

Detailed results of alternative methods

Contents

1	Performance of standard classifiers	2
2	Performance of standard classifiers in non-hierarchical framework	8
3	Performance of standard classifiers utilizing all descriptors	11
4	Performance of standard classifiers with a training set ratio of 30%	17

List of Tables

1	Performance of KNN at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	2
2	Performance of KNN at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	3
3	Performance of Random Forest at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	4
4	Performance of Random Forest at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	5
5	Performance of SVM at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	6
6	Performance of SVM at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	7
7	Performance of KNN in non-hierarchical framework by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader and (c) both subjects.	8
8	Performance of Random Forest in non-hierarchical framework by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader and (c) both subjects.	9
9	Performance of SVM in non-hierarchical framework by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader and (c) both subjects.	10
10	Performance of KNN at hierarchical framework Stage-1 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	11
11	Performance of KNN at hierarchical framework Stage-2 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	12
12	Performance of Random Forest at hierarchical framework Stage-1 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	13
13	Performance of Random Forest at hierarchical framework Stage-2 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	14
14	Performance of SVM at hierarchical framework Stage-1 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	15
15	Performance of SVM at hierarchical framework Stage-2 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.	16
16	Performance of KNN at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.	17
17	Performance of KNN at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.	18

18	Performance of Random Forest at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.	19
19	Performance of Random Forest at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.	20
20	Performance of SVM at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.	21
21	Performance of SVM at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.	22

1 Performance of standard classifiers

Table 1: Performance of KNN at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.68	0.32
	Other	0	0.24	0.76
	Tot.	0.70		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.96	0.01	0.03
	Test	0.10	0.90	0
	Other	0.14	0	0.86
	Tot.	0.94		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.96	0.01	0.03
	Test	0	0.68	0.32
	Other	0.06	0.14	0.80
	Tot.	0.79		

Table 2: Performance of KNN at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.96	0	0.04
	Leis.	0	0	0
	Prog.	0.01	0	0.99
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.04	0.96	0
	Prog.	0	0	0
	Tot.	0.97		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.99	0	0.01
	Leis.	0.04	0.96	0
	Prog.	0.01	0	0.99
	Tot.	0.98		

Table 3: Performance of Random Forest at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.89	0.11
	Other	0	0.18	0.72
	Tot.	0.86		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.84	0.01	0.15
	Test	0	0.81	0.19
	Other	0.03	0.01	0.96
	Tot.	0.86		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.84	0.01	0.15
	Test	0	0.89	0.11
	Other	0.02	0.16	0.82
	Tot.	0.86		

Table 4: Performance of Random Forest at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.95	0	0.05
	Leis.	0	0	0
	Prog.	0	0	1.00
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.04	0.96	0
	Prog.	0	0	0
	Tot.	0.97		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.99	0	0.01
	Leis.	0.04	0.96	0
	Prog.	0	0	1.00
	Tot.	0.98		

Table 5: Performance of SVM at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.89	0.11
	Other	0	0.31	0.69
	Tot.	0.85		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.98	0.01	0.01
	Test	0.19	0.81	0
	Other	0.14	0	0.86
	Tot.	0.95		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.98	0.01	0.01
	Test	0.01	0.88	0.11
	Other	0.06	0.17	0.77
	Tot.	0.89		

Table 6: Performance of SVM at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.91	0	0.09
	Leis.	0	0	0
	Prog.	0	0	1.00
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.05	0.95	0
	Prog.	0	0	0
	Tot.	0.96		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.98	0	0.02
	Leis.	0.05	0.95	0
	Prog.	0	0	1.00
	Tot.	0.98		

2 Performance of standard classifiers in non-hierarchical framework

Table 7: Performance of KNN in non-hierarchical framework by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader and (c) both subjects.

		(a)				
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0	0	0	0	0
	Test	0	0.76	0.06	0	0.18
	Admin.	0	0.22	0.78	0	0
	Leis.	0	0	0	0	0
	Prog.	0	0.31	0	0	0.69
Tot.		0.75				
		(b)				
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0.82	0.01	0.16	0.01	0
	Test	0.06	0.77	0.17	0	0
	Admin.	0.14	0	0.86	0	0
	Leis.	0.01	0	0.03	0.96	0
	Prog.	0	0	0	0	0
Tot.		0.84				
		(c)				
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0.82	0.01	0.16	0.01	0
	Test	0.01	0.75	0.06	0	0.18
	Admin.	0	0.05	0.84	0	0
	Leis.	0.01	0	0.03	0.96	0
	Prog.	0	0.31	0	0	0.69
Tot.		0.78				

Table 8: Performance of Random Forest in non-hierarchical framework by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader and (c) both subjects.

(a)						
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0	0	0	0	0
	Test	0	0.79	0.10	0	0.11
	Admin.	0	0.11	0.89	0	0
	Leis.	0	0	0	0	0
	Prog.	0	0.31	0	0	0.69
Tot.		0.77				
(b)						
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0.80	0.01	0.18	0.01	0
	Test	0	0.80	0.20	0	0
	Admin.	0.05	0	0.95	0	0
	Leis.	0	0	0.04	0.96	0
	Prog.	0	0	0	0	0
Tot.		0.83				
(c)						
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0.80	0.01	0.18	0.01	0
	Test	0	0.79	0.10	0	0.11
	Admin.	0.03	0.03	0.94	0	0
	Leis.	0	0	0.04	0.96	0
	Prog.	0	0.31	0	0	0.69
Tot.		0.80				

Table 9: Performance of SVM in non-hierarchical framework by utilizing only relevant descriptors and a training set ratio of 70% for (a) developer, (b) leader and (c) both subjects.

(a)						
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0	0	0	0	0
	Test	0	0.83	0.05	0	0.12
	Admin.	0	0.20	0.80	0	0
	Leis.	0	0	0	0	0
	Prog.	0	0.30	0	0	0.70
Tot.		0.81				
(b)						
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0.80	0.01	0.18	0.01	0
	Test	0	0.81	0.19	0	0
	Admin.	0.10	0.02	0.88	0	0
	Leis.	0	0	0.03	0.97	0
	Prog.	0	0.30	0	0	0.70
Tot.		0.84				
(c)						
		Estimated task				
		Doc.	Test	Admin.	Leis.	Prog.
Ground truth	Doc.	0.80	0.01	0.18	0.01	0
	Test	0	0.83	0.05	0	0.12
	Admin.	0.07	0.07	0.86	0	0
	Leis.	0	0	0.03	0.97	0
	Prog.	0	0.30	0	0	0.70
Tot.		0.82				

3 Performance of standard classifiers utilizing all descriptors

Table 10: Performance of KNN at hierarchical framework Stage-1 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.84	0.16
	Other	0	0.19	0.81
	Tot.	0.83		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.85	0.03	0.12
	Test	0	1.00	0
	Other	0.08	0.01	0.91
	Tot.	0.87		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.85	0.03	0.12
	Test	0	0.84	0.16
	Other	0.03	0.11	0.86
	Tot.	0.84		

Table 11: Performance of KNN at hierarchical framework Stage-2 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.95	0	0.05
	Leis.	0	0	0
	Prog.	0.05	0	0.95
	Tot.	0.95		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.98	0.02	0
	Leis.	0.08	0.92	0
	Prog.	0	0	0
	Tot.	0.00		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.97	0.02	0.01
	Leis.	0.08	0.92	0
	Prog.	0.05	0	0.95
	Tot.	0.94		

Table 12: Performance of Random Forest at hierarchical framework Stage-1 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.88	0.12
	Other	0	0.30	0.70
	Tot.	0.85		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.86	0.01	0.13
	Test	0	1.00	0
	Other	0.04	0.01	0.95
	Tot.	0.88		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.86	0.01	0.13
	Test	0	0.89	0.11
	Other	0.02	0.17	0.81
	Tot.	0.86		

Table 13: Performance of Random Forest at hierarchical framework Stage-2 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.90	0	0.10
	Leis.	0	0	0
	Prog.	0	0	1.00
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.05	0.95	0
	Prog.	0	0	0
	Tot.	0.96		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.98	0	0.02
	Leis.	0.05	0.95	0
	Prog.	0	0	1.00
	Tot.	0.98		

Table 14: Performance of SVM at hierarchical framework Stage-1 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.90	0.10
	Other	0	0.20	0.80
	Tot.	0.89		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.98	0.01	0.01
	Test	0	1.00	0
	Other	0.13	0	0.87
	Tot.	0.96		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.98	0.01	0.01
	Test	0	0.91	0.09
	Other	0.05	0.12	0.83
	Tot.	0.92		

Table 15: Performance of SVM at hierarchical framework Stage-2 by utilizing all descriptors and a training set ratio of 70% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0	0	0
	Prog.	0.01	0	0.99
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.03	0.97	0
	Prog.	0	0	0
	Tot.	0.97		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.03	0.97	0
	Prog.	0.01	0	0.99
	Tot.	0.98		

4 Performance of standard classifiers with a training set ratio of 30%

Table 16: Performance of KNN at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.

		(a)		
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.80	0.20
	Other	0	0.31	0.69
	Tot.	0.78		
		(b)		
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.89	0.03	0.09
	Test	0.08	0.84	0.08
	Other	0.09	0.01	0.90
	Tot.	0.89		
		(c)		
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.89	0.03	0.09
	Test	0.01	0.80	0.19
	Other	0.04	0.18	0.78
	Tot.	0.82		

Table 17: Performance of KNN at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.90	0	0.10
	Leis.	0	0	0
	Prog.	0.01	0	0.99
	Tot.	0.98		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.07	0.93	0
	Prog.	0	0	0
	Tot.	0.94		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.98	0	0.02
	Leis.	0.07	0.93	0
	Prog.	0.01	0	0.99
	Tot.	0.97		

Table 18: Performance of Random Forest at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.88	0.12
	Other	0	0.30	0.70
	Tot.	0.85		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.88	0.01	0.11
	Test	0.06	0.83	0.11
	Other	0.07	0.01	0.92
	Tot.	0.89		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.88	0.01	0.11
	Test	0.01	0.87	0.12
	Other	0.04	0.16	0.80
	Tot.	0.86		

Table 19: Performance of Random Forest at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.90	0	0.10
	Leis.	0	0	0
	Prog.	0	0	1.00
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	1.00	0	0
	Leis.	0.06	0.94	0
	Prog.	0	0	0
	Tot.	0.95		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.98	0	0.02
	Leis.	0.06	0.94	0
	Prog.	0	0	1.00
	Tot.	0.97		

Table 20: Performance of SVM at hierarchical framework Stage-1 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0	0	0
	Test	0	0.88	0.12
	Other	0	0.30	0.70
	Tot.	0.85		
(b)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.98	0.01	0.01
	Test	0.14	0.86	0
	Other	0.14	0.01	0.85
	Tot.	0.95		
(c)				
		Estimated task		
		Doc.	Test	Other
Ground truth	Doc.	0.98	0.01	0.01
	Test	0.01	0.88	0.11
	Other	0.06	0.17	0.77
	Tot.	0.89		

Table 21: Performance of SVM at hierarchical framework Stage-2 by utilizing only relevant descriptors and a training set ratio of 30% for (a) developer, (b) leader, and (c) both.

(a)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.93	0	0.07
	Leis.	0	0	0
	Prog.	0.01	0	0.99
	Tot.	0.99		
(b)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.98	0.02	0
	Leis.	0.06	0.94	0
	Prog.	0	0	0
	Tot.	0.95		
(c)				
		Estimated task		
		Admin.	Leis.	Prog.
Ground truth	Admin.	0.97	0.02	0.01
	Leis.	0.06	0.94	0
	Prog.	0.01	0	0.99
	Tot.	0.97		