

```
1 "C:\Users\My PC\AppData\Local\Programs\Python\Python36-32\  
2 python.exe" D:/pfe/Projets/pfe/apprentissage_HAS.py  
3  
4  
5 -----Decision Tree-----  
6  
7  
8  
9 dataset/HAS/taken/HAS_del.csv  
10  
11  
12  
13 count      285  
14 unique     2  
15 top        False  
16 freq       248  
17 Name: is_code_smell, dtype: object  
18 [[124    1]  
19 [ 0   18]]  
20 the recall for this model is : 1.0  
21 TP 18  
22 TN 124  
23 FP 1  
24 FN 0  
25  
26 -----Classification Report  
-----  
27          precision    recall   f1-score   support  
28  
29      False        1.00     0.99      1.00      125  
30      True         0.95     1.00      0.97      18  
31  
32  micro avg      0.99     0.99      0.99      143  
33  macro avg      0.97     1.00      0.98      143  
34 weighted avg    0.99     0.99      0.99      143  
35  
36 Precision =  0.9473684210526315  
37 Rappel=  1.0  
38 F_Mesure= 0.972972972972973  
39  
40  
41  
42 -----Decision Tree-----  
43
```

```
44
45
46 dataset/HAS/taken/HAS_RandomUnderSampler.csv
47
48
49
50 count      74
51 unique      2
52 top        True
53 freq       37
54 Name: is_code_smell, dtype: object
55 [[17  0]
56 [ 0 20]]
57 the recall for this model is : 1.0
58 TP 20
59 TN 17
60 FP 0
61 FN 0
62
63 -----Classification Report
-----
64          precision    recall   f1-score   support
65
66      False      1.00      1.00      1.00      17
67      True      1.00      1.00      1.00      20
68
69  micro avg     1.00      1.00      1.00      37
70  macro avg     1.00      1.00      1.00      37
71 weighted avg   1.00      1.00      1.00      37
72
73 Precision =  1.0
74 Rappel=  1.0
75 F_Mesure= 1.0
76
77
78
79 -----Decision Tree-----
80
81
82
83 dataset/HAS/taken/HAS_AllKNN.csv
84
85
86
87 count      275
```

```
88 unique          2
89 top      False
90 freq       238
91 Name: is_code_smell, dtype: object
92 [[123   1]
93 [ 0  14]]
94 the recall for this model is : 1.0
95 TP 14
96 TN 123
97 FP 1
98 FN 0
99
100 -----Classification Report
-----
101              precision    recall   f1-score   support
102
103      False        1.00     0.99      1.00      124
104      True        0.93     1.00      0.97       14
105
106  micro avg      0.99     0.99      0.99      138
107  macro avg      0.97     1.00      0.98      138
108 weighted avg    0.99     0.99      0.99      138
109
110 Precision =  0.9333333333333333
111 Rappel=  1.0
112 F_Mesure= 0.9655172413793104
113
114
115
116 -----Decision Tree-----
117
118
119
120 dataset/HAS/taken/HAS_InstanceHardnessThreshold.csv
121
122
123
124 count          271
125 unique         2
126 top      False
127 freq       234
128 Name: is_code_smell, dtype: object
129 [[117   0]
130 [ 0  19]]
131 the recall for this model is : 1.0
```

```
132 TP 19
133 TN 117
134 FP 0
135 FN 0
136
137 -----Classification Report
-----
138             precision    recall   f1-score   support
139
140      False        1.00     1.00      1.00      117
141      True         1.00     1.00      1.00       19
142
143  micro avg     1.00     1.00      1.00      136
144  macro avg     1.00     1.00      1.00      136
145 weighted avg   1.00     1.00      1.00      136
146
147 Precision =  1.0
148 Rappel=  1.0
149 F_Mesure= 1.0
150
151
152
153 -----Decision Tree-----
154
155
156
157 dataset/HAS/taken/HAS_NearMiss.csv
158
159
160
161 count        74
162 unique       2
163 top          True
164 freq          37
165 Name: is_code_smell, dtype: object
166 [[19  1]
167 [ 0 17]]
168 the recall for this model is : 1.0
169 TP 17
170 TN 19
171 FP 1
172 FN 0
173
174 -----Classification Report
-----
```

	precision	recall	f1-score	support
175				
176				
177	False	1.00	0.95	0.97
178	True	0.94	1.00	0.97
179				
180	micro avg	0.97	0.97	0.97
181	macro avg	0.97	0.97	0.97
182	weighted avg	0.97	0.97	0.97
183				
184	Precision =	0.9444444444444444		
185	Rappel=	1.0		
186	F_Mesure=	0.9714285714285714		
187				
188				
189				
190	-----Decision Tree-----			
191				
192				
193				
194	dataset/HAS/taken/HAS_OneSidedSelection.csv			
195				
196				
197				
198	count	68		
199	unique	2		
200	top	True		
201	freq	37		
202	Name: is_code_smell, dtype: object			
203	[[14 1]			
204	[0 19]]			
205	the recall for this model is :	1.0		
206	TP	19		
207	TN	14		
208	FP	1		
209	FN	0		
210				
211	-----Classification Report-----			
212	precision	recall	f1-score	support
213				
214	False	1.00	0.93	0.97
215	True	0.95	1.00	0.97
216				
217	micro avg	0.97	0.97	0.97
218	macro avg	0.97	0.97	0.97

```
219 weighted avg      0.97      0.97      0.97      34
220
221 Precision = 0.95
222 Rappel= 1.0
223 F_Mesure= 0.9743589743589743
224
225
226
227 -----Decision Tree-----
228
229
230
231 dataset/HAS/taken/HAS_RandomUnderSampler_default.csv
232
233
234
235 count      74
236 unique     2
237 top        True
238 freq       37
239 Name: is_code_smell, dtype: object
240 [[24  0]
241 [ 0 13]]
242 the recall for this model is : 1.0
243 TP 13
244 TN 24
245 FP 0
246 FN 0
247
248 -----Classification Report
-----
249          precision    recall   f1-score   support
250
251      False      1.00      1.00      1.00      24
252      True       1.00      1.00      1.00      13
253
254  micro avg     1.00      1.00      1.00      37
255  macro avg     1.00      1.00      1.00      37
256 weighted avg   1.00      1.00      1.00      37
257
258 Precision = 1.0
259 Rappel= 1.0
260 F_Mesure= 1.0
261
262
```

```
263
264 -----Decision Tree-----
265
266
267
268 dataset/HAS/taken/HAS_TomekLinks.csv
269
270
271
272 count      284
273 unique     2
274 top        False
275 freq       247
276 Name: is_code_smell, dtype: object
277 [[120    1]
278 [ 0   21]]
279 the recall for this model is : 1.0
280 TP 21
281 TN 120
282 FP 1
283 FN 0
284
285 -----Classification Report
-----
286          precision    recall   f1-score   support
287
288      False      1.00      0.99      1.00      121
289      True       0.95      1.00      0.98       21
290
291  micro avg      0.99      0.99      0.99      142
292  macro avg      0.98      1.00      0.99      142
293 weighted avg     0.99      0.99      0.99      142
294
295 Precision =  0.9545454545454546
296 Rappel=  1.0
297 F_Mesure= 0.9767441860465117
298
299
300
301 -----Decision Tree-----
302
303
304
305 dataset/HAS/taken/HAS_CondensedNearestNeighbour.csv
306
```

```
307
308
309 count        45
310 unique       2
311 top          True
312 freq          37
313 Name: is_code_smell, dtype: object
314 [[ 6  0]
315 [ 0 17]]
316 the recall for this model is : 1.0
317 TP 17
318 TN 6
319 FP 0
320 FN 0
321
322 -----Classification Report
-----
323              precision    recall   f1-score   support
324
325      False       1.00     1.00      1.00       6
326      True        1.00     1.00      1.00      17
327
328  micro avg     1.00     1.00      1.00      23
329  macro avg     1.00     1.00      1.00      23
330 weighted avg   1.00     1.00      1.00      23
331
332 Precision =  1.0
333 Rappel=  1.0
334 F_Mesure= 1.0
335
336
337
338 -----Random Forest-----
339
340
341
342 dataset/HAS/taken/HAS_del.csv
343
344
345
346 count        285
347 unique       2
348 top          False
349 freq          248
350 Name: is_code_smell, dtype: object
```

```
351 [[125  0]
352 [ 0  18]]
353 the recall for this model is : 1.0
354 TP 18
355 TN 125
356 FP 0
357 FN 0
358
359 -----Classification Report
-----
360             precision    recall   f1-score   support
361
362      False        1.00     1.00      1.00      125
363      True        1.00     1.00      1.00       18
364
365  micro avg     1.00     1.00      1.00      143
366  macro avg     1.00     1.00      1.00      143
367 weighted avg   1.00     1.00      1.00      143
368
369 Precision =  1.0
370 Rappel=  1.0
371 F_Mesure= 1.0
372
373
374
375 -----Random Forest-----
376
377
378
379 dataset/HAS/taken/HAS_RandomUnderSampler.csv
380
381
382
383 count         74
384 unique        2
385 top           True
386 freq          37
387 Name: is_code_smell, dtype: object
388 [[17  0]
389 [ 0 20]]
390 the recall for this model is : 1.0
391 TP 20
392 TN 17
393 FP 0
394 FN 0
```

```
395
396 -----Classification Report
-----
397          precision    recall   f1-score   support
398
399      False       1.00     1.00      1.00      17
400      True        1.00     1.00      1.00      20
401
402  micro avg     1.00     1.00      1.00      37
403  macro avg     1.00     1.00      1.00      37
404 weighted avg   1.00     1.00      1.00      37
405
406 Precision = 1.0
407 Rappel= 1.0
408 F_Mesure= 1.0
409
410
411
412 -----Random Forest-----
413
414
415
416 dataset/HAS/taken/HAS_AllKNN.csv
417
418
419
420 count         275
421 unique        2
422 top           False
423 freq          238
424 Name: is_code_smell, dtype: object
425 [[122  0]
426 [ 0 16]]
427 the recall for this model is : 1.0
428 TP 16
429 TN 122
430 FP 0
431 FN 0
432
433 -----Classification Report
-----
434          precision    recall   f1-score   support
435
436      False       1.00     1.00      1.00      122
437      True        1.00     1.00      1.00      16
```

```
438
439     micro avg      1.00      1.00      1.00      138
440     macro avg      1.00      1.00      1.00      138
441 weighted avg      1.00      1.00      1.00      138
442
443 Precision = 1.0
444 Rappel= 1.0
445 F_Mesure= 1.0
446
447
448
449 -----Random Forest-----
450
451
452
453 dataset/HAS/taken/HAS_InstanceHardnessThreshold.csv
454
455
456
457 count      271
458 unique      2
459 top      False
460 freq      234
461 Name: is_code_smell, dtype: object
462 [[115    0]
463 [ 0   21]]
464 the recall for this model is : 1.0
465 TP 21
466 TN 115
467 FP 0
468 FN 0
469
470 -----Classification Report
-----
471             precision      recall      f1-score      support
472
473     False      1.00      1.00      1.00      115
474     True      1.00      1.00      1.00       21
475
476     micro avg      1.00      1.00      1.00      136
477     macro avg      1.00      1.00      1.00      136
478 weighted avg      1.00      1.00      1.00      136
479
480 Precision = 1.0
481 Rappel= 1.0
```

```
482 F_Mesure= 1.0
483
484
485
486 -----Random Forest-----
487
488
489
490 dataset/HAS/taken/HAS_NearMiss.csv
491
492
493
494 count      74
495 unique     2
496 top        True
497 freq       37
498 Name: is_code_smell, dtype: object
499 [[17  1]
500 [ 0 19]]
501 the recall for this model is : 1.0
502 TP 19
503 TN 17
504 FP 1
505 FN 0
506
507 -----Classification Report
-----
508          precision    recall   f1-score   support
509
510      False      1.00      0.94      0.97      18
511      True       0.95      1.00      0.97      19
512
513  micro avg     0.97      0.97      0.97      37
514  macro avg     0.97      0.97      0.97      37
515 weighted avg   0.97      0.97      0.97      37
516
517 Precision =  0.95
518 Rappel=  1.0
519 F_Mesure= 0.9743589743589743
520
521
522
523 -----Random Forest-----
524
525
```

```
526
527 dataset/HAS/taken/HAS_OneSidedSelection.csv
528
529
530
531 count      68
532 unique     2
533 top        True
534 freq       37
535 Name: is_code_smell, dtype: object
536 [[16  0]
537 [ 3 15]]
538 the recall for this model is : 0.8333333333333334
539 TP 15
540 TN 16
541 FP 0
542 FN 3
543
544 -----Classification Report
-----
545             precision    recall   f1-score   support
546
547      False        0.84      1.00      0.91       16
548      True         1.00      0.83      0.91       18
549
550  micro avg       0.91      0.91      0.91       34
551  macro avg       0.92      0.92      0.91       34
552 weighted avg     0.93      0.91      0.91       34
553
554 Precision = 1.0
555 Rappel= 0.8333333333333334
556 F_Mesure= 0.9090909090909091
557
558
559
560 -----Random Forest-----
561
562
563
564 dataset/HAS/taken/HAS_RandomUnderSampler_default.csv
565
566
567
568 count      74
569 unique     2
```

```
570 top      True
571 freq      37
572 Name: is_code_smell, dtype: object
573 [[19  0]
574 [ 0 18]]
575 the recall for this model is : 1.0
576 TP 18
577 TN 19
578 FP 0
579 FN 0
580
581 -----Classification Report
-----
582          precision    recall   f1-score   support
583
584      False       1.00     1.00      1.00      19
585      True        1.00     1.00      1.00      18
586
587  micro avg     1.00     1.00      1.00      37
588  macro avg     1.00     1.00      1.00      37
589 weighted avg   1.00     1.00      1.00      37
590
591 Precision = 1.0
592 Rappel= 1.0
593 F_Mesure= 1.0
594
595
596
597 -----Random Forest-----
598
599
600
601 dataset/HAS/taken/HAS_TomekLinks.csv
602
603
604
605 count      284
606 unique     2
607 top        False
608 freq       247
609 Name: is_code_smell, dtype: object
610 [[128  1]
611 [ 0 13]]
612 the recall for this model is : 1.0
613 TP 13
```

```
614 TN 128
615 FP 1
616 FN 0
617
618 -----Classification Report
-----
619             precision    recall   f1-score   support
620
621      False        1.00      0.99      1.00      129
622      True         0.93      1.00      0.96       13
623
624      micro avg     0.99      0.99      0.99      142
625      macro avg     0.96      1.00      0.98      142
626 weighted avg     0.99      0.99      0.99      142
627
628 Precision =  0.9285714285714286
629 Rappel= 1.0
630 F_Mesure= 0.962962962962963
631
632
633
634 -----Random Forest-----
635
636
637
638 dataset/HAS/taken/HAS_CondensedNearestNeighbour.csv
639
640
641
642 count        45
643 unique        2
644 top          True
645 freq          37
646 Name: is_code_smell, dtype: object
647 [[ 5  0]
648 [ 0 18]]
649 the recall for this model is : 1.0
650 TP 18
651 TN 5
652 FP 0
653 FN 0
654
655 -----Classification Report
-----
656             precision    recall   f1-score   support
```

```

657
658      False      1.00      1.00      1.00      5
659      True       1.00      1.00      1.00     18
660
661      micro avg    1.00      1.00      1.00     23
662      macro avg    1.00      1.00      1.00     23
663      weighted avg 1.00      1.00      1.00     23
664
665 Precision = 1.0
666 Rappel= 1.0
667 F_Mesure= 1.0
668
669
670
671 -----Naive Bayes-----
672
673
674
675 dataset/HAS/taken/HAS_del.csv
676
677
678
679 count      285
680 unique      2
681 top        False
682 freq       248
683 Name: is_code_smell, dtype: object
684 [[118  13]
685 [  0  12]]
686 the recall for this model is : 1.0
687 TP 12
688 TN 118
689 FP 13
690 FN 0
691
692 -----Classification Report
-----
693          precision    recall   f1-score   support
694
695      False      1.00      0.90      0.95     131
696      True       0.48      1.00      0.65      12
697
698      micro avg    0.91      0.91      0.91     143
699      macro avg    0.74      0.95      0.80     143
700      weighted avg 0.96      0.91      0.92     143

```

```
701
702 Precision = 0.48
703 Rappel= 1.0
704 F_Mesure= 0.6486486486486487
705
706
707
708 -----Naive Bayes-----
709
710
711
712 dataset/HAS/taken/HAS_RandomUnderSampler.csv
713
714
715
716 count 74
717 unique 2
718 top True
719 freq 37
720 Name: is_code_smell, dtype: object
721 [[12 4]
722 [ 0 21]]
723 the recall for this model is : 1.0
724 TP 21
725 TN 12
726 FP 4
727 FN 0
728
729 -----Classification Report
-----
730 precision recall f1-score support
731
732 False 1.00 0.75 0.86 16
733 True 0.84 1.00 0.91 21
734
735 micro avg 0.89 0.89 0.89 37
736 macro avg 0.92 0.88 0.89 37
737 weighted avg 0.91 0.89 0.89 37
738
739 Precision = 0.84
740 Rappel= 1.0
741 F_Mesure= 0.9130434782608696
742
743
744
```

```
745 -----Naive Bayes-----
746
747
748
749 dataset/HAS/taken/HAS_AllKNN.csv
750
751
752
753 count      275
754 unique      2
755 top        False
756 freq       238
757 Name: is_code_smell, dtype: object
758 [[101 19]
759 [ 0 18]]
760 the recall for this model is : 1.0
761 TP 18
762 TN 101
763 FP 19
764 FN 0
765
766 -----Classification Report
-----
767
768
769          precision    recall   f1-score   support
770
771
772      False      1.00      0.84      0.91      120
773      True       0.49      1.00      0.65       18
774
775
776      micro avg     0.86      0.86      0.86      138
777      macro avg     0.74      0.92      0.78      138
778      weighted avg   0.93      0.86      0.88      138
779
780
781
782 -----Naive Bayes-----
783
784
785
786 dataset/HAS/taken/HAS_InstanceHardnessThreshold.csv
787
788
```

```
789
790 count      271
791 unique     2
792 top        False
793 freq       234
794 Name: is_code_smell, dtype: object
795 [[110    7]
796 [ 0  19]]
797 the recall for this model is : 1.0
798 TP 19
799 TN 110
800 FP 7
801 FN 0
802
803 -----Classification Report
-----
804          precision    recall   f1-score   support
805
806      False      1.00      0.94      0.97      117
807      True       0.73      1.00      0.84       19
808
809  micro avg     0.95      0.95      0.95      136
810  macro avg     0.87      0.97      0.91      136
811 weighted avg   0.96      0.95      0.95      136
812
813 Precision =  0.7307692307692307
814 Rappel= 1.0
815 F_Mesure= 0.8444444444444443
816
817
818
819 -----Naive Bayes-----
820
821
822
823 dataset/HAS/taken/HAS_NearMiss.csv
824
825
826
827 count      74
828 unique     2
829 top        True
830 freq       37
831 Name: is_code_smell, dtype: object
832 [[ 9  9]]
```

```
833 [ 0 19]
834 the recall for this model is : 1.0
835 TP 19
836 TN 9
837 FP 9
838 FN 0
839
840 -----Classification Report
-----
841 precision recall f1-score support
842
843 False 1.00 0.50 0.67 18
844 True 0.68 1.00 0.81 19
845
846 micro avg 0.76 0.76 0.76 37
847 macro avg 0.84 0.75 0.74 37
848 weighted avg 0.83 0.76 0.74 37
849
850 Precision = 0.6785714285714286
851 Rappel= 1.0
852 F_Mesure= 0.8085106382978724
853
854
855
856 -----Naive Bayes-----
857
858
859
860 dataset/HAS/taken/HAS_OneSidedSelection.csv
861
862
863
864 count 68
865 unique 2
866 top True
867 freq 37
868 Name: is_code_smell, dtype: object
869 [[ 9  5]
870 [ 0 20]]
871 the recall for this model is : 1.0
872 TP 20
873 TN 9
874 FP 5
875 FN 0
876
```

```
877 -----Classification Report
-----
878          precision    recall   f1-score   support
879
880      False       1.00     0.64      0.78      14
881      True        0.80     1.00      0.89      20
882
883  micro avg     0.85     0.85      0.85      34
884  macro avg     0.90     0.82      0.84      34
885 weighted avg   0.88     0.85      0.85      34
886
887 Precision =  0.8
888 Rappel=  1.0
889 F_Mesure= 0.888888888888889
890
891
892
893 -----Naive Bayes-----
894
895
896
897 dataset/HAS/taken/HAS_RandomUnderSampler_default.csv
898
899
900
901 count         74
902 unique        2
903 top           True
904 freq          37
905 Name: is_code_smell, dtype: object
906 [[10  7]
907 [ 0 20]]
908 the recall for this model is : 1.0
909 TP 20
910 TN 10
911 FP 7
912 FN 0
913
914 -----Classification Report
-----
915          precision    recall   f1-score   support
916
917      False       1.00     0.59      0.74      17
918      True        0.74     1.00      0.85      20
919
```

File - unknown

```
920     micro avg      0.81      0.81      0.81      37
921     macro avg      0.87      0.79      0.80      37
922 weighted avg      0.86      0.81      0.80      37
923
924 Precision = 0.7407407407407407
925 Rappel= 1.0
926 F_Mesure= 0.851063829787234
927
928
929
930 -----Naive Bayes-----
931
932
933
934 dataset/HAS/taken/HAS_TomekLinks.csv
935
936
937
938 count      284
939 unique      2
940 top      False
941 freq      247
942 Name: is_code_smell, dtype: object
943 [[79 39]
944 [ 0 24]]
945 the recall for this model is : 1.0
946 TP 24
947 TN 79
948 FP 39
949 FN 0
950
951 -----Classification Report
-----
952
953
954 precision      recall      f1-score      support
955
956
957 False      1.00      0.67      0.80      118
958 True       0.38      1.00      0.55      24
959
960
961 micro avg      0.73      0.73      0.73      142
962 macro avg      0.69      0.83      0.68      142
963 weighted avg      0.90      0.73      0.76      142
964
965
966 Precision = 0.38095238095238093
967 Rappel= 1.0
968 F_Mesure= 0.5517241379310345
```

```
964
965
966
967 -----Naive Bayes-----
968
969
970
971 dataset/HAS/taken/HAS_CondensedNearestNeighbour.csv
972
973
974
975 count          45
976 unique         2
977 top            True
978 freq           37
979 Name: is_code_smell, dtype: object
980 [[ 3  2]
981 [ 0 18]]
982 the recall for this model is : 1.0
983 TP 18
984 TN 3
985 FP 2
986 FN 0
987
988 -----Classification Report
-----
989
990
991      precision    recall   f1-score   support
992      False        1.00     0.60      0.75       5
993      True         0.90     1.00      0.95      18
994      micro avg    0.91     0.91      0.91      23
995      macro avg    0.95     0.80      0.85      23
996      weighted avg 0.92     0.91      0.90      23
997
998 Precision = 0.9
999 Rappel= 1.0
1000 F_Mesure= 0.9473684210526316
1001
1002
1003
1004 -----SVM-----
1005
1006
1007
```

```
1008 dataset/HAS/taken/HAS_del.csv
1009
1010
1011
1012 count      285
1013 unique     2
1014 top        False
1015 freq       248
1016 Name: is_code_smell, dtype: object
1017 [[118    1]
1018 [ 11   13]]
1019 the recall for this model is : 0.5416666666666666
1020 TP 13
1021 TN 118
1022 FP 1
1023 FN 11
1024
1025 -----Classification Report
-----
1026          precision    recall   f1-score   support
1027
1028    False       0.91      0.99      0.95      119
1029    True        0.93      0.54      0.68       24
1030
1031  micro avg    0.92      0.92      0.92      143
1032  macro avg    0.92      0.77      0.82      143
1033 weighted avg  0.92      0.92      0.91      143
1034
1035 Precision =  0.9285714285714286
1036 Rappel= 0.5416666666666666
1037 F_Mesure= 0.6842105263157894
1038
1039
1040
1041 -----SVM-----
1042
1043
1044
1045 dataset/HAS/taken/HAS_RandomUnderSampler.csv
1046
1047
1048
1049 count      74
1050 unique     2
1051 top        True
```

```
1052 freq      37
1053 Name: is_code_smell, dtype: object
1054 [[17  0]
1055 [ 0 20]]
1056 the recall for this model is : 1.0
1057 TP 20
1058 TN 17
1059 FP 0
1060 FN 0
1061
1062 -----Classification Report
-----
1063          precision    recall   f1-score   support
1064
1065     False       1.00     1.00       1.00      17
1066     True        1.00     1.00       1.00      20
1067
1068   micro avg       1.00     1.00       1.00      37
1069   macro avg       1.00     1.00       1.00      37
1070 weighted avg       1.00     1.00       1.00      37
1071
1072 Precision = 1.0
1073 Rappel= 1.0
1074 F_Mesure= 1.0
1075
1076
1077
1078 -----SVM-----
1079
1080
1081
1082 dataset/HAS/taken/HAS_AllKNN.csv
1083
1084
1085
1086 count      275
1087 unique      2
1088 top        False
1089 freq       238
1090 Name: is_code_smell, dtype: object
1091 [[112  2]
1092 [ 2 22]]
1093 the recall for this model is : 0.9166666666666666
1094 TP 22
1095 TN 112
```

```
1096 FP 2
1097 FN 2
1098
1099 -----Classification Report
-----
1100          precision    recall   f1-score   support
1101
1102      False       0.98      0.98      0.98      114
1103      True        0.92      0.92      0.92       24
1104
1105  micro avg     0.97      0.97      0.97      138
1106  macro avg     0.95      0.95      0.95      138
1107 weighted avg   0.97      0.97      0.97      138
1108
1109 Precision =  0.9166666666666666
1110 Rappel=  0.9166666666666666
1111 F_Mesure= 0.9166666666666666
1112
1113
1114
1115 -----SVM-----
1116
1117
1118
1119 dataset/HAS/taken/HAS_InstanceHardnessThreshold.csv
1120
1121
1122
1123 count        271
1124 unique        2
1125 top         False
1126 freq         234
1127 Name: is_code_smell, dtype: object
1128 [[114  0]
1129 [ 3 19]]
1130 the recall for this model is : 0.8636363636363636
1131 TP 19
1132 TN 114
1133 FP 0
1134 FN 3
1135
1136 -----Classification Report
-----
1137          precision    recall   f1-score   support
1138
```

File - unknown

```

1139      False      0.97      1.00      0.99      114
1140      True       1.00      0.86      0.93      22
1141
1142      micro avg     0.98      0.98      0.98      136
1143      macro avg     0.99      0.93      0.96      136
1144      weighted avg    0.98      0.98      0.98      136
1145
1146 Precision = 1.0
1147 Rappel= 0.8636363636363636
1148 F_Mesure= 0.9268292682926829
1149
1150
1151
1152 -----SVM-----
1153
1154
1155
1156 dataset/HAS/taken/HAS_NearMiss.csv
1157
1158
1159
1160 count      74
1161 unique      2
1162 top        True
1163 freq        37
1164 Name: is_code_smell, dtype: object
1165 [[19  1]
1166 [ 3 14]]
1167 the recall for this model is : 0.8235294117647058
1168 TP 14
1169 TN 19
1170 FP 1
1171 FN 3
1172
1173 -----Classification Report
-----
1174          precision      recall      f1-score      support
1175
1176      False      0.86      0.95      0.90      20
1177      True       0.93      0.82      0.87      17
1178
1179      micro avg     0.89      0.89      0.89      37
1180      macro avg     0.90      0.89      0.89      37
1181      weighted avg    0.90      0.89      0.89      37
1182

```

```
1183 Precision = 0.9333333333333333
1184 Rappel= 0.8235294117647058
1185 F_Mesure= 0.8749999999999999
1186
1187
1188
1189 -----SVM-----
1190
1191
1192
1193 dataset/HAS/taken/HAS_OneSidedSelection.csv
1194
1195
1196
1197 count      68
1198 unique     2
1199 top        True
1200 freq       37
1201 Name: is_code_smell, dtype: object
1202 [[15  5]
1203 [ 0 14]]
1204 the recall for this model is : 1.0
1205 TP 14
1206 TN 15
1207 FP 5
1208 FN 0
1209
1210 -----Classification Report
-----
1211          precision    recall   f1-score   support
1212
1213      False      1.00      0.75      0.86      20
1214      True       0.74      1.00      0.85      14
1215
1216  micro avg     0.85      0.85      0.85      34
1217  macro avg     0.87      0.88      0.85      34
1218 weighted avg   0.89      0.85      0.85      34
1219
1220 Precision = 0.7368421052631579
1221 Rappel= 1.0
1222 F_Mesure= 0.8484848484848484
1223
1224
1225
1226 -----SVM-----
```

```
1227
1228
1229
1230 dataset/HAS/taken/HAS_RandomUnderSampler_default.csv
1231
1232
1233
1234 count      74
1235 unique      2
1236 top        True
1237 freq       37
1238 Name: is_code_smell, dtype: object
1239 [[18  0]
1240 [ 0 19]]
1241 the recall for this model is : 1.0
1242 TP 19
1243 TN 18
1244 FP 0
1245 FN 0
1246
1247 -----Classification Report
-----
1248             precision    recall   f1-score   support
1249
1250     False       1.00      1.00      1.00       18
1251     True       1.00      1.00      1.00       19
1252
1253   micro avg     1.00      1.00      1.00       37
1254   macro avg     1.00      1.00      1.00       37
1255 weighted avg     1.00      1.00      1.00       37
1256
1257 Precision = 1.0
1258 Rappel= 1.0
1259 F_Mesure= 1.0
1260
1261
1262
1263 -----SVM-----
1264
1265
1266
1267 dataset/HAS/taken/HAS_TomekLinks.csv
1268
1269
1270
```

```
1271 count      284
1272 unique      2
1273 top       False
1274 freq       247
1275 Name: is_code_smell, dtype: object
1276 [[121    4]
1277 [ 1  16]]
1278 the recall for this model is : 0.9411764705882353
1279 TP 16
1280 TN 121
1281 FP 4
1282 FN 1
1283
1284 -----Classification Report
-----
1285          precision    recall   f1-score   support
1286
1287      False        0.99      0.97      0.98      125
1288      True        0.80      0.94      0.86       17
1289
1290  micro avg     0.96      0.96      0.96      142
1291  macro avg     0.90      0.95      0.92      142
1292 weighted avg   0.97      0.96      0.97      142
1293
1294 Precision =  0.8
1295 Rappel=  0.9411764705882353
1296 F_Mesure=  0.8648648648648648
1297
1298
1299
1300 -----SVM-----
1301
1302
1303
1304 dataset/HAS/taken/HAS_CondensedNearestNeighbour.csv
1305
1306
1307
1308 count      45
1309 unique      2
1310 top       True
1311 freq       37
1312 Name: is_code_smell, dtype: object
1313 [[ 0    4]
1314 [ 0  19]]
```

```
1315 the recall for this model is : 1.0
1316 TP 19
1317 TN 0
1318 FP 4
1319 FN 0
1320 C:\Users\My PC\AppData\Local\Programs\Python\Python36-32
    \lib\site-packages\sklearn\metrics\classification.py:
1143: UndefinedMetricWarning: Precision and F-score are
      ill-defined and being set to 0.0 in labels with no
      predicted samples.
1321     'precision', 'predicted', average, warn_for)
1322
1323 -----Classification Report
-----
1324             precision      recall   f1-score   support
1325
1326      False       0.00       0.00       0.00        4
1327      True       0.83       1.00       0.90       19
1328
1329  micro avg       0.83       0.83       0.83       23
1330  macro avg       0.41       0.50       0.45       23
1331 weighted avg     0.68       0.83       0.75       23
1332
1333 Precision =  0.8260869565217391
1334 Rappel= 1.0
1335 F_Mesure= 0.9047619047619047
1336
1337 Process finished with exit code 0
1338
```