Q10. Report the 10-fold cross-validation results (average precision,recall and F1) for each of the 3 kernel types (linear, RBF and polynomial degree 2) for the cost factors, 1, 10, 100 and 1000. Briefly explain your observations of the effect of kernel types and cost factors on computation time and accuracy?

Kernel Type: Linear (10-fold CV)				
	C = 1	*Time Elapsed (in minutes)*	***C = 10***	*Time Elapsed*
Average Precision	0.230567	3.97	0.230566878	33.17
Average Recall	0.259640	4.03	0.259639918	31.32
Average F1-score	0.241250	3.98	0.241250205	31.11

Kernel Type: RBF (10-fold CV)				
	C = 1	*Time Elapsed (in minutes)*	***C = 10***	*Time Elapsed*
Average Precision	0.489148	4.30	0.487970	4.18
Average Recall	0.303493	5.04	0.303226	4.30
Average F1-score	0.306403	4.66	0.306164	4.36

- The RBF kernel clearly outperforms the Linear kernel in terms of F1-score and also in terms of scalability with respect to the cost factors.

For Adaboosting, you will experiment with using weak and strong base classifiers. Does Adaboosting help boost the performance of both? Specifically, compare the 10-fold cross-validation results (average precision,recall and F1) for the base classifiers, with the Adaboosted versions of these base classifiers.

Weak vs. Strong Base Classifiers (max depth = 1)		
	Vanilla Decision Tree Classifier	***Adaboosted Decision Tree Classifier***
Average Precision	0.1843247	0.1910863
Average Recall	0.2175002	0.2229918
Average F1-score	0.1940677	0.1994949

- In the max depth = 1 case, the Adaboosted DT clf slightly outperforms the Vanilla DT Classifier in terms of F1-score.

Weak vs. Strong Base Classifiers (max depth = 5)		
	Vanilla Decision Tree Classifier	***Adaboosted Decision Tree Classifier***
Average Precision	0.2692076	0.2813916
Average Recall	0.2754661	0.2438477
Average F1-score	0.2721698	0.2398720

Weak vs. Strong Base Classifiers (max depth = 10)		
	Vanilla Decision Tree Classifier	***Adaboosted Decision Tree Classifier***
Average Precision	0.2915034	0.2875180
Average Recall	0.2857659	0.2569997
Average F1-score	0.2776274	0.2503066

- However, we find that as we increase the max depth for the Decision Tree base classifier, the performance of the Adaboosted Decision Tree classifier deteriorates due to the noise in the dataset and also the fact that DT clf is quite stable without boosting.