Table. Classification performance on n=800 samples.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Pipelines | Original training dataset | | | | | Augmented training dataset | | | |
|  | level 0 | | level 1 | level 2 | level 3 | level 0 | level 1 | level 2 | level 3 |
| Precision |  | |  |  |  |  |  |  |  |
| TF-IDF + RF | 0.50 | | 0.82 | 0.84 | 0.80 | 0.44 | 0.92 | 0.79 | 0.75 |
| TF-IDF + NB | 0.50 | | 0.65 | 1.00 | 0.87 | 0.75 | 0.94 | 0.58 | 0.65 |
| TF-IDF + SVM | 0.43 | | 0.90 | 0.70 | 0.81 | 0.36 | 0.91 | 0.65 | 0.81 |
| TF-IDF + LR | 0.35 | | 0.89 | 0.65 | 0.83 | 0.38 | 0.89 | 0.63 | 0.82 |
| FastText + LSTM | 0.48 | | 0.93 | 0.59 | 0.87 | 0.19 | 0.87 | 0.46 | 0.78 |
| GloVe + LSTM | 0.38 | | 0.94 | 0.62 | 0.81 | 0.39 | 0.84 | 0.51 | 0.83 |
| Recall |  | |  |  |  |  |  |  |  |
| TF-IDF + RF | 0.21 | | 0.97 | 0.30 | 0.88 | 0.37 | 0.92 | 0.53 | 0.92 |
| TF-IDF + NB | 0.05 | | 1.00 | 0.11 | 0.41 | 0.32 | 0.83 | 0.55 | 0.87 |
| TF-IDF + SVM | 0.53 | | 0.93 | 0.53 | 0.87 | 0.53 | 0.89 | 0.60 | 0.85 |
| TF-IDF + LR | 0.47 | | 0.92 | 0.57 | 0.81 | 0.53 | 0.92 | 0.55 | 0.81 |
| FastText + LSTM | 0.58 | | 0.90 | 0.74 | 0.75 | 0.37 | 0.88 | 0.60 | 0.53 |
| GloVe + LSTM | 0.63 | | 0.87 | 0.67 | 0.85 | 0.68 | 0.91 | 0.54 | 0.58 |
| F1-score |  | |  |  |  |  |  |  |  |
| TF-IDF + RF | 0.30 | | 0.89 | 0.44 | 0.84 | 0.40 | 0.92 | 0.63 | 0.83 |
| TF-IDF + NB | 0.10 | | 0.78 | 0.20 | 0.55 | 0.44 | 0.89 | 0.56 | 0.74 |
| TF-IDF + SVM | 0.48 | | 0.91 | 0.60 | 0.84 | 0.43 | 0.90 | 0.63 | 0.83 |
| TF-IDF + LR | 0.40 | | 0.90 | 0.61 | 0.82 | 0.44 | 0.90 | 0.59 | 0.81 |
| FastText + LSTM | 0.52 | | 0.92 | 0.66 | 0.80 | 0.25 | 0.88 | 0.52 | 0.63 |
| GloVe + LSTM | 0.47 | | 0.91 | 0.65 | 0.83 | 0.50 | 0.88 | 0.52 | 0.68 |
| Accuracy | training (%) | | | testing (%) | | training (%) | | testing (%) | |
| TF-IDF + RF |  | 98.2 | |  | 81.3 |  | 99.8 |  | 84.1 |
| TF-IDF + NB |  | 77.3 | |  | 67.8 |  | 92.1 |  | 78.4 |
| TF-IDF + SVM |  | 98.1 | |  | 83.6 |  | 99.0 |  | 82.1 |
| TF-IDF + LR |  | 99.9 | |  | 82.3 |  | 99.9 |  | 81.9 |
| FastText + LSTM |  | 99.3 | |  | 83.0 |  | 99.9 |  | 73.5 |
| GloVe + LSTM |  | 99.4 | |  | 82.8 |  | 99.9 |  | 76.1 |