

```
1 "C:\Users\My PC\AppData\Local\Programs\Python\Python36-32\  
2 python.exe" D:/pfe/Projets/pfe/apprentissage_BLOB.py  
3  
4  
5 -----Decision Tree-----  
6  
7  
8  
9 dataset/BLOB/taken/BLOB_del.csv  
10  
11  
12  
13 count      16435  
14 unique      2  
15 top        False  
16 freq       16033  
17 Name: is_code_smell, dtype: object  
18 [[4810    0]  
19 [    0 121]]  
20 the recall for this model is : 1.0  
21 TP 121  
22 TN 4810  
23 FP 0  
24 FN 0  
25  
26 -----Classification Report-----  
27  
28  
29          precision    recall   f1-score   support  
30      False        1.00     1.00     1.00     4810  
31      True        1.00     1.00     1.00     121  
32      micro avg    1.00     1.00     1.00     4931  
33      macro avg    1.00     1.00     1.00     4931  
34 weighted avg    1.00     1.00     1.00     4931  
35  
36 Precision = 1.0  
37 Rappel= 1.0  
38 F_Mesure= 1.0  
39  
40 -----Using cross Validation-----  
41  
42 -----k= 1 -----
```

```
43
44 F_Mesure= 1.0
45
46 -----k= 2 -----
47
48 F_Mesure= 1.0
49
50 -----k= 3 -----
51
52 F_Mesure= 0.9937888198757764
53
54 -----k= 4 -----
55
56 F_Mesure= 1.0
57
58 -----k= 5 -----
59
60 F_Mesure= 1.0
61 F_Mesures moyenne = 0.9987577639751553
62
63
64
65 -----Decision Tree-----
66
67
68
69 dataset/BLOB/taken/BLOB_RandomUnderSampler.csv
70
71
72
73 count      804
74 unique      2
75 top        True
76 freq       402
77 Name: is_code_smell, dtype: object
78 [[120    0]
79 [  0 122]]
80 the recall for this model is : 1.0
81 TP 122
82 TN 120
83 FP 0
84 FN 0
85
86 -----Classification Report
-----
```

	precision	recall	f1-score	support
87				
88				
89	False	1.00	1.00	1.00
90	True	1.00	1.00	1.00
91				
92	micro avg	1.00	1.00	1.00
93	macro avg	1.00	1.00	1.00
94	weighted avg	1.00	1.00	1.00
95				
96	Precision = 1.0			
97	Rappel= 1.0			
98	F_Mesure= 1.0			
99				
100	-----Using cross Validation			
101				
102	-----k= 1 -----			
103				
104	F_Mesure= 1.0			
105				
106	-----k= 2 -----			
107				
108	F_Mesure= 0.9933774834437086			
109				
110	-----k= 3 -----			
111				
112	F_Mesure= 1.0			
113				
114	-----k= 4 -----			
115				
116	F_Mesure= 1.0			
117				
118	-----k= 5 -----			
119				
120	F_Mesure= 1.0			
121	F_Mesures moyenne = 0.9986754966887418			
122				
123				
124				
125	-----Decision Tree-----			
126				
127				
128				
129	dataset/BLOB/taken/BLOB_AllKNN.csv			
130				

```
131
132
133 count      16435
134 unique       2
135 top        False
136 freq       16033
137 Name: is_code_smell, dtype: object
138 [[4793    0]
139 [    0   138]]
140 the recall for this model is : 1.0
141 TP 138
142 TN 4793
143 FP 0
144 FN 0
145
146 -----Classification Report
-----
147          precision    recall   f1-score   support
148
149      False       1.00     1.00      1.00      4793
150      True       1.00     1.00      1.00      138
151
152  micro avg     1.00     1.00      1.00      4931
153  macro avg     1.00     1.00      1.00      4931
154 weighted avg   1.00     1.00      1.00      4931
155
156 Precision =  1.0
157 Rappel=  1.0
158 F_Mesure= 1.0
159
160 -----Using cross Validation
-----
161
162 -----k= 1 -----
163
164 F_Mesure= 1.0
165
166 -----k= 2 -----
167
168 F_Mesure= 1.0
169
170 -----k= 3 -----
171
172 F_Mesure= 1.0
173
```

```
174 -----k= 4 -----
175
176 F_Mesure= 0.9887640449438202
177
178 -----k= 5 -----
179
180 F_Mesure= 1.0
181 F_Mesures moyenne = 0.997752808988764
182
183
184
185 -----Decision Tree-----
186
187
188
189 dataset/BLOB/taken/BLOB_ InstanceHardnessThreshold.csv
190
191
192
193 count      16435
194 unique      2
195 top        False
196 freq       16033
197 Name: is_code_smell, dtype: object
198 [[4823    0]
199 [    0   108]]
200 the recall for this model is : 1.0
201 TP 108
202 TN 4823
203 FP 0
204 FN 0
205
206 -----Classification Report
-----
207
208
209          precision    recall   f1-score   support
210
211
212
213
214
215
216 Precision = 1.0
217 Rappel= 1.0
```

```
218 F_Mesure= 1.0
219
220 -----Using cross Validation
-----
221
222 -----k= 1 -----
223
224 F_Mesure= 1.0
225
226 -----k= 2 -----
227
228 F_Mesure= 1.0
229
230 -----k= 3 -----
231
232 F_Mesure= 1.0
233
234 -----k= 4 -----
235
236 F_Mesure= 0.9887640449438202
237
238 -----k= 5 -----
239
240 F_Mesure= 1.0
241 F_Mesures moyenne = 0.997752808988764
242
243
244
245 -----Decision Tree-----
246
247
248
249 dataset/BLOB/taken/BLOB_NearMiss.csv
250
251
252
253 count      804
254 unique     2
255 top        True
256 freq       402
257 Name: is_code_smell, dtype: object
258 [[136    0]
259 [  0 106]]
260 the recall for this model is : 1.0
261 TP 106
```

```
262 TN 136
263 FP 0
264 FN 0
265
266 -----Classification Report
-----
267             precision    recall   f1-score   support
268
269     False        1.00      1.00      1.00      136
270     True         1.00      1.00      1.00      106
271
272     micro avg     1.00      1.00      1.00      242
273     macro avg     1.00      1.00      1.00      242
274 weighted avg     1.00      1.00      1.00      242
275
276 Precision = 1.0
277 Rappel= 1.0
278 F_Mesure= 1.0
279
280 -----Using cross Validation
-----
281
282 -----k= 1 -----
283
284 F_Mesure= 1.0
285
286 -----k= 2 -----
287
288 F_Mesure= 0.9933774834437086
289
290 -----k= 3 -----
291
292 F_Mesure= 1.0
293
294 -----k= 4 -----
295
296 F_Mesure= 1.0
297
298 -----k= 5 -----
299
300 F_Mesure= 1.0
301 F_Mesures moyenne = 0.9986754966887418
302
303
304
```

```
305 -----Decision Tree-----
306
307
308
309 dataset/BLOB/taken/BLOB_OneSidedSelection.csv
310
311
312
313 count      578
314 unique      2
315 top        True
316 freq       402
317 Name: is_code_smell, dtype: object
318 [[ 46   0]
319 [  0 128]]
320 the recall for this model is : 1.0
321 TP 128
322 TN 46
323 FP 0
324 FN 0
325
326 -----Classification Report
-----
327          precision    recall   f1-score   support
328
329      False      1.00      1.00      1.00       46
330      True      1.00      1.00      1.00      128
331
332  micro avg     1.00      1.00      1.00      174
333  macro avg     1.00      1.00      1.00      174
334 weighted avg   1.00      1.00      1.00      174
335
336 Precision =  1.0
337 Rappel=  1.0
338 F_Mesure= 1.0
339
340 -----Using cross Validation
-----
341
342 -----k= 1 -----
343
344 F_Mesure= 1.0
345
346 -----k= 2 -----
347
```

```
348 F_Mesure= 1.0
349
350 -----k= 3 -----
351
352 F_Mesure= 1.0
353
354 -----k= 4 -----
355
356 F_Mesure= 1.0
357
358 -----k= 5 -----
359
360 F_Mesure= 1.0
361 F_Mesures moyenne = 1.0
362
363
364
365 -----Decision Tree-----
366
367
368
369 dataset/BLOB/taken/BLOB_RandomUnderSampler_default.csv
370
371
372
373 count      804
374 unique     2
375 top        True
376 freq       402
377 Name: is_code_smell, dtype: object
378 [[113  0]
379 [ 0 129]]
380 the recall for this model is : 1.0
381 TP 129
382 TN 113
383 FP 0
384 FN 0
385
386 -----Classification Report
-----
```

	precision	recall	f1-score	support
389 False	1.00	1.00	1.00	113
390 True	1.00	1.00	1.00	129

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391
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```
392     micro avg      1.00      1.00      1.00      242
393     macro avg      1.00      1.00      1.00      242
394 weighted avg      1.00      1.00      1.00      242
395
396 Precision = 1.0
397 Rappel= 1.0
398 F_Mesure= 1.0
399
400 -----Using cross Validation
-----
401
402 -----k= 1 -----
403
404 F_Mesure= 1.0
405
406 -----k= 2 -----
407
408 F_Mesure= 0.9933774834437086
409
410 -----k= 3 -----
411
412 F_Mesure= 1.0
413
414 -----k= 4 -----
415
416 F_Mesure= 1.0
417
418 -----k= 5 -----
419
420 F_Mesure= 1.0
421 F_Mesures moyenne = 0.9986754966887418
422
423
424
425 -----Decision Tree-----
426
427
428
429 dataset/BLOB/taken/BLOB_TomekLinks.csv
430
431
432
433 count      16435
434 unique      2
435 top        False
```

```
436 freq      16033
437 Name: is_code_smell, dtype: object
438 [[4802    0]
439 [    0 129]]
440 the recall for this model is : 1.0
441 TP 129
442 TN 4802
443 FP 0
444 FN 0
445
446 -----Classification Report
-----
447          precision    recall   f1-score   support
448
449      False       1.00     1.00      1.00      4802
450      True        1.00     1.00      1.00      129
451
452  micro avg       1.00     1.00      1.00      4931
453  macro avg       1.00     1.00      1.00      4931
454 weighted avg     1.00     1.00      1.00      4931
455
456 Precision = 1.0
457 Rappel= 1.0
458 F_Mesure= 1.0
459
460 -----Using cross Validation
-----
461
462 -----k= 1 -----
463
464 F_Mesure= 1.0
465
466 -----k= 2 -----
467
468 F_Mesure= 1.0
469
470 -----k= 3 -----
471
472 F_Mesure= 1.0
473
474 -----k= 4 -----
475
476 F_Mesure= 1.0
477
478 -----k= 5 -----
```

```
479
480 F_Mesure= 1.0
481 F_Mesures moyenne = 1.0
482
483
484
485 -----Decision Tree-----
486
487
488
489 dataset/BLOB/taken/BLOB_CondensedNearestNeighbour.csv
490
491
492
493 count      405
494 unique     2
495 top        True
496 freq       402
497 Name: is_code_smell, dtype: object
498 [[ 1   0]
499 [ 0 121]]
500 the recall for this model is : 1.0
501 TP 121
502 TN 1
503 FP 0
504 FN 0
505
506 -----Classification Report
-----
507          precision    recall   f1-score   support
508
509      False       1.00     1.00      1.00       1
510      True        1.00     1.00      1.00     121
511
512  micro avg     1.00     1.00      1.00     122
513  macro avg     1.00     1.00      1.00     122
514 weighted avg   1.00     1.00      1.00     122
515
516 Precision = 1.0
517 Rappel= 1.0
518 F_Mesure= 1.0
519
520 -----Using cross Validation
-----
```

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```
522 -----k= 1 -----
523
524
525 -----k= 2 -----
526
527 F_Mesure= 0.9937106918238994
528
529 -----k= 3 -----
530
531
532 -----k= 4 -----
533
534 F_Mesure= 1.0
535
536 -----k= 5 -----
537
538 F_Mesure= 1.0
539 F_Mesures moyenne = 0.9979035639412999
540
541
542
543 -----Random Forest-----
544
545
546
547 dataset/BLOB/taken/BLOB_del.csv
548
549
550
551 count      16435
552 unique      2
553 top        False
554 freq       16033
555 Name: is_code_smell, dtype: object
556 [[4815    0]
557 [    0   116]]
558 the recall for this model is : 1.0
559 TP 116
560 TN 4815
561 FP 0
562 FN 0
563
564 -----Classification Report
-----
565          precision    recall   f1-score   support
```

```
566
567     False      1.00      1.00      1.00      4815
568     True       1.00      1.00      1.00      116
569
570     micro avg   1.00      1.00      1.00      4931
571     macro avg   1.00      1.00      1.00      4931
572 weighted avg   1.00      1.00      1.00      4931
573
574 Precision = 1.0
575 Rappel= 1.0
576 F_Mesure= 1.0
577
578 -----Using cross Validation
-----
579
580 -----k= 1 -----
581
582 F_Mesure= 1.0
583
584 -----k= 2 -----
585
586 F_Mesure= 1.0
587
588 -----k= 3 -----
589
590 F_Mesure= 0.9937888198757764
591
592 -----k= 4 -----
593
594 F_Mesure= 1.0
595
596 -----k= 5 -----
597
598 F_Mesure= 1.0
599 F_Mesures moyenne = 0.9987577639751553
600
601
602
603 -----Random Forest-----
604
605
606
607 dataset/BLOB/taken/BLOB_RandomUnderSampler.csv
608
609
```

```
610
611 count      804
612 unique     2
613 top        True
614 freq       402
615 Name: is_code_smell, dtype: object
616 [[114    0]
617 [ 0 128]]
618 the recall for this model is : 1.0
619 TP 128
620 TN 114
621 FP 0
622 FN 0
623
624 -----Classification Report
-----
625          precision    recall   f1-score   support
626
627      False       1.00     1.00      1.00      114
628      True        1.00     1.00      1.00      128
629
630  micro avg     1.00     1.00      1.00      242
631  macro avg     1.00     1.00      1.00      242
632 weighted avg   1.00     1.00      1.00      242
633
634 Precision = 1.0
635 Rappel= 1.0
636 F_Mesure= 1.0
637
638 -----Using cross Validation
-----
639
640 -----k= 1 -----
641
642 F_Mesure= 1.0
643
644 -----k= 2 -----
645
646 F_Mesure= 0.9933774834437086
647
648 -----k= 3 -----
649
650 F_Mesure= 1.0
651
652 -----k= 4 -----
```

```
653
654 F_Mesure= 1.0
655
656 -----k= 5 -----
657
658 F_Mesure= 1.0
659 F_Mesures moyenne = 0.9986754966887418
660
661
662
663 -----Random Forest-----
664
665
666
667 dataset/BLOB/taken/BLOB_AllKNN.csv
668
669
670
671 count      16435
672 unique      2
673 top        False
674 freq       16033
675 Name: is_code_smell, dtype: object
676 [[4792    0]
677 [    1   138]]
678 the recall for this model is : 0.9928057553956835
679 TP 138
680 TN 4792
681 FP 0
682 FN 1
683
684 -----Classification Report
-----
685          precision    recall   f1-score   support
686
687      False      1.00      1.00      1.00      4792
688      True       1.00      0.99      1.00      139
689
690  micro avg     1.00      1.00      1.00      4931
691  macro avg     1.00      1.00      1.00      4931
692 weighted avg   1.00      1.00      1.00      4931
693
694 Precision = 1.0
695 Rappel= 0.9928057553956835
696 F_Mesure= 0.996389891696751
```

```
697
698 -----Using cross Validation
-----
699
700 -----k= 1 -----
701
702 F_Mesure= 1.0
703
704 -----k= 2 -----
705
706 F_Mesure= 1.0
707
708 -----k= 3 -----
709
710 F_Mesure= 1.0
711
712 -----k= 4 -----
713
714 F_Mesure= 0.9944134078212291
715
716 -----k= 5 -----
717
718 F_Mesure= 1.0
719 F_Mesures moyenne = 0.9988826815642458
720
721
722
723 -----Random Forest-----
724
725
726
727 dataset/BLOB/taken/BLOB_InstanceHardnessThreshold.csv
728
729
730
731 count      16435
732 unique       2
733 top        False
734 freq       16033
735 Name: is_code_smell, dtype: object
736 [[4805    0]
737 [    0   126]]
738 the recall for this model is : 1.0
739 TP 126
740 TN 4805
```

```
741 FP 0
742 FN 0
743
744 -----Classification Report
-----
745             precision    recall   f1-score   support
746
747     False        1.00      1.00      1.00      4805
748     True         1.00      1.00      1.00      126
749
750     micro avg    1.00      1.00      1.00      4931
751     macro avg    1.00      1.00      1.00      4931
752 weighted avg   1.00      1.00      1.00      4931
753
754 Precision = 1.0
755 Rappel= 1.0
756 F_Mesure= 1.0
757
758 -----Using cross Validation
-----
759
760 -----k= 1 -----
761
762 F_Mesure= 1.0
763
764 -----k= 2 -----
765
766 F_Mesure= 1.0
767
768 -----k= 3 -----
769
770 F_Mesure= 1.0
771
772 -----k= 4 -----
773
774 F_Mesure= 0.9944134078212291
775
776 -----k= 5 -----
777
778 F_Mesure= 1.0
779 F_Mesures moyenne = 0.9988826815642458
780
781
782
783 -----Random Forest-----
```

```
784  
785  
786  
787 dataset/BLOB/taken/BLOB_NearMiss.csv  
788  
789  
790  
791 count      804  
792 unique      2  
793 top        True  
794 freq       402  
795 Name: is_code_smell, dtype: object  
796 [[113    0]  
797 [ 0 129]]  
798 the recall for this model is : 1.0  
799 TP 129  
800 TN 113  
801 FP 0  
802 FN 0  
803  
804 -----Classification Report  
-----  
805          precision    recall   f1-score   support  
806  
807     False        1.00     1.00      1.00      113  
808     True         1.00     1.00      1.00      129  
809  
810   micro avg     1.00     1.00      1.00      242  
811   macro avg     1.00     1.00      1.00      242  
812 weighted avg   1.00     1.00      1.00      242  
813  
814 Precision = 1.0  
815 Rappel= 1.0  
816 F_Mesure= 1.0  
817  
818 -----Using cross Validation  
-----  
819  
820 -----k= 1 -----  
821  
822 F_Mesure= 1.0  
823  
824 -----k= 2 -----  
825  
826 F_Mesure= 0.9933774834437086
```

```
827
828 -----k= 3 -----
829
830 F_Mesure= 1.0
831
832 -----k= 4 -----
833
834 F_Mesure= 1.0
835
836 -----k= 5 -----
837
838 F_Mesure= 1.0
839 F_Mesures moyenne = 0.9986754966887418
840
841
842
843 -----Random Forest-----
844
845
846
847 dataset/BLOB/taken/BLOB_OneSidedSelection.csv
848
849
850
851 count      578
852 unique      2
853 top        True
854 freq       402
855 Name: is_code_smell, dtype: object
856 [[ 60   0]
857 [ 1 113]]
858 the recall for this model is : 0.9912280701754386
859 TP 113
860 TN 60
861 FP 0
862 FN 1
863
864 -----Classification Report
-----
865          precision    recall  f1-score   support
866
867      False       0.98      1.00      0.99       60
868      True        1.00      0.99      1.00      114
869
870   micro avg       0.99      0.99      0.99      174
```

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```
871     macro avg      0.99      1.00      0.99      174
872 weighted avg      0.99      0.99      0.99      174
873
874 Precision = 1.0
875 Rappel= 0.9912280701754386
876 F_Mesure= 0.9955947136563876
877
878 -----Using cross Validation
-----
879
880 -----k= 1 -----
881
882 F_Mesure= 1.0
883
884 -----k= 2 -----
885
886 F_Mesure= 0.993939393939394
887
888 -----k= 3 -----
889
890 F_Mesure= 1.0
891
892 -----k= 4 -----
893
894 F_Mesure= 1.0
895
896 -----k= 5 -----
897
898 F_Mesure= 1.0
899 F_Mesures moyenne = 0.9987878787878788
900
901
902
903 -----Random Forest-----
904
905
906
907 dataset/BLOB/taken/BLOB_RandomUnderSampler_default.csv
908
909
910
911 count      804
912 unique      2
913 top        True
914 freq       402
```

```
915 Name: is_code_smell, dtype: object
916 [[111    0]
917 [  0 131]]
918 the recall for this model is : 1.0
919 TP 131
920 TN 111
921 FP 0
922 FN 0
923
924 -----Classification Report
-----
925          precision    recall   f1-score   support
926
927      False       1.00     1.00      1.00      111
928      True        1.00     1.00      1.00      131
929
930  micro avg       1.00     1.00      1.00      242
931  macro avg       1.00     1.00      1.00      242
932 weighted avg     1.00     1.00      1.00      242
933
934 Precision = 1.0
935 Rappel= 1.0
936 F_Mesure= 1.0
937
938 -----Using cross Validation
-----
939
940 -----k= 1 -----
941
942 F_Mesure= 1.0
943
944 -----k= 2 -----
945
946 F_Mesure= 0.9933774834437086
947
948 -----k= 3 -----
949
950 F_Mesure= 1.0
951
952 -----k= 4 -----
953
954 F_Mesure= 1.0
955
956 -----k= 5 -----
957
```

```
958 F_Mesure= 1.0
959 F_Mesures moyenne = 0.9986754966887418
960
961
962
963 -----Random Forest-----
964
965
966
967 dataset/BLOB/taken/BLOB_TomekLinks.csv
968
969
970
971 count      16435
972 unique      2
973 top        False
974 freq       16033
975 Name: is_code_smell, dtype: object
976 [[4794    0]
977 [    0   137]]
978 the recall for this model is : 1.0
979 TP 137
980 TN 4794
981 FP 0
982 FN 0
983
984 -----Classification Report
-----
985          precision    recall  f1-score   support
986
987      False       1.00     1.00      1.00      4794
988      True       1.00     1.00      1.00       137
989
990  micro avg       1.00     1.00      1.00      4931
991  macro avg       1.00     1.00      1.00      4931
992 weighted avg       1.00     1.00      1.00      4931
993
994 Precision = 1.0
995 Rappel= 1.0
996 F_Mesure= 1.0
997
998 -----Using cross Validation
-----
999
1000 -----k= 1 -----
```

```
1001
1002 F_Mesure= 1.0
1003
1004 -----k= 2 -----
1005
1006 F_Mesure= 1.0
1007
1008 -----k= 3 -----
1009
1010 F_Mesure= 0.9937888198757764
1011
1012 -----k= 4 -----
1013
1014 F_Mesure= 1.0
1015
1016 -----k= 5 -----
1017
1018 F_Mesure= 1.0
1019 F_Mesures moyenne = 0.9987577639751553
1020
1021
1022
1023 -----Random Forest-----
1024
1025
1026
1027 dataset/BLOB/taken/BLOB_CondensedNearestNeighbour.csv
1028
1029
1030
1031 count      405
1032 unique     2
1033 top        True
1034 freq       402
1035 Name: is_code_smell, dtype: object
1036 [[ 0   3]
1037 [ 0 119]]
1038 the recall for this model is : 1.0
1039 TP 119
1040 TN 0
1041 FP 3
1042 FN 0
1043
1044 -----Classification Report
-----
```

```
1045 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.
1046              precision      recall   f1-score   support
1047
1048      'precision', 'predicted', average, warn_for)
1049      False        0.00        0.00        0.00         3
1050      True        0.98        1.00        0.99      119
1051
1052      micro avg     0.98        0.98        0.98      122
1053      macro avg     0.49        0.50        0.49      122
1054  weighted avg     0.95        0.98        0.96      122
1055
1056 Precision = 0.9754098360655737
1057 Rappel= 1.0
1058 F_Mesure= 0.9875518672199171
1059
1060 -----Using cross Validation
-----
1061
1062 -----k= 1 -----
1063
1064
1065 -----k= 2 -----
1066
1067 F_Mesure= 1.0
1068
1069 -----k= 3 -----
1070
1071
1072 -----k= 4 -----
1073
1074 F_Mesure= 0.9937888198757764
1075
1076 -----k= 5 -----
1077
1078 F_Mesure= 1.0
1079 F_Mesures moyenne = 0.9979296066252589
1080
1081
1082
1083 -----Naive Bayes-----
1084
```

```
1085
1086
1087 dataset/BLOB/taken/BLOB_del.csv
1088
1089
1090
1091 count      16435
1092 unique       2
1093 top        False
1094 freq       16033
1095 Name: is_code_smell, dtype: object
1096 [[4801    6]
1097 [    0   124]]
1098 the recall for this model is : 1.0
1099 TP 124
1100 TN 4801
1101 FP 6
1102 FN 0
1103
1104 -----Classification Report
-----
1105             precision    recall   f1-score   support
1106
1107     False       1.00      1.00      1.00      4807
1108     True        0.95      1.00      0.98      124
1109
1110   micro avg     1.00      1.00      1.00      4931
1111   macro avg     0.98      1.00      0.99      4931
1112 weighted avg     1.00      1.00      1.00      4931
1113
1114 Precision =  0.9538461538461539
1115 Rappel=  1.0
1116 F_Mesure= 0.9763779527559054
1117
1118 -----Using cross Validation
-----
1119
1120 -----k= 1 -----
1121
1122 F_Mesure= 0.967032967032967
1123
1124 -----k= 2 -----
1125
1126 F_Mesure= 0.975
1127
```

File - unknown

```
1128 -----k= 3 -----
1129
1130 F_Mesure= 0.970059880239521
1131
1132 -----k= 4 -----
1133
1134 F_Mesure= 0.9836065573770492
1135
1136 -----k= 5 -----
1137
1138 F_Mesure= 0.9844559585492229
1139 F_Mesures moyenne = 0.9760310726397521
1140
1141
1142
1143 -----Naive Bayes-----
1144
1145
1146
1147 dataset/BLOB/taken/BLOB_RandomUnderSampler.csv
1148
1149
1150
1151 count      804
1152 unique      2
1153 top        True
1154 freq       402
1155 Name: is_code_smell, dtype: object
1156 [[125    1]
1157 [ 0 116]]
1158 the recall for this model is : 1.0
1159 TP 116
1160 TN 125
1161 FP 1
1162 FN 0
1163
1164 -----Classification Report
-----
1165          precision    recall   f1-score   support
1166
1167      False      1.00     0.99      1.00      126
1168      True      0.99     1.00      1.00      116
1169
1170  micro avg      1.00     1.00      1.00      242
1171  macro avg      1.00     1.00      1.00      242
```

```
1172 weighted avg      1.00      1.00      1.00      242
1173
1174 Precision = 0.9914529914529915
1175 Rappel= 1.0
1176 F_Mesure= 0.9957081545064378
1177
1178 -----Using cross Validation
-----
1179
1180 -----k= 1 -----
1181
1182 F_Mesure= 0.9941520467836257
1183
1184 -----k= 2 -----
1185
1186 F_Mesure= 0.9934640522875817
1187
1188 -----k= 3 -----
1189
1190 F_Mesure= 1.0
1191
1192 -----k= 4 -----
1193
1194 F_Mesure= 0.9938650306748467
1195
1196 -----k= 5 -----
1197
1198 F_Mesure= 1.0
1199 F_Mesures moyenne = 0.9962962259492109
1200
1201
1202
1203 -----Naive Bayes-----
1204
1205
1206
1207 dataset/BLOB/taken/BLOB_AllKNN.csv
1208
1209
1210
1211 count      16435
1212 unique      2
1213 top        False
1214 freq       16033
1215 Name: is_code_smell, dtype: object
```

```
1216 [[4794    5]
1217 [    0  132]]
1218 the recall for this model is : 1.0
1219 TP 132
1220 TN 4794
1221 FP 5
1222 FN 0
1223
1224 -----Classification Report
-----
1225             precision    recall   f1-score   support
1226
1227     False        1.00      1.00      1.00      4799
1228     True         0.96      1.00      0.98      132
1229
1230   micro avg     1.00      1.00      1.00      4931
1231   macro avg     0.98      1.00      0.99      4931
1232 weighted avg    1.00      1.00      1.00      4931
1233
1234 Precision =  0.9635036496350365
1235 Rappel= 1.0
1236 F_Mesure= 0.9814126394052044
1237
1238 -----Using cross Validation
-----
1239
1240 -----k= 1 -----
1241
1242 F_Mesure= 0.975609756097561
1243
1244 -----k= 2 -----
1245
1246 F_Mesure= 0.9866666666666666
1247
1248 -----k= 3 -----
1249
1250 F_Mesure= 0.9625
1251
1252 -----k= 4 -----
1253
1254 F_Mesure= 0.9782608695652174
1255
1256 -----k= 5 -----
1257
1258 F_Mesure= 0.9818181818181818
```

```
1259 F_Mesures moyenne = 0.9769710948295254
1260
1261
1262
1263 -----Naive Bayes-----
1264
1265
1266
1267 dataset/BLOB/taken/BLOB_InstanceHardnessThreshold.csv
1268
1269
1270
1271 count      16435
1272 unique      2
1273 top        False
1274 freq       16033
1275 Name: is_code_smell, dtype: object
1276 [[4802    8]
1277 [ 0  121]]
1278 the recall for this model is : 1.0
1279 TP 121
1280 TN 4802
1281 FP 8
1282 FN 0
1283
1284 -----Classification Report
-----
1285          precision    recall   f1-score   support
1286
1287      False      1.00      1.00      1.00      4810
1288      True       0.94      1.00      0.97      121
1289
1290  micro avg     1.00      1.00      1.00      4931
1291  macro avg     0.97      1.00      0.98      4931
1292 weighted avg   1.00      1.00      1.00      4931
1293
1294 Precision =  0.937984496124031
1295 Rappel= 1.0
1296 F_Mesure= 0.9680000000000001
1297
1298 -----Using cross Validation
-----
1299
1300 -----k= 1 -----
1301
```

```
1302 F_Mesure= 0.975609756097561
1303
1304 -----k= 2 -----
1305
1306 F_Mesure= 0.9866666666666666
1307
1308 -----k= 3 -----
1309
1310 F_Mesure= 0.9625
1311
1312 -----k= 4 -----
1313
1314 F_Mesure= 0.9782608695652174
1315
1316 -----k= 5 -----
1317
1318 F_Mesure= 0.9818181818181818
1319 F_Mesures moyenne = 0.9769710948295254
1320
1321
1322
1323 -----Naive Bayes-----
1324
1325
1326
1327 dataset/BLOB/taken/BLOB_NearMiss.csv
1328
1329
1330
1331 count      804
1332 unique      2
1333 top        True
1334 freq       402
1335 Name: is_code_smell, dtype: object
1336 [[119    0]
1337 [  0 123]]
1338 the recall for this model is : 1.0
1339 TP 123
1340 TN 119
1341 FP 0
1342 FN 0
1343
1344 -----Classification Report
-----
1345          precision      recall   f1-score   support
```

```
1346
1347      False      1.00      1.00      1.00      119
1348      True       1.00      1.00      1.00      123
1349
1350      micro avg    1.00      1.00      1.00      242
1351      macro avg    1.00      1.00      1.00      242
1352      weighted avg  1.00      1.00      1.00      242
1353
1354 Precision = 1.0
1355 Rappel= 1.0
1356 F_Mesure= 1.0
1357
1358 -----Using cross Validation
-----
1359
1360 -----k= 1 -----
1361
1362 F_Mesure= 1.0
1363
1364 -----k= 2 -----
1365
1366 F_Mesure= 1.0
1367
1368 -----k= 3 -----
1369
1370 F_Mesure= 1.0
1371
1372 -----k= 4 -----
1373
1374 F_Mesure= 1.0
1375
1376 -----k= 5 -----
1377
1378 F_Mesure= 1.0
1379 F_Mesures moyenne = 1.0
1380
1381
1382
1383 -----Naive Bayes-----
1384
1385
1386
1387 dataset/BLOB/taken/BLOB_OneSidedSelection.csv
1388
1389
```

```
1390
1391 count      578
1392 unique      2
1393 top        True
1394 freq       402
1395 Name: is_code_smell, dtype: object
1396 [[ 62   0]
1397 [  0 112]]
1398 the recall for this model is : 1.0
1399 TP 112
1400 TN 62
1401 FP 0
1402 FN 0
1403
1404 -----Classification Report
-----
1405             precision    recall   f1-score   support
1406
1407     False        1.00     1.00      1.00       62
1408     True         1.00     1.00      1.00      112
1409
1410   micro avg     1.00     1.00      1.00      174
1411   macro avg     1.00     1.00      1.00      174
1412 weighted avg   1.00     1.00      1.00      174
1413
1414 Precision =  1.0
1415 Rappel=  1.0
1416 F_Mesure= 1.0
1417
1418 -----Using cross Validation
-----
1419
1420 -----k= 1 -----
1421
1422 F_Mesure= 0.9938650306748467
1423
1424 -----k= 2 -----
1425
1426 F_Mesure= 1.0
1427
1428 -----k= 3 -----
1429
1430 F_Mesure= 1.0
1431
1432 -----k= 4 -----
```

```
1433
1434 F_Mesure= 1.0
1435
1436 -----k= 5 -----
1437
1438 F_Mesure= 1.0
1439 F_Mesures moyenne = 0.9987730061349694
1440
1441
1442
1443 -----Naive Bayes-----
1444
1445
1446
1447 dataset/BLOB/taken/BLOB_RandomUnderSampler_default.csv
1448
1449
1450
1451 count      804
1452 unique      2
1453 top        True
1454 freq       402
1455 Name: is_code_smell, dtype: object
1456 [[123   1]
1457 [  0 118]]
1458 the recall for this model is : 1.0
1459 TP 118
1460 TN 123
1461 FP 1
1462 FN 0
1463
1464 -----Classification Report
-----
1465          precision    recall  f1-score   support
1466
1467      False      1.00     0.99      1.00      124
1468      True      0.99     1.00      1.00      118
1469
1470  micro avg      1.00     1.00      1.00      242
1471  macro avg      1.00     1.00      1.00      242
1472 weighted avg      1.00     1.00      1.00      242
1473
1474 Precision = 0.9915966386554622
1475 Rappel= 1.0
1476 F_Mesure= 0.9957805907172996
```

```
1477
1478 -----Using cross Validation
-----
1479
1480 -----k= 1 -----
1481
1482 F_Mesure= 1.0
1483
1484 -----k= 2 -----
1485
1486 F_Mesure= 0.9934640522875817
1487
1488 -----k= 3 -----
1489
1490 F_Mesure= 0.980891719745223
1491
1492 -----k= 4 -----
1493
1494 F_Mesure= 1.0
1495
1496 -----k= 5 -----
1497
1498 F_Mesure= 1.0
1499 F_Mesures moyenne = 0.9948711544065609
1500
1501
1502
1503 -----Naive Bayes-----
1504
1505
1506
1507 dataset/BLOB/taken/BLOB_TomekLinks.csv
1508
1509
1510
1511 count      16435
1512 unique       2
1513 top        False
1514 freq       16033
1515 Name: is_code_smell, dtype: object
1516 [[4808      5]
1517 [    0   118]]
1518 the recall for this model is : 1.0
1519 TP 118
1520 TN 4808
```

```
1521 FP 5
1522 FN 0
1523
1524 -----Classification Report
-----
1525             precision    recall   f1-score   support
1526
1527     False        1.00      1.00      1.00      4813
1528     True         0.96      1.00      0.98      118
1529
1530   micro avg     1.00      1.00      1.00      4931
1531   macro avg     0.98      1.00      0.99      4931
1532 weighted avg   1.00      1.00      1.00      4931
1533
1534 Precision =  0.959349593495935
1535 Rappel= 1.0
1536 F_Mesure= 0.979253112033195
1537
1538 -----Using cross Validation
-----
1539
1540 -----k= 1 -----
1541
1542 F_Mesure= 0.967032967032967
1543
1544 -----k= 2 -----
1545
1546 F_Mesure= 0.975
1547
1548 -----k= 3 -----
1549
1550 F_Mesure= 0.970059880239521
1551
1552 -----k= 4 -----
1553
1554 F_Mesure= 0.9836065573770492
1555
1556 -----k= 5 -----
1557
1558 F_Mesure= 0.9844559585492229
1559 F_Mesures moyenne = 0.9760310726397521
1560
1561
1562
1563 -----Naive Bayes-----
```

```
1564  
1565  
1566  
1567 dataset/BLOB/taken/BLOB_CondensedNearestNeighbour.csv  
1568  
1569  
1570  
1571 count      405  
1572 unique      2  
1573 top        True  
1574 freq       402  
1575 Name: is_code_smell, dtype: object  
1576 [[ 0   1]  
1577 [ 0 121]]  
1578 the recall for this model is : 1.0  
1579 TP 121  
1580 TN 0  
1581 FP 1  
1582 FN 0  
1583  
1584 -----Classification Report  
-----  
1585          precision    recall   f1-score   support  
1586  
1587      False      0.00      0.00      0.00       1  
1588      True      0.99      1.00      1.00     121  
1589 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.  
1590  
1591      micro avg      0.99      0.99      0.99     122  
1592      'precision', 'predicted', average, warn_for)  
1593      macro avg      0.50      0.50      0.50     122  
1594 weighted avg      0.98      0.99      0.99     122  
1595  
1596 Precision =  0.9918032786885246  
1597 Rappel= 1.0  
1598 F_Mesure= 0.9958847736625513  
1599  
1600 -----Using cross Validation  
-----  
1601  
1602 -----k= 1 -----
```

```
1603
1604
1605 -----k= 2 -----
1606
1607 F_Mesure= 0.9937888198757764
1608
1609 -----k= 3 -----
1610
1611
1612 -----k= 4 -----
1613
1614 F_Mesure= 0.9937888198757764
1615
1616 -----k= 5 -----
1617
1618 F_Mesure= 1.0
1619 F_Mesures moyenne = 0.9958592132505176
1620
1621
1622
1623 -----SVM-----
1624
1625
1626
1627 dataset/BLOB/taken/BLOB_del.csv
1628
1629
1630
1631 count      16435
1632 unique      2
1633 top        False
1634 freq       16033
1635 Name: is_code_smell, dtype: object
1636 [[4818    0]
1637 [    5   108]]
1638 the recall for this model is : 0.9557522123893806
1639 TP 108
1640 TN 4818
1641 FP 0
1642 FN 5
1643
1644 -----Classification Report
-----
1645             precision    recall   f1-score   support
1646
```

File - unknown

```
1647      False      1.00      1.00      1.00      4818
1648      True       1.00      0.96      0.98      113
1649
1650      micro avg     1.00      1.00      1.00      4931
1651      macro avg     1.00      0.98      0.99      4931
1652      weighted avg    1.00      1.00      1.00      4931
1653
1654 Precision = 1.0
1655 Rappel= 0.9557522123893806
1656 F_Mesure= 0.9773755656108597
1657
1658 -----Using cross Validation
-----
1659
1660 -----k= 1 -----
1661
1662 F_Mesure= 0.9885057471264368
1663
1664 -----k= 2 -----
1665
1666 F_Mesure= 0.9668874172185431
1667
1668 -----k= 3 -----
1669
1670 F_Mesure= 0.9615384615384615
1671
1672 -----k= 4 -----
1673
1674 F_Mesure= 0.9915966386554621
1675
1676 -----k= 5 -----
1677
1678 F_Mesure= 0.978494623655914
1679 F_Mesures moyenne = 0.9774045776389635
1680
1681
1682
1683 -----SVM-----
1684
1685
1686
1687 dataset/BLOB/taken/BLOB_RandomUnderSampler.csv
1688
1689
1690
```

```
1691 count      804
1692 unique      2
1693 top         True
1694 freq        402
1695 Name: is_code_smell, dtype: object
1696 [[121    0]
1697 [ 27   94]]
1698 the recall for this model is : 0.7768595041322314
1699 TP 94
1700 TN 121
1701 FP 0
1702 FN 27
1703
1704 -----Classification Report
-----
1705             precision    recall   f1-score   support
1706
1707     False       0.82      1.00      0.90      121
1708     True        1.00      0.78      0.87      121
1709
1710   micro avg     0.89      0.89      0.89      242
1711   macro avg     0.91      0.89      0.89      242
1712 weighted avg    0.91      0.89      0.89      242
1713
1714 Precision = 1.0
1715 Rappel= 0.7768595041322314
1716 F_Mesure= 0.8744186046511627
1717
1718 -----Using cross Validation
-----
1719
1720 -----k= 1 -----
1721
1722 F_Mesure= 0.9634146341463414
1723
1724 -----k= 2 -----
1725
1726 F_Mesure= 0.8571428571428571
1727
1728 -----k= 3 -----
1729
1730 F_Mesure= 0.8759124087591241
1731
1732 -----k= 4 -----
1733
```

```
1734 F_Mesure= 0.8671328671328672
1735
1736 -----k= 5 -----
1737
1738 F_Mesure= 0.9150326797385622
1739 F_Mesures moyenne = 0.8957270893839503
1740
1741
1742
1743 -----SVM-----
1744
1745
1746
1747 dataset/BLOB/taken/BLOB_AllKNN.csv
1748
1749
1750
1751 count      16435
1752 unique      2
1753 top        False
1754 freq       16033
1755 Name: is_code_smell, dtype: object
1756 [[4824    0]
1757 [    0 107]]
1758 the recall for this model is : 1.0
1759 TP 107
1760 TN 4824
1761 FP 0
1762 FN 0
1763
1764 -----Classification Report
-----
1765          precision    recall   f1-score   support
1766
1767    False       1.00     1.00      1.00      4824
1768    True        1.00     1.00      1.00       107
1769
1770  micro avg     1.00     1.00      1.00      4931
1771  macro avg     1.00     1.00      1.00      4931
1772 weighted avg   1.00     1.00      1.00      4931
1773
1774 Precision = 1.0
1775 Rappel= 1.0
1776 F_Mesure= 1.0
1777
```

```
1778 -----Using cross Validation
-----
1779
1780 -----k= 1 -----
1781
1782 F_Mesure= 0.9873417721518987
1783
1784 -----k= 2 -----
1785
1786 F_Mesure= 0.950354609929078
1787
1788 -----k= 3 -----
1789
1790 F_Mesure= 0.9801324503311257
1791
1792 -----k= 4 -----
1793
1794 F_Mesure= 0.9772727272727273
1795
1796 -----k= 5 -----
1797
1798 F_Mesure= 0.9875
1799 F_Mesures moyenne = 0.9765203119369659
1800
1801
1802
1803 -----SVM-----
1804
1805
1806
1807 dataset/BLOB/taken/BLOB_InstanceHardnessThreshold.csv
1808
1809
1810
1811 count      16435
1812 unique      2
1813 top        False
1814 freq       16033
1815 Name: is_code_smell, dtype: object
1816 [[4822      0]
1817 [    7   102]]
1818 the recall for this model is : 0.9357798165137615
1819 TP 102
1820 TN 4822
1821 FP 0
```

```
1822 FN 7
1823
1824 -----Classification Report
-----
1825             precision    recall   f1-score   support
1826
1827      False        1.00     1.00      1.00      4822
1828      True         1.00     0.94      0.97      109
1829
1830      micro avg     1.00     1.00      1.00      4931
1831      macro avg     1.00     0.97      0.98      4931
1832 weighted avg     1.00     1.00      1.00      4931
1833
1834 Precision = 1.0
1835 Rappel= 0.9357798165137615
1836 F_Mesure= 0.966824644549763
1837
1838 -----Using cross Validation
-----
1839
1840 -----k= 1 -----
1841
1842 F_Mesure= 0.9873417721518987
1843
1844 -----k= 2 -----
1845
1846 F_Mesure= 0.950354609929078
1847
1848 -----k= 3 -----
1849
1850 F_Mesure= 0.9801324503311257
1851
1852 -----k= 4 -----
1853
1854 F_Mesure= 0.9772727272727273
1855
1856 -----k= 5 -----
1857
1858 F_Mesure= 0.9875
1859 F_Mesures moyenne = 0.9765203119369659
1860
1861
1862
1863 -----SVM-----
1864
```

```
1865  
1866  
1867 dataset/BLOB/taken/BLOB_NearMiss.csv  
1868  
1869  
1870  
1871 count      804  
1872 unique      2  
1873 top        True  
1874 freq       402  
1875 Name: is_code_smell, dtype: object  
1876 [[132    0]  
1877 [ 31   79]]  
1878 the recall for this model is : 0.7181818181818181  
1879 TP 79  
1880 TN 132  
1881 FP 0  
1882 FN 31  
1883  
1884 -----Classification Report  
-----  
1885          precision    recall  f1-score   support  
1886  
1887      False       0.81     1.00      0.89      132  
1888      True        1.00     0.72      0.84      110  
1889  
1890  micro avg     0.87     0.87      0.87      242  
1891  macro avg     0.90     0.86      0.87      242  
1892 weighted avg   0.90     0.87      0.87      242  
1893  
1894 Precision = 1.0  
1895 Rappel= 0.71818181818181  
1896 F_Mesure= 0.8359788359788359  
1897  
1898 -----Using cross Validation  
-----  
1899  
1900 -----k= 1 -----  
1901  
1902 F_Mesure= 0.9506172839506173  
1903  
1904 -----k= 2 -----  
1905  
1906 F_Mesure= 0.8307692307692308  
1907
```

File - unknown

```
1908 -----k= 3 -----
1909
1910 F_Mesure= 0.8592592592592593
1911
1912 -----k= 4 -----
1913
1914 F_Mesure= 0.8345323741007193
1915
1916 -----k= 5 -----
1917
1918 F_Mesure= 0.8551724137931034
1919 F_Mesures moyenne = 0.866070112374586
1920
1921
1922
1923 -----SVM-----
1924
1925
1926
1927 dataset/BLOB/taken/BLOB_OneSidedSelection.csv
1928
1929
1930
1931 count      578
1932 unique      2
1933 top        True
1934 freq       402
1935 Name: is_code_smell, dtype: object
1936 [[ 50   0]
1937 [ 8 116]]
1938 the recall for this model is : 0.9354838709677419
1939 TP 116
1940 TN 50
1941 FP 0
1942 FN 8
1943
1944 -----Classification Report
-----
1945             precision    recall   f1-score   support
1946
1947     False        0.86      1.00      0.93       50
1948     True         1.00      0.94      0.97      124
1949
1950   micro avg     0.95      0.95      0.95      174
1951   macro avg     0.93      0.97      0.95      174
```

```
1952 weighted avg      0.96      0.95      0.95      174
1953
1954 Precision = 1.0
1955 Rappel= 0.9354838709677419
1956 F_Mesure= 0.9666666666666666
1957
1958 -----Using cross Validation
-----
1959
1960 -----k= 1 -----
1961
1962 F_Mesure= 0.8750000000000001
1963
1964 -----k= 2 -----
1965
1966 F_Mesure= 0.9878048780487805
1967
1968 -----k= 3 -----
1969
1970 F_Mesure= 0.961038961038961
1971
1972 -----k= 4 -----
1973
1974 F_Mesure= 0.7958115183246073
1975
1976 -----k= 5 -----
1977
1978 F_Mesure= 0.8817204301075269
1979 F_Mesures moyenne = 0.9002751575039751
1980
1981
1982
1983 -----SVM-----
1984
1985
1986
1987 dataset/BLOB/taken/BLOB_RandomUnderSampler_default.csv
1988
1989
1990
1991 count      804
1992 unique      2
1993 top        True
1994 freq       402
1995 Name: is_code_smell, dtype: object
```

```
1996 [[115 0]
1997 [ 21 106]]
1998 the recall for this model is : 0.8346456692913385
1999 TP 106
2000 TN 115
2001 FP 0
2002 FN 21
2003
2004 -----Classification Report
-----
2005 precision recall f1-score support
2006
2007 False 0.85 1.00 0.92 115
2008 True 1.00 0.83 0.91 127
2009
2010 micro avg 0.91 0.91 0.91 242
2011 macro avg 0.92 0.92 0.91 242
2012 weighted avg 0.93 0.91 0.91 242
2013
2014 Precision = 1.0
2015 Rappel= 0.8346456692913385
2016 F_Mesure= 0.9098712446351932
2017
2018 -----Using cross Validation
-----
2019
2020 -----k= 1 -----
2021
2022 F_Mesure= 0.9634146341463414
2023
2024 -----k= 2 -----
2025
2026 F_Mesure= 0.8571428571428571
2027
2028 -----k= 3 -----
2029
2030 F_Mesure= 0.8759124087591241
2031
2032 -----k= 4 -----
2033
2034 F_Mesure= 0.8671328671328672
2035
2036 -----k= 5 -----
2037
2038 F_Mesure= 0.9150326797385622
```

```
2039 F_Mesures moyenne = 0.8957270893839503
2040
2041
2042
2043 -----SVM-----
2044
2045
2046
2047 dataset/BLOB/taken/BLOB_TomekLinks.csv
2048
2049
2050
2051 count      16435
2052 unique      2
2053 top        False
2054 freq       16033
2055 Name: is_code_smell, dtype: object
2056 [[4811    0]
2057 [   6   114]]
2058 the recall for this model is : 0.95
2059 TP 114
2060 TN 4811
2061 FP 0
2062 FN 6
2063
2064 -----Classification Report
-----
2065          precision    recall   f1-score   support
2066
2067    False       1.00     1.00      1.00      4811
2068    True        1.00     0.95      0.97      120
2069
2070  micro avg     1.00     1.00      1.00      4931
2071  macro avg     1.00     0.97      0.99      4931
2072 weighted avg   1.00     1.00      1.00      4931
2073
2074 Precision = 1.0
2075 Rappel= 0.95
2076 F_Mesure= 0.9743589743589743
2077
2078 -----Using cross Validation
-----
2079
2080 -----k= 1 -----
2081
```

```
2082 F_Mesure= 0.9885057471264368
2083
2084 -----k= 2 -----
2085
2086 F_Mesure= 0.9668874172185431
2087
2088 -----k= 3 -----
2089
2090 F_Mesure= 0.9615384615384615
2091
2092 -----k= 4 -----
2093
2094 F_Mesure= 0.9915966386554621
2095
2096 -----k= 5 -----
2097
2098 F_Mesure= 0.978494623655914
2099 F_Mesures moyenne = 0.9774045776389635
2100
2101
2102
2103 -----SVM-----
2104
2105
2106
2107 dataset/BLOB/taken/BLOB_CondensedNearestNeighbour.csv
2108
2109
2110
2111 count      405
2112 unique     2
2113 top        True
2114 freq       402
2115 Name: is_code_smell, dtype: object
2116 [[122]]
2117 Traceback (most recent call last):
2118   File "D:/pfe/Projets/pfe/apprentissage_BLOB.py", line
2119     102, in <module>
2120       print("the recall for this model is :",cnf_matrix[1,
2121         1]/(cnf_matrix[1,1]+cnf_matrix[1,0]))
2122 IndexError: index 1 is out of bounds for axis 0 with
2123   size 1
2124
2125 Process finished with exit code 1
2126
```