Table B1: Phishing dataset. Performance (%) of different methods under noise. We generate noise by randomly replacing the results of different rows in the base clusterings with other clusters. It can be observed that our method still exhibits satisfactory performance even at high noise levels.

	ARI					NMI					Purity				
Method	10%	30%	50%	70%	90%	10%	30%	50%	70%	90%	10%	30%	50%	70%	90%
CEAM	$5.9_{\pm2}$	$5.9_{\pm2}$	$5.8_{\pm2}$	$1.3_{\pm2}$	$0.0_{\pm1}$	$6.0_{\pm2}$	$4.8_{\pm2}$	$4.7_{\pm2}$	$1.1_{\pm2}$	$0.1_{\pm1}$	$59.9_{\pm2}$	$60.1_{\pm2}$	$60.7_{\pm2}$	$57.1_{\pm2}$	$55.5_{\pm2}$
CES^{2}L	$3.7_{\pm3}$	$6.7_{\pm3}$	$7.7_{\pm4}$	$0.5_{\pm2}$	$0.2_{\pm1}$	$4.7_{\pm3}$	$7.1_{\pm4}$	$6.3_{\pm3}$	$0.6_{\pm2}$	$0.1_{\pm1}$	$59.0_{\pm3}$	$61.1_{\pm3}$	$62.0_{\pm4}$	$56.1_{\pm2}$	$55.5_{\pm2}$
CES^{2}Q	$5.1_{\pm4}$	$5.6_{\pm3}$	$5.7_{\pm3}$	$1.0_{\pm2}$	$0.1_{\pm1}$	$5.3_{\pm3}$	$5.6_{\pm4}$	$5.2_{\pm3}$	$0.9_{\pm2}$	$0.1_{\pm1}$	$59.5_{\pm3}$	$59.9_{\pm3}$	$60.5_{\pm3}$	$56.6_{\pm3}$	$55.5_{\pm2}$
LWEA	$-0.4_{\pm2}$	$-0.2_{\pm2}$	$0.0_{\pm2}$	$0.0_{\pm1}$	$0.0_{\pm1}$	$0.2_{\pm2}$	$0.1_{\pm2}$	$0.2_{\pm2}$	$0.3_{\pm2}$	$0.1_{\pm1}$	$55.5_{\pm2}$	$55.5_{\pm2}$	$55.6_{\pm2}$	$55.7_{\pm2}$	$55.5_{\pm2}$
MKKM	$7.7_{\pm3}$	$0.9_{\pm2}$	$3.9_{\pm2}$	$1.2_{\pm2}$	$0.0_{\pm1}$	$7.9_{\pm3}$	$2.8_{\pm3}$	$3.9_{\pm3}$	$1.0_{\pm2}$	$0.1_{\pm1}$	$61.3_{\pm3}$	$56.7_{\pm3}$	$59.3_{\pm3}$	$56.9_{\pm2}$	$55.5_{\pm2}$
SMKKM	$7.3_{\pm3}$	$7.6_{\pm3}$	$3.3_{\pm3}$	$0.5_{\pm2}$	$0.2_{\pm1}$	$7.1_{\pm3}$	$7.1_{\pm3}$	$3.7_{\pm3}$	$0.6_{\pm2}$	$0.1_{\pm1}$	$61.2_{\pm3}$	$61.5_{\pm3}$	$58.6_{\pm3}$	$56.1_{\pm2}$	$55.5_{\pm2}$
SEC	$4.5_{\pm4}$	$3.4_{\pm3}$	$8.4_{\pm5}$	$1.0_{\pm3}$	$0.1_{\pm2}$	$5.5_{\pm4}$	$4.1_{\pm3}$	$7.0_{\pm4}$	$1.1_{\pm3}$	$0.1_{\pm2}$	$59.7_{\pm4}$	$58.8_{\pm3}$	$62.7_{\pm5}$	$56.6_{\pm3}$	$55.5_{\pm2}$
TRCE	$8.6_{\pm2}$	$5.1_{\pm2}$	$6.9_{\pm3}$	$1.1_{\pm2}$	$0.0_{\pm1}$	$8.3_{\pm2}$	$5.0_{\pm2}$	$5.7_{\pm2}$	$1.1_{\pm2}$	$0.1_{\pm1}$	$62.1_{\pm2}$	$59.7_{\pm2}$	$61.4_{\pm3}$	$56.8_{\pm3}$	$55.5_{\pm2}$
CESHL	$-0.4_{\pm3}$	$0.0_{\pm2}$	$0.3_{\pm3}$	$0.3_{\pm2}$	$0.0_{\pm1}$	$0.2_{\pm2}$	$0.5_{\pm3}$	$0.8_{\pm3}$	$0.3_{\pm2}$	$0.0_{\pm1}$	$55.5_{\pm2}$	$55.7_{\pm2}$	$56.0_{\pm3}$	$55.9_{\pm3}$	$55.5_{\pm2}$
SCCABG	$3.7_{\pm3}$	$7.2_{\pm4}$	$8.0_{\pm4}$	$0.5_{\pm2}$	$0.1_{\pm1}$	$4.7_{\pm3}$	$7.4_{\pm4}$	$6.9_{\pm3}$	$0.6_{\pm2}$	$0.1_{\pm1}$	$58.5_{\pm4}$	$61.4_{\pm4}$	$62.3_{\pm4}$	$56.0_{\pm3}$	$55.5_{\pm2}$
AWEC	$5.1_{\pm3}$	$4.2_{\pm3}$	$9.1_{\pm3}$	$0.8_{\pm3}$	$0.1_{\pm2}$	$5.4_{\pm3}$	$4.7_{\pm3}$	$7.3_{\pm3}$	$0.8_{\pm2}$	$0.1_{\pm1}$	$59.7_{\pm3}$	$59.1_{\pm3}$	$63.1_{\pm3}$	$56.5_{\pm3}$	$55.5_{\pm2}$
ECCMS	$-0.3_{\pm3}$	$-0.2_{\pm3}$	$0.3_{\pm3}$	$0.2_{\pm3}$	$0.0_{\pm2}$	$0.2_{\pm3}$	$0.4_{\pm3}$	$1.2_{\pm3}$	$0.3_{\pm2}$	$0.1_{\pm2}$	$55.5_{\pm2}$	$55.7_{\pm2}$	$56.2_{\pm3}$	$55.8_{\pm3}$	$55.5_{\pm2}$
NWCA	$-0.4_{\pm3}$	$0.0_{\pm2}$	$0.3_{\pm3}$	$0.3_{\pm3}$	$0.0_{\pm2}$	$0.2_{\pm3}$	$0.5_{\pm3}$	$0.8_{\pm3}$	$0.3_{\pm3}$	$0.0_{\pm2}$	$55.5_{\pm2}$	$55.7_{\pm2}$	$56.0_{\pm3}$	$55.9_{\pm3}$	$55.5_{\pm2}$
Proposed (α=0.1)	$\underline{27.6}_{\pm6}$	$\underline{23.2}_{\pm5}$	$\underline{16.7}_{\pm3}$	$\underline{4.9}_{\pm2}$	$\underline{0.2}_{\pm1}$	$\underline{21.7}_{\pm3}$	$\underline{18.0}_{\pm2}$	$\underline{12.7}_{\pm3}$	$\underline{3.7}_{\pm2}$	$\underline{0.1}_{\pm1}$	$\underline{75.3}_{\pm3}$	$\underline{68.1}_{\pm3}$	$\underline{65.9}_{\pm3}$	$\underline{57.2}_{\pm3}$	$\underline{55.5}_{\pm2}$
Proposed	$\mathbf{27.6}_{\pm6}$	$\mathbf{23.2}_{\pm5}$	$\mathbf{19.4}_{\pm6}$	$\mathbf{5.6}_{\pm6}$	$\mathbf{0.2}_{\pm1}$	$\mathbf{21.7}_{\pm6}$	$\mathbf{18.0}_{\pm6}$	$\mathbf{14.6}_{\pm6}$	$\mathbf{4.1}_{\pm6}$	$\mathbf{0.1}_{\pm1}$	$\mathbf{75.3}_{\pm3}$	$\mathbf{68.1}_{\pm3}$	$\mathbf{68.4}_{\pm3}$	$\mathbf{57.9}_{\pm3}$	$\mathbf{55.5}_{\pm2}$

Table B2: Seeds dataset. Performance (%) of different methods under noise. It can be observed that our method also achieves excellent performance on this dataset. However, when the noise level reaches 90%, we consider that all methods are unable to provide valuable information, as the data is severely contaminated at this point.

	ARI					NMI					Purity				
Method	10%	30%	50%	70%	90%	10%	30%	50%	70%	90%	10%	30%	50%	70%	90%
CEAM	$61.0_{\pm4}$	$60.1_{\pm4}$	$50.3_{\pm6}$	$18.7_{\pm5}$	$0.1_{\pm2}$	$57.6_{\pm9}$	$58.0_{\pm8}$	$36.5_{\pm7}$	$4.9_{\pm5}$	$1.4_{\pm2}$	$76.1_{\pm2}$	$76.3_{\pm3}$	$62.1_{\pm4}$	$41.1_{\pm4}$	$37.1_{\pm2}$
CES^{2}L	$55.2_{\pm7}$	$45.2_{\pm5}$	$31.0_{\pm13}$	$2.9_{\pm7}$	$0.3_{\pm3}$	$58.6_{\pm9}$	$57.0_{\pm9}$	$40.0_{\pm17}$	$6.7_{\pm8}$	$1.7_{\pm3}$	$74.8_{\pm7}$	$75.7_{\pm5}$	$66.5_{\pm11}$	$43.1_{\pm5}$	$36.9_{\pm2}$
CES^{2}Q	$50.5_{\pm10}$	$41.8_{\pm8}$	$28.5_{\pm12}$	$3.6_{\pm8}$	$0.2_{\pm2}$	$58.3_{\pm14}$	$51.8_{\pm13}$	$35.3_{\pm16}$	$6.0_{\pm10}$	$1.6_{\pm3}$	$74.6_{\pm9}$	$70.3_{\pm7}$	$61.8_{\pm11}$	$42.3_{\pm6}$	$37.0_{\pm2}$
LWEA	$60.3_{\pm2}$	$58.1_{\pm3}$	$44.1_{\pm6}$	$6.9_{\pm4}$	$0.2_{\pm3}$	$60.4_{\pm4}$	$56.5_{\pm6}$	$38.2_{\pm9}$	$8.3_{\pm8}$	$1.8_{\pm3}$	$77.7_{\pm1}$	$75.6_{\pm2}$	$63.2_{\pm3}$	$45.8_{\pm5}$	$36.6_{\pm2}$
MKKM	$44.6_{\pm13}$	$26.7_{\pm7}$	$14.9_{\pm5}$	$9.2_{\pm3}$	$0.4_{\pm2}$	$44.1_{\pm14}$	$26.4_{\pm7}$	$14.5_{\pm5}$	$9.5_{\pm2}$	$\underline{2.3}_{\pm2}$	$75.0_{\pm11}$	$65.3_{\pm5}$	$57.8_{\pm4}$	$52.4_{\pm2}$	$\underline{41.0}_{\pm1}$
SMKKM	$59.2_{\pm3}$	$53.5_{\pm2}$	$49.7_{\pm5}$	$20.8_{\pm4}$	$0.6_{\pm2}$	$60.4_{\pm5}$	$55.8_{\pm6}$	$48.3_{\pm5}$	$18.3_{\pm4}$	$1.4_{\pm2}$	$82.9_{\pm2}$	$79.6_{\pm2}$	$79.0_{\pm3}$	$60.8_{\pm4}$	$39.5_{\pm2}$
SEC	$30.3_{\pm6}$	$40.8_{\pm4}$	$33.6_{\pm8}$	$10.0_{\pm4}$	$0.4_{\pm3}$	$58.7_{\pm13}$	$47.8_{\pm9}$	$40.0_{\pm12}$	$11.6_{\pm6}$	$1.8_{\pm4}$	$64.2_{\pm4}$	$70.3_{\pm2}$	$65.7_{\pm6}$	$51.0_{\pm4}$	$39.2_{\pm2}$
TRCE	$58.1_{\pm2}$	$52.2_{\pm3}$	$44.0_{\pm5}$	$10.3_{\pm8}$	$0.1_{\pm3}$	$59.7_{\pm2}$	$58.0_{\pm3}$	$48.6_{\pm8}$	$18.7_{\pm9}$	$1.6_{\pm3}$	$82.6_{\pm1}$	$82.1_{\pm2}$	$73.1_{\pm4}$	$50.5_{\pm6}$	$36.5_{\pm2}$
CESHL	$58.1_{\pm8}$	$55.4_{\pm5}$	$35.0_{\pm2}$	$14.8_{\pm9}$	$0.3_{\pm2}$	$56.7_{\pm12}$	$56.2_{\pm9}$	$42.3_{\pm17}$	$19.4_{\pm3}$	$1.4_{\pm2}$	$82.5_{\pm7}$	$79.6_{\pm7}$	$66.7_{\pm11}$	$53.2_{\pm7}$	$38.8_{\pm2}$
SCCABG	$56.9_{\pm6}$	$48.2_{\pm6}$	$17.8_{\pm8}$	$0.6_{\pm7}$	$0.0_{\pm2}$	$58.9_{\pm10}$	$56.6_{\pm21}$	$26.3_{\pm21}$	$4.2_{\pm6}$	$\underline{2.3}_{\pm2}$	$81.7_{\pm7}$	$75.1_{\pm12}$	$53.4_{\pm12}$	$35.8_{\pm5}$	$34.7_{\pm1}$
AWEC	$55.1_{\pm2}$	$54.7_{\pm2}$	$50.1_{\pm4}$	$19.7_{\pm5}$	$0.0_{\pm2}$	$61.7_{\pm4}$	$61.5_{\pm5}$	$47.6_{\pm8}$	$20.2_{\pm6}$	$0.8_{\pm2}$	$83.2_{\pm2}$	$80.0_{\pm2}$	$81.6_{\pm2}$	$62.3_{\pm4}$	$37.8_{\pm3}$
ECCMS	$60.9_{\pm3}$	$50.1_{\pm2}$	$44.1_{\pm6}$	$6.9_{\pm4}$	$0.2_{\pm3}$	$60.0_{\pm7}$	$53.4_{\pm6}$	$45.8_{\pm9}$	$9.2_{\pm8}$	$1.2_{\pm3}$	$83.8_{\pm2}$	$79.0_{\pm2}$	$73.9_{\pm3}$	$47.2_{\pm5}$	$38.3_{\pm2}$
NWCA	$58.6_{\pm2}$	$49.1_{\pm2}$	$23.9_{\pm3}$	$2.1_{\pm3}$	$0.2_{\pm2}$	$58.1_{\pm4}$	$47.9_{\pm7}$	$27.4_{\pm9}$	$4.1_{\pm8}$	$1.0_{\pm3}$	$82.4_{\pm2}$	$77.5_{\pm2}$	$61.0_{\pm3}$	$41.6_{\pm4}$	$37.9_{\pm2}$
Proposed (α=0.1)	$\underline{68.0}_{\pm6}$	$\underline{67.3}_{\pm6}$	$\underline{57.1}_{\pm6}$	$\underline{22.4}_{\pm6}$	$\underline{0.4}_{\pm3}$	$\underline{67.9}_{\pm12}$	$\underline{66.1}_{\pm12}$	$\underline{53.6}_{\pm9}$	$\underline{20.6}_{\pm3}$	$1.2_{\pm3}$	$\underline{87.9}_{\pm2}$	$\underline{87.7}_{\pm2}$	$\underline{83.4}_{\pm3}$	$\underline{63.5}_{\pm8}$	$39.2_{\pm2}$
Proposed	$\mathbf{68.0}_{\pm6}$	$\mathbf{67.3}_{\pm6}$	$\mathbf{58.8}_{\pm4}$	$\mathbf{25.1}_{\pm5}$	$\mathbf{0.5}_{\pm3}$	$\mathbf{67.9}_{\pm12}$	$\mathbf{66.4}_{\pm12}$	$\mathbf{55.9}_{\pm7}$	$\mathbf{23.2}_{\pm3}$	$\mathbf{2.5}_{\pm2}$	$\mathbf{87.9}_{\pm2}$	$\mathbf{87.7}_{\pm2}$	$\mathbf{84.1}_{\pm3}$	$\mathbf{65.9}_{\pm5}$	$\mathbf{41.5}_{\pm2}$