Experiments using one corpora as train and other as test with different groups of features

We look at the results of using a model trained on out-of-domain data to detect personality. Table 1 shows the result of training on Essays dataset and testing on Facebook data using all the features. All the algorithms tested here performs well on one or other of the tasks. It can be said that using this feature set, Neuroticism can be detected better than any other trait.

When the Twitter dataset is used for test, the effect of class imbalance on the supervised classification, is clear. The majority classifier almost always gives best accuracies with the exception in case of agreeableness. Even in that case, the difference with the highest score is just 0.007.

Next, we investigate whether different groups of features yields better results than using all of the features for personality detection. Table 1 also shows the results of using different groups of features - emotions, part of speech tags with stopwords and sentiments. POS tags and stopword features tend to work well for extraversion, neuroticism and openness while emotion features work better for agreeableness and conscientiousness.

Table 3 displays which features work best when the Essays corpus is used for training and Facebook or Twitter data is used for testing. In case of Extraversion, there is an POS tags+stopwords feature works best for both the corpora. The POS tags+stopwords features seem to work best for Neuroticism for both corpora. There is no overlap for the best-performing features for Agreeableness and Conscentiousness for both the datasets. For Openness, the POS tags+stopwords feature tends to work well. Emotion as a feature works best for detecting Agreeableness and Conscientiousness in Facebook data while Sentiments work well for Twitter data. POS tags+stopwords features tend to work well across different social media platforms. Thus, it can be concluded that the simpler features tend to work better in some cases as also argued by Oberlander and Nowson (2006), who used ngram features for personality detection.

References

Jon Oberlander and Scott Nowson. 2006. Whose thumb is it anyway?: Classifying author personality from weblog text. In *Proceedings of the COLING/ACL on Main Conference Poster Sessions*, COLING-ACL '06, pages 627–634, Stroudsburg, PA, USA. Association for Computational Linguistics.

		Extraversion	Neuroticism	Agreeableness	Conscientiousness	Openness
All Features	Majority	0.384	0.396	0.536	0.52	0.52
	SVM (Linear)	0.4	0.388	0.464	0.504	0.476
	SVM (RBF)	0.384	0.396	0.536	0.52	0.52
	Naive Bayes	0.46	**0.596**	0.544	0.492	0.472
	Random Forest	0.46	0.54	0.52	0.492	0.52
Emotion Features	Majority	0.384	0.396	0.536	0.52	0.52
	SVM (Linear)	0.384	0.512	0.536	0.516	0.508
	SVM (RBF)	0.48	0.48	**0.552**	0.512	0.472
	Naive Bayes	0.504	0.552	0.54	0.544	0.472
	Random Forest	0.5	0.512	0.536	**0.54**	0.468
Sentiment Features	Majority	0.384	0.396	0.536	0.52	0.52
	SVM (Linear)	0.384	0.396	0.536	0.52	0.52
	SVM (RBF)	0.384	0.396	0.536	0.52	0.52
	Naive Bayes	0.384	0.396	0.536	0.52	0.52
	Random Forest	0.512	0.52	0.52	0.452	0.504
POS tags & Stopwords Features	Majority	0.384	0.396	0.52	0.536	0.52
	SVM (Linear)	**0.592**	0.468	0.5	0.504	0.46
	SVM (RBF)	0.384	0.396	0.52	0.52	**0.536**
	Naive Bayes	0.472	**0.596**	0.48	0.472	**0.536**
	Random Forest	0.404	0.544	0.5	0.484	0.508

Table 1: Train - Essays, Test - Facebook status updates for different sets of features

		Extraversion	Neuroticism	Agreeableness	Conscientiousness	Openness
All Features	Majority	**0.789**	**0.691**	0.750	**0.770**	**0.980**
	SVM (Linear)	0.770	0.678	0.289	0.763	0.217
	SVM (RBF)	**0.789**	**0.691**	0.750	**0.770**	**0.980**
	Naive Bayes	0.697	0.342	0.737	0.461	0.164
	Random Forest	0.375	0.461	0.651	0.500	0.645
Emotion Features	SVM (Linear)	0.724	0.454	0.750	0.612	0.711
	SVM (RBF)	0.757	0.645	0.724	0.684	0.875
	Naive Bayes	0.507	0.428	0.645	0.559	0.539
	Random Forest	0.553	0.487	0.605	0.467	0.526
Sentiment Features	SVM (Linear)	**0.789**	**0.691**	0.750	**0.770**	**0.980**
	SVM (RBF)	**0.789**	**0.691**	0.750	**0.770**	**0.980**
	Naive Bayes	**0.789**	**0.691**	0.750	**0.770**	**0.980**
	Random Forest	0.546	0.461	0.572	0.553	0.493
POS tags & Stopwords Features	SVM (Linear)	0.322	0.599	0.270	**0.770**	**0.980**
	SVM (RBF)	**0.789**	**0.691**	0.750	**0.770**	**0.980**
	Naive Bayes	0.763	0.316	0.750	0.599	0.020
	Random Forest	0.559	0.599	**0.757**	0.230	0.704

Table 2: Train - Essays, Test - Twitter status updates for different sets of features

Test set	Best performing features				
	Extraversion	Neuroticism	Agreeableness	Conscientiousness	Openness
Facebook	POS tags & stopwords	Full set ; POS tags & stopwords	Emotion	Emotion	POS tags & stopwords
Twitter	Full set; Sentiment ; POS tags & stopwords	Full set; Sentiment; POS tags & stopwords	POS tags &stopwords	Full set; Sentiment ; POS tags & stopwords	Full set ; Sentiment ; POS tags & stopwords

Table 3: Features which work best for each trait for different test datasets