OneRAttributeEval 0.703 0.869 0.887 0.757 0.794 0.935 0.82416667 class2 class1 0.722 0.527 0.468 0.461 0.453 0.344 0.49583333 Weight 0.71 0.753 0.746 0.679 0.736 0.7135 ClassifierAttributeEval 0.935 0.82633333 0.703 0.868 0.897 0.761 0.794 class2 class1 0.722 0.527 0.463 0.456 0.453 0.344 0.49416667 Weight 0.71 0.736 0.71433333

The confusion matrix table

CfsSubSetEv	al			CorrelationA	ttributeEval		
Confusion M	1 a	b		Confusion M	la	b	
NaiveBayes	2118	570	a=2	NaiveBayes	1891	797	a=
	487	882	b=1		380	989	b=
Logistic	а	b		Logistic	а	b	
_	2256	432			2334	354	
	605	764			648	721	
RandomFore	e a	b		RandomFore	a	b	
	2251	437			2390	298	
	693	676			752	617	
RandomTree	e a	b		RandomTree	a	b	
	2197	491			2018	670	
	755	614			750	619	
IBK	a	b		IBK	a	b	
	2203	485		12.1	2133	555	
	775	594			749	620	
OneR	a	b		OneR	a	b	
	2514	174		Onch	2514	-	
	898	471			898	471	
OneRAttribu		L		ClassifierAt		L	
Confusion M	1 a	b 707	2	Confusion M	a	b	
	1 a 1891	797	a=2		a 1891	797	_
Confusion M NaiveBayes	1 a 1891 380	797 989	a=2 b=1	Confusion M NaiveBayes	a 1891 380	797 989	_
Confusion M	1891 380 a	797 989 b		Confusion M	a 1891 380 a	797 989 b	b=
Confusion M NaiveBayes	1 a 1891 380 a 2335	797 989 b	b=1	Confusion M NaiveBayes	a 1891 380 a 2334	797 989 b	b=
Confusion M NaiveBayes Logistic	1 a 1891 380 a 2335 648	797 989 b 353 721	b=1	Confusion M NaiveBayes Logistic	a 1891 380 a 2334 648	797 989 b 354 721	b=
Confusion M NaiveBayes	1 a 1891 380 a 2335 648	797 989 b 353 721	b=1	Confusion M NaiveBayes	a 1891 380 a 2334 648	797 989 b 354 721	b=
Confusion M NaiveBayes Logistic	1 a 1891 380 a 2335 648 e a 2384	797 989 b 353 721 b	b=1	Confusion M NaiveBayes Logistic	a 1891 380 a 2334 648 a 2410	797 989 b 354 721 b	b=
Confusion M NaiveBayes Logistic RandomFore	1 a 1891 380 a 2335 648 e a 2384 728	797 989 b 353 721 b 304 641	b=1	Confusion M NaiveBayes Logistic RandomFore	a 1891 380 a 2334 648 a 2410	797 989 b 354 721 b 278 634	b=
Confusion M NaiveBayes Logistic RandomFore	1 a 1891 380 a 2335 648 e a 2384 728	797 989 b 353 721 b 304 641	b=1	Confusion M NaiveBayes Logistic	a 1891 380 a 2334 648 a 2410 735	797 989 b 354 721 b 278 634	b=
Confusion M NaiveBayes Logistic RandomFore	1 a 1891 380 a 2335 648 e a 2384 728 e a 2035	797 989 b 353 721 b 304 641 b	b=1	Confusion M NaiveBayes Logistic RandomFore	a 1891 380 a 2334 648 a 2410 735 a 2045	797 989 b 354 721 b 278 634 b	b=
Confusion M NaiveBayes Logistic RandomFore RandomTree	1 a 1891 380 a 2335 648 e a 2384 728 e a 2035 738	797 989 b 353 721 b 304 641 b	b=1	Confusion M NaiveBayes Logistic RandomFore RandomTree	a 1891 380 a 2334 648 a 2410 735 a 2045	797 989 b 354 721 b 278 634 b	b=
Confusion M NaiveBayes Logistic RandomFore RandomTree	1 a 1891 380 a 2335 648 e a 2384 728 e a 2035 738	797 989 b 353 721 b 304 641 b 653 631	b=1	Confusion M NaiveBayes Logistic RandomFore	a 1891 380 a 2334 648 a 2410 735 a 2045 745	797 989 b 354 721 b 278 634 b 643 624	b=
Confusion M NaiveBayes Logistic RandomFore RandomTree	1 a 1891 380 a 2335 648 a 2384 728 a 2035 738 a 2133	797 989 b 353 721 b 304 641 b 653 631 b	b=1	Confusion M NaiveBayes Logistic RandomFore RandomTree	a 1891 380 a 2334 648 a 2410 735 a 2045 745 a 2133	797 989 b 354 721 b 278 634 b 643 624 b	b=
Confusion M NaiveBayes Logistic RandomFore RandomTree	1 a 1891 380 a 2335 648 e a 2384 728 e a 2035 738 a 2133 749	797 989 b 353 721 b 304 641 b 653 631 b	b=1	Confusion M NaiveBayes Logistic RandomFore RandomTree	a 1891 380 a 2334 648 a 2410 735 a 2045 745 a 2133	797 989 b 354 721 b 278 634 b 643 624 b	b=
Confusion M NaiveBayes Logistic RandomFore RandomTree	1 a 1891 380 a 2335 648 a 2384 728 a 2035 738 a 2133 749	797 989 b 353 721 b 304 641 b 653 631 b 555 620	b=1	Confusion M NaiveBayes Logistic RandomFore RandomTree	a 1891 380 a 2334 648 a 2410 735 a 2045 745 a 2133 749	797 989 b 354 721 b 278 634 b 643 624 b	b=
Confusion M NaiveBayes Logistic RandomFore RandomTree	1 a 1891 380 a 2335 648 e a 2384 728 e a 2035 738 a 2133 749	797 989 b 353 721 b 304 641 b 653 631 b	b=1	Confusion M NaiveBayes Logistic RandomFore RandomTree	a 1891 380 a 2334 648 a 2410 735 a 2045 745 a 2133	797 989 b 354 721 b 278 634 b 643 624 b	b=

Part 3: Best Results and Discussion

The best test result I believe I achieved with all the 24 runs are *with CfsSubSetEval Attribute selection and Logistic classifier*. The specific detail for this test run is below. The reason why I believe this is the best run, is because out of all the test results, it gives me the accuracy rate of 74.4392 and incorrect instance of 25.5608. The reason why I believe that *CfsSubSetEval Attribute selection and Logistic classifier* is the best performance is because even though out of all 24 test, this one actually did not gave me the highest correct instance, I believe OneAttribute-Logistic actually has a higher percentage of correct instance. However, overall, the average correct instance of 72.0565% and average recall 0.83933 for CfSubSetEval is the highest out of all 4 attribute selection, and logistics is the highest out of the 6 classifier used with CfsSubaSetEval. As I mentioned before, I think for this project, if we are trying to test out the true positives for havarth3, then the test run with the highest recall rate should be the best performance test. Therefore I believe, in-combination of the attribute selection and classification methods CfsSubaSetEval –Logistic gives the best results.

```
Time taken to test model on supplied test set: 3.44 seconds
=== Summary ===
Correctly Classified Instances
                                    3020
                                                      74.4392 %
Incorrectly Classified Instances
                                    1037
                                                      25.5608 %
                                       0.4101
Kappa statistic
Mean absolute error
                                       0.3343
Root mean squared error
                                       0.4111
Relative absolute error
                                      74.7508 %
Root relative squared error
                                      86.9479 %
                                    4057
Total Number of Instances
=== Detailed Accuracy By Class ===
                TP Rate FP Rate Precision Recall
                                                                       ROC Area PRC Area Class
                                                    F-Measure MCC
                                            0.839
                0.839
                        0.442
                                 0.789
                                                    0.813
                                                               0.412
                                                                        0.801
                                                                                 0.881
                                                                                           2
                                 0.639
                0.558
                        0.161
                                            0.558
                                                    0.596
                                                               0.412
                                                                        0.801
                                                                                 0.654
Weighted Avg.
                        0.347
                                            0.744
                                                    0.740
                                                                                 0.805
                0.744
                                 0.738
                                                               0.412
                                                                        0.801
=== Confusion Matrix ===
        b
           <-- classified as
   a
 2256 432 | a = 2
 605 764 |
               b = 1
```

М	D			
Selected at	ttributes: 2,13,2	20,22,31,41,46	6,64,67,87,10	2:11
	employ1			
	deaf			
	pneuvac4			
	diffwalk			
	physhlth			
	persdoc2			
	chccopd1			
	x.age80			
	x.age65yr			L
	x.rfhlth		,	
	x.exteth3			

## Part 4: Attribute and other Observations Discussions

From the above list of attribute, I believe that employ1, deaf, pneuvac4, diffwalk and physhlth are the 5 most relevant to the class attribute. First of all, when I was doing rank search method with other attribute selections, diffwalk and physhlth do rank fairly high on some of the other attribute selections, such as for

**ClassififerAttributeEva**l etc. Also for my best performing model, these are the top 5 attribute.

What I learned from this project is that, for all the attribute selections I have chosen, *CfsSubSetEval* actually has the least attribute, but it actually gaves the best overall performance compared to other methods. It is easy to make assumption that the more attribute you have, or the "more data" you have, you should be able to make better predication, but my results from this project proves this is not true. I believe the reason

for this, is when you add more attribute or "more data" when you are doing predictive modeling, the large amount of less relevant attribute or data can actually become "noise" that would negatively affect your predication outcome. For better performance, it is actually better just to find out and select the most relevant attribute or data ( the relevant data must be correct though, otherwise making prediction with incorrect smaller amount data can cause bigger mistakes), this way it actually reduced the "noise" in the data or with smaller relevant data, it even reduced the possibility of bad data with error.

There are some other interesting things I noticed in my test results; For OneR classifer, my output results and my confusion matrix are the same across the board. At first I thought this is a mistake in the way I processed the test runs, but no matter how I adjust the methods, I always got the same results for OneR. I think this is due to how OneR is processed, that it will always use only one rule with the smallest total error. Since I am running test on the same BRFSS data over and over again, this is probably why I am getting the same results for all OneR test runs.

I also noticed that RandomTree and IBK produced the worst performance out of the 6 classifier I used. I think this could be there are many attributes (more than 10) when I am processing the test runs. However RandomTree and IBK(KNN) are better to be used to predicate smaller amount of attributes.

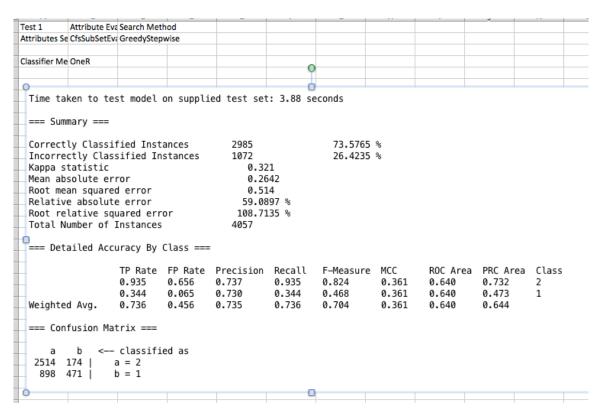
Part 5: All results screenshots of all Weka Output Window and selected attributes.

A			В	(	D		Ł	F	G	н
Test 1	Att	ribute Evalu	ator	Search I	Method					
Attributes Selected	Cfs	SubSetEval		Greedy	Stepwise					
Classifier Method	Nai	veBayes								
=== Summary ===										
Correctly Class	ified Inst	ances	3000		73,9463	%				
Incorrectly Clas			1057		26.0537					
Kappa statistic			0.42	59						
Mean absolute e			0.28	5						
Root mean square			0.43	5						
Relative absolut			63.95							
Root relative so			92.20	08 %						
Total Number of	Instances		4057							
=== Detailed Acc	curacy By	Class ===								
	TP Rate	FP Rate	Precision	Recall	F-Measure	MCC	ROC Area	PRC Area	Class	
	0.788	0.356	0.813	0.788	0.800	0.426	0.801	0.883	2	
	0.644	0.212	0.607	0.644	0.625	0.426	0.801	0.654	1	
Weighted Avg.	0.739	0.307	0.744	0.739	0.741	0.426	0.801	0.805	-	
=== Confusion Ma	atrix ===									
a b <	- classifi	ed as								
2118 570	a = 2									
487 882	b = 1									
				_						

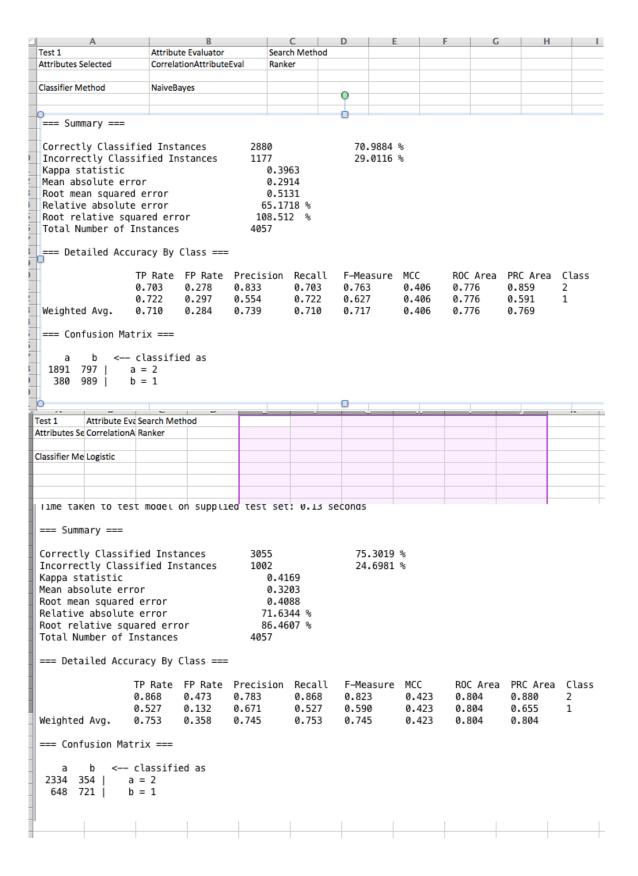
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andfine Ma	l a alabia														
assifier Me	rogistic					•									
Time tak	en to tes	t model	on suppl	ied test	set: 3	.44 secon	ds								
=== Summ	ary ===														
	y Classif			302			74.4392 %								
	tly Class	ified In	stances	103			25.5608 %								
(appa sta Mean abs	atistic olute err	or			0.4101 0.3343										
	n squared				0.4111										
	absolute				4.7508										
	ative squ mber of I			405	6.9479 <sup>9</sup>	6									
oca c ma		s carrees		.03											
== Deta	iled Accu	racy By	Class ==	=											
		TP Rate	FP Rate	Precis	ion Re	call F-	Measure	MCC	ROC /	Area Pi	RC Are	a Cla	SS		
		0.839	0.442	0.789	0.8	839 0.	813	0.412	0.80	1 0	881	2			
laiabtad	Δνα	0.558 0.744	0.161 0.347	0.639 0.738				0.412 0.412	0.80		.654 .805	1			
/eighted	Avg.	0.744	0.34/	v./38	0.	/44 V.	740	0.412	U. 80.	. 0	כשס				
== Conf	usion Mat	rix ===													
_	h -	oloo-ifi	ad a-												
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ributes Se ssifier Me	CfsSubSetE	va GreedyS rest	tepwise				0								
ributes Se essifier Me === Eva	CfsSubSetE RandomFo luation	rest on test	set ===		test se	t: 6.41	seconds								
ributes Se ssifier Me === Eva	CfsSubSetE RandomFo luation	rest on test	set ===		test se	t: 6.41	seconds								
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		0.817	0.551	0.744	0.817	0.779	0.282	0.687	0.772	2	
		0.449	0.183	0.556	0.449	0.496	0.282	0.687	0.522	1	
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	Correctly	Class	ified Ins	tances	3007		74.1188	%			
	Incorrectl				1050		25.8812				
	Kappa stat				0.36	99					
	Mean absol				0.35						
	Root mean				0.41						
	Relative a Root relat			ror	78.94 86.89						
	Total Numb				4057	34 %					
	=== Detail	ed Ac	curacy By	Class ===							
			TD Date	ED Date	Precision	Pecall	F-Measure	MCC	POC Area	PRC Area	Clas
			0.889	0.549	0.761	0.889		0.384		0.886	2
			0.451	0.111	0.674	0.451		0.384		0.661	1
	Weighted A	vg.	0.741	0.401	0.732	0.741	0.726	0.384	0.804	0.810	
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Correct	ly Classi	fied Inst	ances	2753		67.858	%			
		sified In	stances	1304		32.142	%			
	statistic			0.2						
	solute er ean square			0.3						
	e absolut			0.50 71.8	879 %					
		uared err	or	119.8						
		Instances		4057						
=== Det	ailed Acc	uracy By	Class ===							
)		TD Date	ED Data	Precision	Docall	F-Measure	MCC	DOC Area	PRC Area	Class
		0.794	0.547	0.740	0.794	0.766	0.257	0.623	0.724	2
		0.453	0.206	0.528	0.453	0.487	0.257		0.424	1
Weighte	ed Avg.	0.679	0.432	0.668	0.679	0.672	0.257	0.623	0.623	
	nfusion Ma									
		a = 2 b = 1								
st 1	Attribute Eva	Search Metho	od	-	0	1	1	1		1
st 1	Attribute Eva	Search Metho Ranker	od	-				-		-
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est 1 tributes Se	CorrelationA		od		0					
st 1 tributes Se assifier Me	CorrelationA OneR	Ranker	od							
st 1 tributes Se assifier Me	CorrelationA	Ranker	d							
st 1 tributes Se assifier Me === Corr	CorrelationA OneR Summary =	Ranker  == ssified In	stances	2985		73.5765				
st 1 tributes Se assifier Me Corr	CorrelationA OneR Summary =	Ranker  == ssified In	stances	1072		73.5765 26.4235				
st 1 tributes Se assifier Me  Corr Inco Kapp	CorrelationA  ConeR  Summary =  rectly Cla  prrectly C  pa statist	Ranker == ssified In lassified ic	stances	1072 0.	321					
est 1 tributes Se assifier Me  ===  Corr Inco Kapp Mean	CorrelationA ConeR Summary = rectly Cla prrectly C pa statist absolute	Ranker == ssified In lassified ic error	stances Instances	1072 0. 0.	2642					
sst 1 tributes Se assifier Me assifier Me Corr Inco Kapp Mean Root	CorrelationA  ConeR  Summary =  Tectly Cla  orrectly Clo  a statist  absolute  mean squ	Ranker == ssified In lassified ic	stances Instances	1072 0. 0.						
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st 1 tributes Se assifier Me  Corr Inco Kapp Mean Root Rela Root Tota	CorrelationA  ConeR  Summary =  Tectly Cla  Description  absolute  mean squ  ntive abso  relative  n Number of	essified In lassified ic error arrod error lute error squared e of Instanc Accuracy B	stances Instances error es y Class = e FP Rat 0.656	1072 0. 0. 59. 108. 4057 == e Precisio 0.737	2642 514 0897 % 7135 %	26.4235 F-Measure 0.824	% MCC 0.361	0.640	0.732	2
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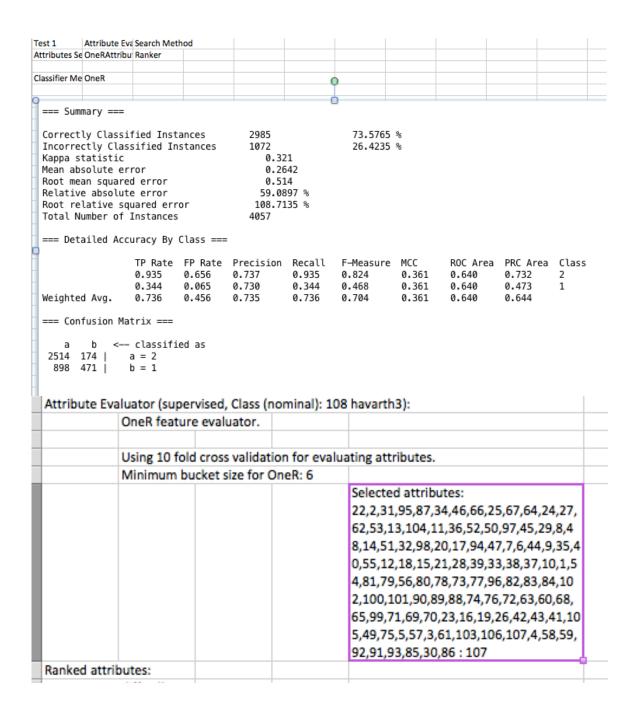
ttribute Evaluator (supervised, Class (	nominal): 108 havarth3):
Correlation Ranking Filter	,
	Selected attributes:
	64,66,22,2,67,87,97,102,20,46,
	95,31,6,25,62,13,29,104,24,69,
	27,53,59,43,26,45,98,44,47,14,
	41,16,36,48,52,105,49,34,106,
	50,78,103,76,84,10,57,61,68,8
	8,8,86,21,33,80,93,9,90,60,58,
	30,71,63,15,54,11,91,81,65,82,
	89,85,56,35,19,55,7,70,12,96,3
	2,42,77,51,100,101,94,28,5,99,
	72,75,18,1,83,74,73,79,4,3,107
anked attributes:	,39,40,92,38,17,23,37:107

## OneRAttributeEval

Test 1	Attribut	e Evaluator	Searc	h Method					
Attributes Selected	OneRAt	tributeEval	Ranke	er					
Classifier Method	NaiveBa	iyes							
=== Summary ===									
,									
Correctly Class:	ified Inst	ances	2880		70.9884	%			
Incorrectly Clas			1177		29.0116	-			
Kappa statistic			0.39	963	2310220				
Mean absolute e			0.29						
Root mean square			0.51						
Relative absolut			65.17						
Root relative so		or	108.51						
	Instances		4057						
Total Number of	Instances	5	4057						
Total Number of									
Total Number of	curacy By	Class ===	:	Recall	F-Measure	MCC	ROC Area	PRC Area	Cla
Total Number of	curacy By TP Rate	Class ===	Precision					PRC Area	-
Total Number of	curacy By TP Rate 0.703	Class === FP Rate 0.278	Precision	0.703	0.763	0.406	0.776	0.859	2
Total Number of  === Detailed Acc	TP Rate 0.703 0.722	Class === FP Rate 0.278 0.297	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	
Total Number of	curacy By TP Rate 0.703	Class === FP Rate 0.278 0.297	Precision	0.703	0.763	0.406	0.776	0.859	2
Total Number of  === Detailed Acc	TP Rate 0.703 0.722 0.710	Class === FP Rate 0.278 0.297	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	2
Total Number of  === Detailed Acc  Weighted Avg.  === Confusion Ma	TP Rate 0.703 0.722 0.710 atrix ===	FP Rate 0.278 0.297 0.284	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	2
Total Number of  === Detailed Acc  Weighted Avg.  === Confusion Ma  a b <	TP Rate 0.703 0.722 0.710 atrix ===	FP Rate 0.278 0.297 0.284	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	2
Total Number of  === Detailed Acc  Weighted Avg.  === Confusion Ma  a b < 1891 797	TP Rate 0.703 0.722 0.710 atrix === - classifi a = 2	FP Rate 0.278 0.297 0.284	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	2
Total Number of  === Detailed Acc  Weighted Avg.  === Confusion Ma  a b <	TP Rate 0.703 0.722 0.710 atrix ===	FP Rate 0.278 0.297 0.284	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	2
Total Number of  === Detailed Acc  Weighted Avg.  === Confusion Ma  a b < 1891 797	TP Rate 0.703 0.722 0.710 atrix === - classifi a = 2	FP Rate 0.278 0.297 0.284	Precision 0.833 0.554	0.703 0.722	0.763 0.627	0.406 0.406	0.776 0.776	0.859 0.591	2

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	OneRAttribu	Ranker								
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lassifier ivie	KandomFore	St								
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	,									
orrectly	Classifie	ad Incts	nces	3025		74.5625	٠.			
,				1032		25.4375				
	ly Classi	ried ins	cances		43	23.43/3	76			
appa stat				0.38						
	lute erro			0.35						
	squared (			0.41						
elative a	absolute (	error		79.38	49 %					
oot relat	tive squa	red erro	or	87.12	11 %					
	per of In			4057						
o ca c realin	JC1 01 111.	cances		4057						
Dotoil	led Accus	acv Bu /	lace							
Detal	led Accura	асу ву (	. cass ===							
				Precision					PRC Area	
	0	.887	0.532	0.766	0.887	0.822	0.397	0.802	0.885	2
	0	468	0.113	0.678	0.468	0.554	0.397	0.802	0.661	1
eighted A	Avg. 0	746	0.390	0.736	0.746	0.732	0.397	0.802	0.809	
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2384 304 728 641	4   a : 1   b :	= 1 Search M	ethod							
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2384 304 728 641	4   a : 1   b : Attribute Eva OneRAttribu	= 1 Search M	ethod							
2384 304 728 642 Test 1 Attributes Se	4   a : 1   b : Attribute Eva OneRAttribu	= 1 Search M	ethod							
2384 304 728 642 Test 1 Attributes Se	4   a : 1   b : Attribute Eva OneRAttribu	= 1 Search M	ethod							
2384 304 728 642 Test 1 Attributes Se	4   a : 1   b : Attribute Eva OneRAttribu	= 1 Search M	ethod		· O					
2384 304 728 642 Test 1 Attributes Se	4   a : 1   b : Attribute Eva OneRAttribu	= 1 Search M	ethod							
2384 304 728 641 Test 1 Attributes Se	4   a : 1   b : Attribute Eva OneRAttribu Logistic	= 1 Search M	ethod		0					
2384 304 728 642 Test 1 Attributes Se	4   a : 1   b : Attribute Eva OneRAttribu Logistic	= 1 Search M	ethod							
2384 304 728 642 Fest 1 Attributes Se Classifier Me	4   a : 1   b :  Attribute Eva OneRAttribu  Logistic	Search M Ranker		2056		75 2266				
2384 304 728 643  Fest 1 Attributes Se  Classifier Me  Correct l	4   a : 1   b :  Attribute Evanore Attribute Logistic  hary ===	Search M Ranker	tances	3056		75.3266				
2384 304 728 643  Fest 1 Attributes Se  Classifier Me  Correct l Incorrect	4   a : 1   b :  Attribute Eva OneRAttribu  Logistic  hary ===  y Classif ttly Class	Search M Ranker	tances	1001		75.3266 24.673 <sup>4</sup>				
2384 304 728 643 Test 1 Attributes Se Classifier Me Correct l Incorrec Kappa st	Attribute Evanore Evan	Search M Ranker	tances	1001						
2384 304 728 643 Test 1 Attributes Se Classifier Me Correct l Incorrec Kappa st	4   a : 1   b :  Attribute Eva OneRAttribu  Logistic  hary ===  y Classif ttly Class	Search M Ranker	tances	1001 0.4						
2384 304 728 643  Test 1  Attributes Se  Classifier Me  Correctl Incorrect Kappa st Mean abs	Attribute Evan OneRAttribute Logistic  Darry ===  Ly Classifitly C	Search M Ranker	tances	1001 0.4 0.3	4174 3203					
2384 304 728 643  Test 1  Attributes Se  Classifier Me  Correctl Incorrect Kappa st Mean abs Root mea	Attribute Evanone Attribute Evanone Attribute Evanone	Search M Ranker	tances	1001 0.4 0.3 0.4	1174 3203 1088					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrect Kappa st Mean abs Root mea Relative	Attribute Eva OneRAttribu Logistic hary === y Classifitly Classifi	Search M Ranker	tances	1001 0.4 0.3 71.6	4174 3203 4088 5347 %					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrectl Kappa st Mean abs Root mea Relative Root rel	Attribute Eva OneRAttribut Logistic Mary === y Classifitly Classif	Search M Ranker	tances	1001 0.4 0.4 71.6 86.4	1174 3203 1088					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrectl Kappa st Mean abs Root mea Relative Root rel	Attribute Eva OneRAttribu Logistic hary === y Classifitly Classifi	Search M Ranker	tances	1001 0.4 0.3 71.6	4174 3203 4088 5347 %					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrect Kappa st Mean abs Relative Root rel Total Nu	Attribute Evanone Rattribute Eva	Search M Ranker	tances nstances	1001 0.4 0.3 0.4 71.6 86.4 4057	4174 3203 4088 5347 %					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrect Kappa st Mean abs Relative Root rel Total Nu	Attribute Eva OneRAttribut Logistic Mary === y Classifitly Classif	Search M Ranker	tances nstances	1001 0.4 0.3 0.4 71.6 86.4 4057	4174 3203 4088 5347 %					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrect Kappa st Mean abs Relative Root rel Total Nu	Attribute Evanone Rattribute Eva	Search M Ranker	tances nstances	1001 0.4 0.3 0.4 71.6 86.4 4057	4174 3203 4088 5347 %					
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrect Kappa st Mean abs Relative Root rel Total Nu	Attribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Classificative Classificative Evan Squared Evan Squared Evan Squared Evan Squared Evan One Evan O	Search M Ranker  ied Insified I  or error error ared er nstance	tances nstances ror s	1001 0.4 0.3 0.4 71.6 86.4 4057	1174 3203 4088 5347 % 4604 %	24.6734	1 %	ROC Are:	a PRC Are	a Cla
2384 304 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrect Kappa st Mean abs Relative Root rel Total Nu	Attribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Classificative Classificative Evan Squared Evan Squared Evan Squared Evan Squared Evan One Evan O	Search M Ranker  ied Instified I  or error error ared er instance	tances nstances  ror s Class ==	1001 0.4 0.3 0.4 71.6 86.4 4057	1174 1203 1088 5347 % 1604 %	24.6734 F-Measure	4 % e MCC		a PRC Are	
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2384 304 728 643 728 643 Test 1 Attributes Se Classifier Me Correctl Incorrec Kappa st Mean abs Root mea Relative Root rel Total Nu	Attribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Columber of Insulative Squared and Squared Evan Evan Squared Evan Evan Squared Evan Squared Evan Squared Evan Squared Evan Squared Evan Squared Evan Squa	Search M Ranker  ied Insified I for error error ared er finstance tracy By TP Rate 0.869 0.527	tances nstances  ror s Class == FP Rate 0.473 0.131	1001 0.4 0.3 0.4 71.6 86.4 4057 == Precision 0.783 0.671	1174 3203 1088 5347 % 1604 %	24.6734 F-Measure 0.823 0.590	e MCC 0.424 0.424	0.804 0.804	0.880 0.655	
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2384 304 728 643 Test 1 Attributes Se Classifier Me  Correctl Incorrect Kappa st Mean abs Root mea Root rel Total Nu  === Deta	Attribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Columber of Insulative Squared and Squared Evan Evan Squared Evan Evan Squared Evan Squared Evan Squared Evan Squared Evan Squared Evan Squared Evan Squa	Search M Ranker  ied Ins ified I error error ared er nstance eracy By TP Rate 0.869 0.527 0.753	tances nstances  ror s Class == 0.473 0.131 0.358	1001 0.4 0.3 0.4 71.6 86.4 4057 == Precision 0.783 0.671	1174 3203 1088 5347 % 1604 %	24.6734 F-Measure 0.823 0.590	e MCC 0.424 0.424	0.804 0.804	0.880 0.655	2
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2384 304 728 643 728 643 Fest 1 Attributes Se Classifier Me  Correctl Incorrect Kappa st Mean abs Reative Root rel Total Nu === Deta  Weighted === Confi	Attribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Evan OneRAttribute Color Colo	Search M Ranker  ied Instified I for error error ared errorstance tracy By TP Rate 0.869 0.527 0.753 trix === classif	tances nstances  ror s Class == PP Rate 0.473 0.131 0.358	1001 0.4 0.3 0.4 71.6 86.4 4057 == Precision 0.783 0.671	1174 3203 1088 5347 % 1604 %	24.6734 F-Measure 0.823 0.590	e MCC 0.424 0.424	0.804 0.804	0.880 0.655	2

Test 1	Attribute Eva									
Attributes Se	OneRAttribu	Ranker								
Classifier Me	e RandomTree									
Classifier ivid	Randonniee									
= S	ummary ===	=								
	ctly Class rectly Cla			2666 1391		65.71 34.28				
	statistic		iis talices		2214	34.20	04 %			
	absolute e				3505					
	mean squar			0.	5697					
	ive absolu				3826 %					
	relative s				4941 %					
iotal	Number of	Instance	S	4057						
=== D	etailed Ac	curacy By	Class ==	=						
		, 2)								
				Precisio			re MCC			rea Class
		0.757	0.539	0.734	0.757	0.745	0.222		0.724	
Weigh	ted Avg.	0.461 0.657	0.243 0.439	0.491 0.652	0.461 0.657	0.476 0.654	0.222 0.222		0.420 0.622	1
- werdu	ccu Avg.	0.037	0.433	0.032	0.03/	0.034	V. ZZZ	0.013	0.022	
= C	onfusion M	Matrix ===								
=== C	onfusion M	Matrix ===								
a	b <-	classif								
a	b <- 653	classif a = 2								
a	b <-	classif								
a 2035	b <- 653	classif a = 2 b = 1								
a 2035 738 Attributes Se	b <- 653   631   OneRAttribu	classif a = 2 b = 1								
a 2035	b <- 653   631   OneRAttribu	classif a = 2 b = 1								
a 2035 738 Attributes Se	b <- 653   631   OneRAttribu	classif a = 2 b = 1								
a 2035 738 Attributes Se	b <- 653   631   OneRAttribu	classif a = 2 b = 1								
a 2035 738 Attributes Se	b <- 653   631   OneRAttribu	classif a = 2 b = 1								
a 2035 738 Attributes Se	b <-653   631   OneRAttribu	classif a = 2 b = 1 Ranker	ied as							
a 2035 738 Attributes Se Classifier Me === Summ	b <- 653   631   OneRAttribu	classif a = 2 b = 1 Ranker	ied as	2753		67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect	b <- 653   631   OneRAttribu	classif a = 2 b = 1 Ranker	ied as	1304	(					
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrec Kappa st	b <-653   631   OneRAttribu	classif a = 2 b = 1 Ranker	ied as	1304 0.25	553	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs	b <-653   631   OneRAttribu	classif a = 2 b = 1 Ranker ied Instan	ied as	1304 0.25 0.32	553 15	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea	b <-653   631   OneRAttribu	classif a = 2 b = 1 Ranker  ied Instar ified Inst	ied as	1304 0.25	553 115 169	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrec Kappa st Mean abs Root mea Relative Root rel	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instantified Instanti	ied as	1304 0.25 0.32 0.56	53 15 69 179 %	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrec Kappa st Mean abs Root mea Relative Root rel	b <- 653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instantified Instanti	ied as	1304 0.25 0.32 0.56 71.88	53 15 69 179 %	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nu	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instanified Instanified Instancer error error ered error ared error	ied as	1304 0.25 0.32 0.56 71.88 119.88	53 15 69 179 %	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nu	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instanified Instanified Instancer error error ered error ared error	ied as	1304 0.25 0.32 0.56 71.88 119.88	53 15 69 179 %	67.858				
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nu	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instantified Instanti	ied as	1304 0.25 0.32 0.56 71.88 119.88 4057	553 15 669 179 % 664 %	67.858 32.142	%	ROC Area	PRC Are	ea Class
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nu	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instar ified Inst or error error ared error ared error stances racy By Cl	ied as  ices ances  ass ===	1304 0.25 0.32 0.56 71.88 119.88	553 15 669 179 % 664 %	67.858	%	ROC Area	PRC Are 0.724	ea Class
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrec Kappa st Mean abs Root mea Relative Root rel Total Nu	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instantified Instantified Instancer error error ared error ared error ared error ared error ared error	ied as  ices ances  ass ===	1304 0.25 0.32 0.56 71.88 119.88 4057	553 :15 :69 :79 % :64 %	67.858 32.142 F-Measure	% MCC			
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nu	b <-653   631   OneRAttribu	classif a = 2 b = 1  Ranker  ied Instantified Instantified Instancer error error ared error ared error ared error ared error for ared error	ied as  ices ices ices ices ices ices ices ic	1304 0.25 0.32 0.56 71.88 119.88 4057	553 :15 :69 :79 % :64 %	67.858 32.142 F-Measure 0.766	% MCC 0.257	0.623	0.724	2
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Root mea Root rel Total Nui	b <-653   631   OneRAttribu	reclassif  a = 2 b = 1  Ranker  Ranker  ied Instantified Instantified Instances  recror error er	ied as  ices ices ices ices ices ices ices ic	1304 0.25 0.32 0.56 71.88 119.88 4057 Precision 0.740 0.528	553 :15 :69 :79 % :64 % Recall 0.794 0.453	67.858 32.142 F-Measure 0.766 0.487	% MCC 0.257 0.257	0.623 0.623	0.724 0.424	2
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Root mea Root rel Total Nui	b <-653   631   OneRAttribu	reclassif  a = 2 b = 1  Ranker  Ranker  ied Instantified Instantified Instances  recror error er	ied as  ices ices ices ices ices ices ices ic	1304 0.25 0.32 0.56 71.88 119.88 4057 Precision 0.740 0.528	553 :15 :69 :79 % :64 % Recall 0.794 0.453	67.858 32.142 F-Measure 0.766 0.487	% MCC 0.257 0.257	0.623 0.623	0.724 0.424	2
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nu === Deta Weighted === Confi	b <-653   631   OneRAttribu	rix ===	ied as  ices ances  P Rate 0.547 0.206	1304 0.25 0.32 0.56 71.88 119.88 4057 Precision 0.740 0.528	553 :15 :69 :79 % :64 % Recall 0.794 0.453	67.858 32.142 F-Measure 0.766 0.487	% MCC 0.257 0.257	0.623 0.623	0.724 0.424	2
a 2035 738 Attributes Se Classifier Me === Summ Correctl Incorrect Kappa st Mean abs Root mea Relative Root rel Total Nui	b <-653   631   OneRAttribu  BBK  ary === y Classifitly Classicative constitute error in squared absolute ative squamber of Ir iled Accur  Avg. 6  usion Matr	reclassif  a = 2 b = 1  Ranker  Ranker  ied Instantified Instantified Instances  recror error er	ied as  ices ances  P Rate 0.547 0.206	1304 0.25 0.32 0.56 71.88 119.88 4057 Precision 0.740 0.528	553 :15 :69 :79 % :64 % Recall 0.794 0.453	67.858 32.142 F-Measure 0.766 0.487	% MCC 0.257 0.257	0.623 0.623	0.724 0.424	2



ClassifierAttributeEva

Test 1	Attribute Eva	luator	Search M	ethod					
Attributes Selected	ClassifierAtt	ributeEval	Ranker						
Classifier Method	MaiyoPayos								
lassifier Method	NaiveBayes								
=== Summary ==	==								
Correctly Clas	lassified In		2880 1177		70.9884 29.0116				
Kappa statist				963					
Mean absolute Root mean squa				914 131					
Relative abso				719 %					
Root relative			108.5	12 %					
Total Number o	of Instances		4057						
=== Detailed A	Accuracy By	Class ===							
			Precision		F-Measure			PRC Area	
	0.703	0.278	0.833	0.703	0.763	0.406	0.776	0.859	2 1
Weighted Avg.	0.722 0.710	0.297 0.284	0.554 0.739	0.722 0.710	0.627 0.717	0.406 0.406	0.776 0.776	0.591 0.769	1
neighted Avgi	01/10	0.204	0.755	0.710	0.717	01400	0.770	0.703	
=== Confusion	Matrix ===								
a b <	< classifi	ed as							
1891 797	a = 2	eu as							
380 989	b = 1								
t 1 Attribute Eva 9	Search Method								
ributes Se ClassifierAtt I				0					
ributes Se ClassifierAtt F	Ranker			0					
ributes Se ClassifierAtt I	Ranker	===							
ributes Se ClassifierAtt I	Ranker on test set		d test set	0	econds				
ributes Se ClassifierAtt F	Ranker on test set		d test set	0	econds				
ributes Se Classifier Att is ssifier Me Logistic === Evaluation of Time taken to te	Ranker on test set		d test set	0	econds				
ributes Se ClassifierAtt ssifier Me Logistic === Evaluation of Time taken to to ==== Summary ====	on test set	n supplie		0					
ributes Se Classifier Att sistifier Me Logistic === Evaluation of Time taken to to ==== Summary ==== Correctly Class	est model on	n supplie	3055	0	75.3019				
ributes Se Classifier Att   ssifier Me Logistic === Evaluation of Time taken to to === Summary === Correctly Class Incorrectly Class	est model on	n supplie	3055 1002	:: 0.16 se					
ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Kappa statistic	on test set est model on ified Instan	n supplie	3055 1002 0.41	:: 0.16 se	75.3019				
ributes Se ClassifierAtt sisifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Class Incorrectly Class	est model on ified Instan	n supplie	3055 1002	:: 0.16 se	75.3019				
ssifier Me Logistic === Evaluation of Time taken to to === Summary === Correctly Classi Incorrectly Classi Kappa statistic Mean absolute en	est model on ified Instansified Instansified Instansified Instansified Instansified error	n supplie	3055 1002 0.41 0.32	2: 0.16 so	75.3019				
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Class Incorrectly Class Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so	est model or ified Instarsified Instarsified Instarsified Instarced error te error quared error	n supplie nces tances	3055 1002 0.41 0.32 0.46	2: 0.16 so	75.3019				
ssifier Me Logistic === Evaluation of Time taken to to === Summary === Correctly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolute	est model or ified Instarsified Instarsified Instarsified Instarced error te error quared error	n supplie nces tances	3055 1002 0.41 0.32 0.46 71.63	2: 0.16 so	75.3019				
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of	Ranker on test set est model or ified Instar ssified Inst rror ed error te error quared error Instances	n supplie nces tances	3055 1002 0.41 0.32 0.46 71.63 86.46	2: 0.16 so	75.3019				
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of	con test set est model or dified Instal ssified Instal estified Encorrer ed error ed error quared error Instances curacy By C	n supplie nces tances r	3055 1002 0.41 0.32 0.46 71.63 86.46 4057	69 203 388 445 %	75.3019 24.6981	. %	ROC Are	a PRC Are	a Cl
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of	con test set est model or dified Instants sified Instants rror ed error quared error quared error Instances curacy By C	n supplie nces tances r lass ===	3055 1002 0.41 0.32 0.46 71.63 86.46 4057	169 203 388 345 % 805 %	75.3019 24.6981 F-Measure	· %		a PRC Are	
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of	est model on ified Instances for a correct error quared error instances for a correct error instance in a correct error in a correc	n supplie nces tances r lass === FP Rate	3055 1002 0.41 0.32 0.46 71.63 86.46 4057	69 203 388 445 %	75.3019 24.6981	. %	ROC Are: 0.804 0.804	a PRC Are 0.880 0.655	a Cla 2 1
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of	Ranker  on test set est model on  ified Instant ssified Instant esteror ed error quared error Instances curacy By C  TP Rate ( 0.868 ( 0.527 (	n supplie nces tances r lass === FP Rate 0.473	3055 1002 0.41 0.32 0.46 71.63 86.46 4057 Precision 0.783	169 203 388 345 % 805 %	75.3019 24.6981 F-Measure 0.823	* MCC 0.423	0.804	0.880	2
ributes Se Classifier Attissifier Me Logistic  === Evaluation of Time taken to test to	Ranker  on test set est model on  ified Instant ssified Instant rror ed error quared error quared error Instances curacy By C  TP Rate   0.868   0.527   0.753   0.753	n supplie nces tances r lass === FP Rate 0.473	3055 1002 0.41 0.32 0.46 71.63 86.46 4057 Precision 0.783 0.671	169 103 108 1045 105 % Recall 10.868 10.527	75.3019 24.6981 F-Measure 0.823 0.590	MCC 0.423 0.423	0.804 0.804	0.880 0.655	2
ributes Se Classifier Attissifier Me Logistic  === Evaluation of Time taken to te to the Evaluation of Time taken to te to the Evaluation of Time taken as the Evaluation of Time taken absolute en Root mean square Relative absolute Root relative so Total Number of Number of Total Number of Number	Ranker  on test set est model on ified Instances fror ed error quared error quared error function and set on test set est model on ified Instances fror ed error quared error function and set on 1868 0.527 0.753 etrix ===	n supplie nces tances r lass === FP Rate 0.473 0.132	3055 1002 0.41 0.32 0.46 71.63 86.46 4057 Precision 0.783 0.671	169 103 108 1045 105 % Recall 10.868 10.527	75.3019 24.6981 F-Measure 0.823 0.590	MCC 0.423 0.423	0.804 0.804	0.880 0.655	2
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of === Detailed Accord Weighted Avg. === Confusion Ma a b <	Ranker  on test set est model on  ified Instant ssified Inst rror ed error quared error quared error function for the error quared error function for the error	n supplie nces tances r lass === FP Rate 0.473 0.132	3055 1002 0.41 0.32 0.46 71.63 86.46 4057 Precision 0.783 0.671	169 103 108 1045 105 % Recall 10.868 10.527	75.3019 24.6981 F-Measure 0.823 0.590	MCC 0.423 0.423	0.804 0.804	0.880 0.655	2
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of === Detailed Accord Weighted Avg. === Confusion Ma a b < 2334 354	Ranker  on test set est model on ified Instant ssified Instant rror ed error quared error quared error Instances curacy By C' TP Rate   0.868  () 0.527  () 0.753  () atrix === - classified a = 2	n supplie nces tances r lass === FP Rate 0.473 0.132	3055 1002 0.41 0.32 0.46 71.63 86.46 4057 Precision 0.783 0.671	169 103 108 1045 105 % Recall 10.868 10.527	75.3019 24.6981 F-Measure 0.823 0.590	MCC 0.423 0.423	0.804 0.804	0.880 0.655	2
ributes Se Classifier Atti ssifier Me Logistic === Evaluation of Time taken to te === Summary === Correctly Classi Incorrectly Classi Incorrectly Classi Kappa statistic Mean absolute en Root mean square Relative absolut Root relative so Total Number of === Detailed Accord Weighted Avg. === Confusion Ma a b <	Ranker  on test set est model on  ified Instant ssified Inst rror ed error quared error quared error function for the error quared error function for the error	n supplie nces tances r lass === FP Rate 0.473 0.132	3055 1002 0.41 0.32 0.46 71.63 86.46 4057 Precision 0.783 0.671	169 103 108 1045 105 % Recall 10.868 10.527	75.3019 24.6981 F-Measure 0.823 0.590	MCC 0.423 0.423	0.804 0.804	0.880 0.655	2

Test 1 Attributes Se	Attribute Ev ClassifierAt		thod							
Classifier Me	RandomFore	est								
-							-			
=== Summ	ary ===									
Incorrec Kappa st Mean abs Root mea Relative Root rel	y Classif tly Class atistic olute err n squared absolute ative squ mber of I	ified In for lerror e error ared err	stances	3044 1013 0.39 0.35 0.41 79.11 86.79 4057	38 04 57 %	75.0308 24.9692				
=== Deta	iled Accu	iracy By	Class ===							
Weighted		TP Rate 0.897 0.463 0.750	FP Rate 0.537 0.103 0.391	Precision 0.766 0.695 0.742	Recall 0.897 0.463 0.750	F-Measure 0.826 0.556 0.735	MCC 0.407 0.407 0.407	ROC Area 0.806 0.806 0.806	PRC Area 0.886 0.667 0.813	Class 2 1
			3.331	V1172	3.750	3.733	0.407	0.000	0.013	
=== Conf	usion Mat	rix ===								
a 2410 2	-	classifi = 2	ed as							
		) = 1								
	Attribute Eva		hod					1		
ttributes Se	ClassifierAt	Ranker								
lassifier Me	RandomTree	1								
=== Sumn	nary ===									
Incorrect Kappa st Mean abs Root mea Relative Root re	ly Classi ttly Clas tatistic solute er an square e absolut lative sq umber of	sified In ror d error e error uared er	nstances	0.3 0.5 78.6	2206 5515 6631 5136 % 1905 %	65.7875 34.2125				
=== Deta	ailed Acc	uracy By	Class ==	=						
- -		TP Rate 0.761 0.456	FP Rate 0.544 0.239	Precision 0.733 0.493	Recall 0.761 0.456	F-Measure 0.747 0.473	e MCC 0.221 0.221	ROC Are 0.619 0.619	a PRC Are 0.728 0.424	ea Cla 2 1
Weighted	d Avg.	0.658	0.441	0.652	0.658	0.654	0.221	0.619	0.625	_
=== Con1	fusion Ma	trix ===								
	543	classif: a = 2 b = 1	ied as							

		Search Meth		_					,	
Attributes Se	ClassifierAtt									
Classifier Me	IBK									
=== 5	Summary ≕	==								
				2752		67.0	- 0 0			
		ssified In		2753			58 %			
	statist		Instances		2553	32.1	42 %			
	absolute				3215					
		ared erro	r		5669					
		lute erro			.8879 %					
		squared e			8864 %					
		of Instanc		4057						
=== [	Detailed A	Accuracy F	By Class =	==						
				e Precisio			ure MCC	ROC Are		
		0.794		0.740	0.794		0.257		0.724	2
		0.453		0.528	0.453		0.257		0.424	1
Weigr	nted Avg.	0.679	0.432	0.668	0.679	0.672	0.257	0.623	0.623	
		Matrix ==								
2133	a b· 3 555   9 620	< classi a = 2 b = 1								
	020	0 - 1								
	Assetheran Fred	Carach Mark	- 4							
Test 1 Attributes Se (		Search Meth	00							
attributes se c	LIASSIIICI ALL	ndlikel								
lassifier Me (	OneR									
					0					
0										
	mary ===				0					
Suiii	illary									
Correct	lv Classi	ified Inst	ances	2985		73.576	5 %			
		sified In		1072		26.423				
	tatistic			0.32	21	201.25				
Mean ab	solute er	ror		0.26	542					
Root me	an square	ed error		0.51	L4					
	e absolut	e error		59.08	397 %					
		quared err		108.71	l35 %					
Relativ Root re	lumber of	Instances	i	4057						
Relativ Root re										
Relativ Root re Total N		_	Class ===							
Relativ Root re Total N		curacy By				F-Measur	MCC	DOC 4 ====	DDC Area	C1
Relativ Root re Total N				Drocisis	Doca11			KUL Area	PRC Area	
Relativ Root re Total N		TP Rate	FP Rate	Precision				0.640	0 722	
Relativ Root re Total N		TP Rate 0.935	FP Rate 0.656	0.737	0.935	0.824	0.361	0.640		2
Relativ Root re Total N	ailed Acc	TP Rate 0.935 0.344	FP Rate 0.656 0.065	0.737 0.730	0.935 0.344	0.824 0.468	0.361 0.361	0.640	0.473	1
Relativ Root re Total N	ailed Acc	TP Rate 0.935	FP Rate 0.656	0.737	0.935	0.824	0.361			
Relativ Root re Total N === Det	ailed Acc	TP Rate 0.935 0.344 0.736	FP Rate 0.656 0.065	0.737 0.730	0.935 0.344	0.824 0.468	0.361 0.361	0.640	0.473	
Relativ Root re Total N === Det	ailed Acc	TP Rate 0.935 0.344	FP Rate 0.656 0.065	0.737 0.730	0.935 0.344	0.824 0.468	0.361 0.361	0.640	0.473	
Relativ Root re Total N === Det	ailed Acc d Avg. fusion Ma	TP Rate 0.935 0.344 0.736	FP Rate 0.656 0.065 0.456	0.737 0.730	0.935 0.344	0.824 0.468	0.361 0.361	0.640	0.473	
Relativ Root re Total N === Det Weighte	ailed Acc d Avg. fusion Ma b <	TP Rate 0.935 0.344 0.736	FP Rate 0.656 0.065 0.456	0.737 0.730	0.935 0.344	0.824 0.468	0.361 0.361	0.640	0.473	
Relativ Root re Total N === Det Weighte === Con a 2514	ailed Acc d Avg. fusion Ma b <	TP Rate 0.935 0.344 0.736 atrix ===	FP Rate 0.656 0.065 0.456	0.737 0.730	0.935 0.344	0.824 0.468	0.361 0.361	0.640	0.473	

Classi	fier feature evaluator	
Using	Wrapper Subset Evaluator	
Learn	ing scheme: weka.classifiers.rules.ZeroR	
Schen	ne options:	
Subse	t evaluation: classification accuracy	
Numb	per of folds for accuracy estimation: 5	
	Selected attributes:	
	107,34,36,37,38,35,33,27,32,	
	29,30,31,39,40,41,42,49,50,5	
	1,48,47,46,43,44,45,28,26,53,	
	7,9,10,11,8,6,25,5,2,3,4,12,13	
	,14,15,22,23,24,21,20,19,16,1	
	7,18,52,54,106,88,90,91,92,8	
	9,87,81,86,83,84,85,93,94,95,	
	96,103,104,105,102,101,100,	
	97,98,99,82,80,55,61,63,64,6	
	5,62,60,79,59,56,57,58,66,67,	
	68,69,76,77,78,75,74,73,70,7	
	1,72,1:107	