

TABLE S-I
THE ACCURACY OF RSMOTE TO PREDICT THE SEVERITY OF *Eclipse*.

Eclipse_JDT_Debug	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	70.78	71.08	68.37	70.78	71.08	70.25
	ROS	67.77	66.87	60.24	54.52	67.77	62.35
	CMA	67.77	71.08	70.08	68.67	71.08	69.40
	SMOTE	70.78	63.27	68.56	65.37	70.78	67.00
	RSMOTE	71.39	65.06	63.25	71.39	71.39	67.77
		71.59	68.37	70.08	67.87	71.59	69.48
Eclipse_CDT-core	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	68.06	80.63	73.82	80.10	80.63	75.65
	ROS	55.50	72.77	62.30	52.88	72.77	60.86
	CMA	66.49	80.63	76.96	73.82	80.63	74.48
	SMOTE	79.25	74.36	80.00	76.96	80.00	77.64
	RSMOTE	79.58	73.82	80.17	75.92	80.17	77.37
		80.80	73.65	81.15	79.58	81.15	78.80
Eclipse_JDT_Core	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	68.97	72.58	75.21	77.67	77.67	73.61
	ROS	69.46	69.95	62.73	54.68	69.95	64.21
	CMA	66.83	72.58	69.29	76.35	76.35	71.26
	SMOTE	77.01	66.67	71.76	78.28	78.28	73.43
	RSMOTE	75.37	66.67	70.77	76.19	76.19	72.25
		74.06	75.18	71.76	78.54	78.54	74.89
Eclipse_PDE_UI	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	70.52	71.90	66.67	71.90	71.90	70.25
	ROS	69.70	68.04	60.06	63.36	69.70	65.29
	CMA	68.87	71.90	68.60	64.74	71.90	68.53
	SMOTE	58.63	56.16	71.28	73.16	73.16	64.81
	RSMOTE	73.55	65.01	72.45	69.42	73.55	70.11
		70.52	74.10	72.91	74.75	74.75	73.07
Eclipse_Platform_Debug	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	62.97	52.36	58.96	58.96	62.97	58.31
	ROS	64.62	51.89	54.72	53.77	64.62	56.25
	CMA	66.51	52.36	67.45	61.79	67.45	62.03
	SMOTE	71.70	43.38	70.16	63.68	71.70	62.23
	RSMOTE	69.81	52.36	68.40	58.02	69.81	62.15
		72.48	53.46	67.30	63.21	72.48	64.11
Eclipse_Platform_UI	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	60.43	69.60	65.78	73.57	73.57	67.35
	ROS	61.30	58.70	62.02	67.73	67.73	62.44
	CMA	60.72	69.60	67.29	70.11	70.11	66.93
	SMOTE	58.63	55.79	70.13	73.25	73.25	64.45
	RSMOTE	59.13	63.97	67.08	73.94	73.94	66.03
		61.40	64.28	70.30	74.83	74.83	67.70
Eclipse_ALL	AVG.	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
		68.42	66.11	68.84	69.16	73.15	68.13

TABLE S-II
THE ACCURACY OF RSMOTE TO PREDICT THE SEVERITY OF *GNOME*.

GNOME_Panel_Panel	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	77.57	79.04	82.72	83.64	83.64	80.74
	ROS	77.39	78.49	75.92	78.13	78.49	77.48
	CMA	77.21	78.86	81.99	84.19	84.19	80.56
	SMOTE	80.33	86.03	82.54	84.56	86.03	83.37
	RSMOTE	79.78	80.70	81.80	83.09	83.09	81.34
		79.47	86.52	83.09	84.80	86.52	83.47
GNOME_Terminal_General	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	86.70	93.10	92.60	93.60	93.60	91.50
	ROS	83.54	92.93	89.11	92.02	92.93	89.40
	CMA	92.02	93.10	93.02	93.10	93.10	92.81
	SMOTE	92.85	94.43	93.18	94.10	94.43	93.64
	RSMOTE	92.69	87.61	92.19	93.85	93.85	91.59
		93.52	95.15	92.38	94.02	95.15	93.77
GNOME_Ekiga_General	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	91.21	90.66	91.03	91.01	91.21	90.98
	ROS	91.76	95.24	91.21	90.48	95.24	92.17
	CMA	91.39	90.66	89.56	91.03	91.39	90.66
	SMOTE	91.39	91.39	93.04	91.76	93.04	91.90
	RSMOTE	91.58	93.77	92.86	91.94	93.77	92.54
		91.70	95.54	92.49	91.76	95.54	92.87
GNOME_Evolution_Calendar	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	79.30	81.78	82.28	81.73	82.28	81.27
	ROS	77.09	79.56	70.36	72.83	79.56	74.96
	CMA	79.13	81.18	81.94	76.75	81.94	79.75
	SMOTE	82.37	79.56	81.00	83.39	83.39	81.58
	RSMOTE	81.77	79.05	79.90	81.18	81.77	80.48
		81.40	83.28	80.64	82.57	83.28	81.97
GNOME_Evolution_Contacts	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	73.86	73.49	72.26	74.97	74.97	73.65
	ROS	71.52	73.61	68.43	66.72	73.61	70.07
	CMA	72.63	73.12	71.76	74.48	74.48	73.00
	SMOTE	73.61	79.65	76.57	71.39	79.65	75.31
	RSMOTE	73.37	77.07	72.50	71.52	77.07	73.62
		71.80	82.16	75.50	73.28	82.16	75.69
GNOME_Evolution_Shell	Original	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
	RUS	76.76	76.94	73.94	76.76	76.94	76.10
	ROS	75.35	75.00	70.25	73.24	75.35	73.46
	CMA	76.41	76.06	75.53	76.06	76.41	76.02
	SMOTE	77.46	81.51	75.00	76.06	81.51	77.51
	RSMOTE	77.11	76.06	75.35	77.82	77.82	76.59
		77.17	82.63	76.17	76.23	82.63	78.05
GNOME_ALL	AVG.	NB	KNN	RT	J48	MAX_ACC	AVG_ACC
		81.67	83.75	81.95	82.61	84.72	82.50

TABLE S-III
THE *F-measure* OF RSMOTE TO PREDICT THE SEVERITY OF *Eclipse*.

		NB	KNN	RT	J48	MAX_F	AVG_F
Eclipse_JDT_Debug	Original	0.71	0.69	0.68	0.65	0.71	0.68
	RUS	0.69	0.67	0.62	0.56	0.69	0.64
	ROS	0.69	0.69	0.70	0.66	0.70	0.69
	CMA	0.72	0.63	0.68	0.66	0.72	0.67
	SMOTE	0.70	0.67	0.64	0.68	0.70	0.67
	RSMOTE	0.72	0.69	0.70	0.66	0.72	0.69
Eclipse_CDT_cdt-core	Original	0.70	0.74	0.74	0.71	0.74	0.72
	RUS	0.60	0.70	0.64	0.57	0.70	0.63
	ROS	0.70	0.74	0.75	0.73	0.75	0.73
	CMA	0.78	0.74	0.80	0.77	0.80	0.77
	SMOTE	0.78	0.74	0.71	0.74	0.78	0.74
	RSMOTE	0.81	0.76	0.80	0.77	0.81	0.79
Eclipse_JDT_Core	Original	0.70	0.71	0.73	0.75	0.75	0.72
	RUS	0.70	0.70	0.64	0.57	0.70	0.65
	ROS	0.69	0.71	0.69	0.76	0.76	0.71
	CMA	0.77	0.66	0.72	0.78	0.78	0.73
	SMOTE	0.74	0.68	0.71	0.75	0.75	0.72
	RSMOTE	0.74	0.70	0.72	0.78	0.78	0.74
Eclipse_PDE_UI	Original	0.71	0.70	0.67	0.68	0.71	0.69
	RUS	0.71	0.70	0.62	0.64	0.71	0.67
	ROS	0.70	0.70	0.68	0.66	0.70	0.69
	CMA	0.61	0.56	0.71	0.72	0.72	0.65
	SMOTE	0.72	0.67	0.72	0.70	0.72	0.70
	RSMOTE	0.71	0.75	0.73	0.73	0.75	0.73
Eclipse_Platform_Debug	Original	0.68	0.53	0.59	0.59	0.68	0.60
	RUS	0.65	0.52	0.55	0.54	0.65	0.57
	ROS	0.67	0.53	0.67	0.61	0.67	0.62
	CMA	0.70	0.43	0.70	0.63	0.70	0.62
	SMOTE	0.68	0.51	0.68	0.59	0.68	0.62
	RSMOTE	0.71	0.50	0.68	0.63	0.71	0.63
Eclipse_Platform_UI	Original	0.62	0.69	0.66	0.70	0.70	0.67
	RUS	0.63	0.61	0.63	0.68	0.68	0.64
	ROS	0.63	0.69	0.66	0.70	0.70	0.67
	CMA	0.61	0.56	0.71	0.73	0.73	0.65
	SMOTE	0.61	0.66	0.68	0.72	0.72	0.67
	RSMOTE	0.63	0.65	0.71	0.74	0.74	0.68
Eclipse_ALL	AVG.	0.69	0.66	0.69	0.68	0.69	0.68

TABLE S-IV
THE *F-measure* OF RSMOTE TO PREDICT THE SEVERITY OF *GNOME*.

		NB	KNN	RT	J48	MAX_F	AVG_F
GNOME_Panel_Panel	Original	0.79	0.74	0.82	0.82	0.82	0.79
	RUS	0.79	0.75	0.78	0.80	0.80	0.78
	ROS	0.79	0.74	0.81	0.84	0.84	0.80
	CMA	0.80	0.85	0.83	0.84	0.85	0.83
	SMOTE	0.80	0.81	0.81	0.83	0.83	0.81
	RSMOTE	0.80	0.87	0.83	0.84	0.87	0.84
GNOME_Terminal_General	Original	0.89	0.91	0.92	0.92	0.92	0.91
	RUS	0.87	0.92	0.91	0.93	0.93	0.91
	ROS	0.93	0.91	0.93	0.92	0.93	0.92
	CMA	0.91	0.95	0.94	0.94	0.95	0.94
	SMOTE	0.91	0.89	0.93	0.94	0.94	0.92
	RSMOTE	0.92	0.95	0.93	0.94	0.95	0.94
GNOME_Ekiga_General	Original	0.91	0.87	0.90	0.88	0.91	0.89
	RUS	0.93	0.95	0.92	0.92	0.95	0.93
	ROS	0.92	0.87	0.88	0.92	0.92	0.90
	CMA	0.91	0.91	0.93	0.93	0.93	0.92
	SMOTE	0.90	0.93	0.93	0.93	0.93	0.92
	RSMOTE	0.91	0.95	0.92	0.92	0.95	0.93
GNOME_Evolution_Calendar	Original	0.81	0.79	0.82	0.81	0.82	0.81
	RUS	0.79	0.79	0.74	0.76	0.79	0.77
	ROS	0.81	0.79	0.81	0.79	0.81	0.80
	CMA	0.82	0.82	0.82	0.83	0.83	0.82
	SMOTE	0.81	0.80	0.81	0.82	0.82	0.81
	RSMOTE	0.81	0.85	0.82	0.83	0.85	0.83
GNOME_Evolution_Contacts	Original	0.74	0.69	0.71	0.76	0.76	0.73
	RUS	0.72	0.73	0.70	0.68	0.73	0.71
	ROS	0.73	0.68	0.70	0.76	0.76	0.72
	CMA	0.72	0.81	0.77	0.72	0.81	0.76
	SMOTE	0.71	0.77	0.72	0.72	0.77	0.73
	RSMOTE	0.71	0.76	0.72	0.83	0.83	0.76
GNOME_Evolution_Shell	Original	0.78	0.75	0.73	0.78	0.78	0.76
	RUS	0.76	0.76	0.71	0.74	0.76	0.74
	ROS	0.77	0.75	0.76	0.77	0.77	0.76
	CMA	0.78	0.82	0.75	0.76	0.82	0.78
	SMOTE	0.77	0.77	0.76	0.77	0.77	0.77
	RSMOTE	0.77	0.83	0.77	0.76	0.83	0.78
GNOME_ALL	AVG.	0.82	0.83	0.82	0.83	0.85	0.82

TABLE S-V
THE DETAIL OF FMR-FI (SAME CLASSIFIERS) AND FMR-FI (DIFFERENT CLASSIFIERS) IN EXPERIMENTAL.

Project	Product-Component	Same Classifier	Differe Classifiers
Eclipse	Platform-UI	J48	KNN, RT, J48
	JDT-Core	J48	NB, KNN, J48
	JDT-Debug	RT	NB, KNN, RT
	Platform-Debug	NB	NB, RT, J48
	CDT-Core	NB	NB, KNN, RT
	PDE-UI	KNN	NB, KNN, RT
Mozilla	Core-Layout	J48	NB, KNN, J48
	Core-XPCOM	J48	NB, KNN, J48
	Core-XUL	RT	NB, KNN, RT
	Core-XPCConnect	J48	NB, RT, J48
GNOME	Evolution-Calendar	KNN	NB, KNN, J48
	Terminal-General	J48	NB, RT, J48
	Ekiga-General	KNN	NB, KNN, RT
	Evolution-Contacts	KNN	KNN, RT, J48
	Evolution-Shell	KNN	NB, KNN, RT
	Panel-Panel	KNN	KNN, RT, J48