

Supplementary materials

Event classification on subsea pipeline inspection data using an ensemble of deep learning-based classifiers

Truong Dang^a, Tien Thanh Nguyen^a, Alan Wee-Chung Liew^b, Eyad Elyan^a

^a*School of Computing, Robert Gordon University, Aberdeen, Scotland, United Kingdom*

^b*School of Information and Communication Technology, Griffith University, Gold Coast, Australia*

Table S1: The weights of 6 classifiers on Dataset A in the proposed ensemble

Method	Anode	Debris	Exposure	Freespan	Normal
VGG16	0.0577	0.1617	0.0000	0.2283	0.1092
Resnet50	0.1919	0.1607	0.2820	0.3636	0.3027
InceptionV3	0.2570	0.0145	0.0621	0.0752	0.2358
InceptionResNetV2	0.1840	0.3125	0.0000	0.0000	0.0299
Xception	0.3242	0.2440	0.1747	0.1474	0.1240
SwinTransformer	0.0623	0.2921	0.4924	0.1631	0.2450

Table S2: The weights of 9 classifiers on Dataset A in the proposed ensemble

Method	Anode	Debris	Exposure	Freespan	Normal
VGG16	0.0000	0.0925	0.0000	0.1287	0.0474
Resnet50	0.0491	0.0000	0.0798	0.2573	0.1698
InceptionV3	0.1197	0.0000	0.0000	0.0173	0.1084
InceptionResNetV2	0.0696	0.2049	0.0000	0.0000	0.0000
DenseNet121	0.2208	0.2322	0.2067	0.0502	0.3912
Xception	0.1703	0.0666	0.0609	0.0713	0.0136
VisionTransformer	0.0000	0.0000	0.1460	0.1281	0.0384
MaxViT	0.4270	0.3851	0.3215	0.2793	0.2577
SwinTransformer	0.0000	0.1508	0.2282	0.0000	0.0000

Table S3: The weights of 6 classifiers on Dataset C in the proposed ensemble

Method	Concrete damage	Debris	Exposure	Normal
VGG16	0.1705	0.0000	0.0000	0.0111
Resnet50	0.8179	0.5146	0.5715	0.1994
InceptionV3	0.0882	0.0548	0.0204	0.5758
InceptionResNetV2	0.3140	0.2804	0.2039	0.0172
Xception	0.0000	0.0801	0.0000	0.0643
SwinTransformer	0.1700	0.3166	0.2027	0.1332

Table S4: The weights of 9 classifiers on Dataset C in the proposed ensemble

Method	Concrete damage	Debris	Exposure	Normal
VGG16	0.0000	0.0000	0.0000	0.0091
Resnet50	0.0565	0.1191	0.1077	0.0027
InceptionV3	0.0000	0.1419	0.0000	0.1696
InceptionResNetV2	0.0000	0.0000	0.0000	0.0115
DenseNet121	0.2492	0.0000	0.0547	0.6021
Xception	0.1001	0.0000	0.0000	0.0092
VisionTransformer	0.0000	0.0321	0.0000	0.0000
MaxViT	0.8562	0.8735	0.8344	0.1670
SwinTransformer	0.0000	0.0000	0.0000	0.0296

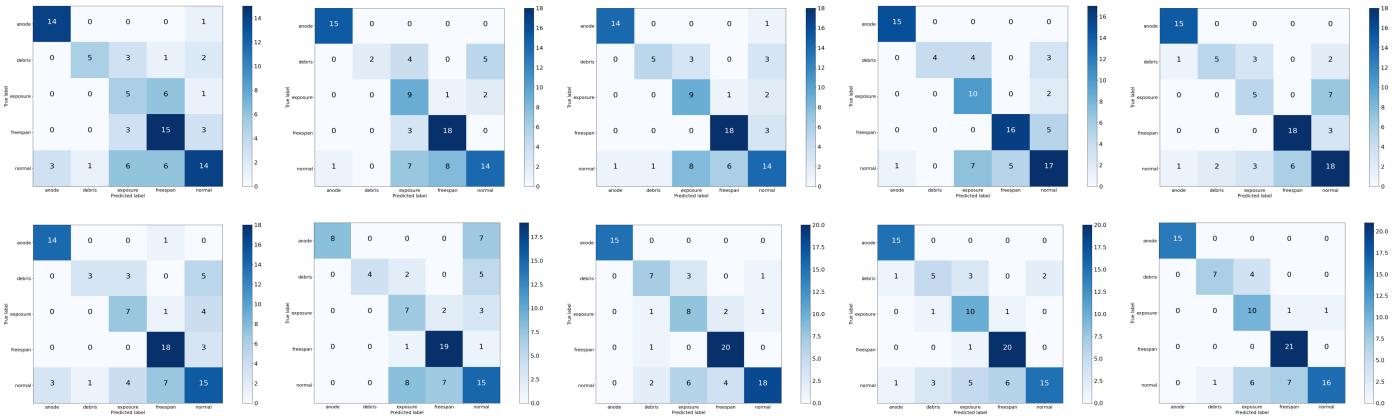


Figure S1: Confusion matrix of the base classifiers and the proposed ensemble on Dataset A

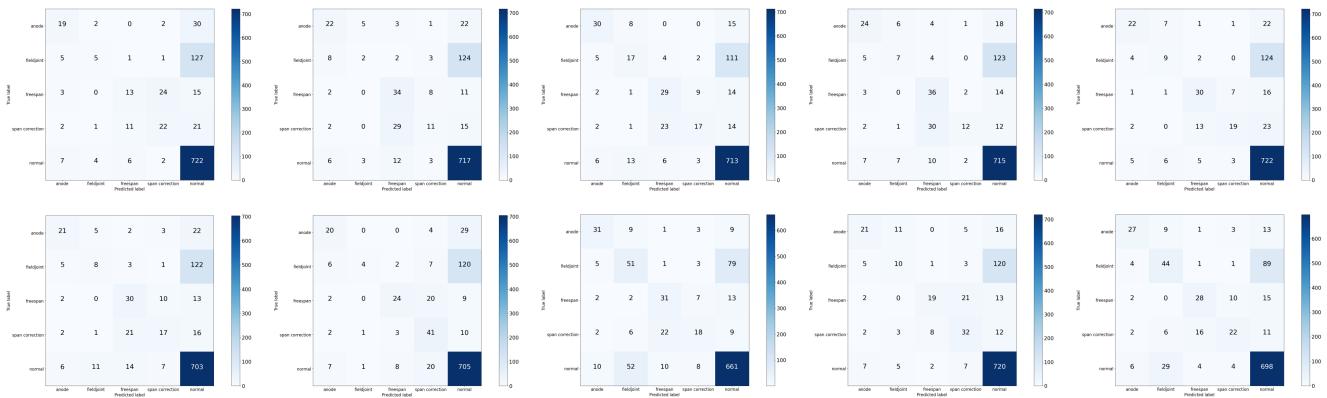


Figure S2: Confusion matrix of the base classifiers and the proposed ensemble on Dataset B

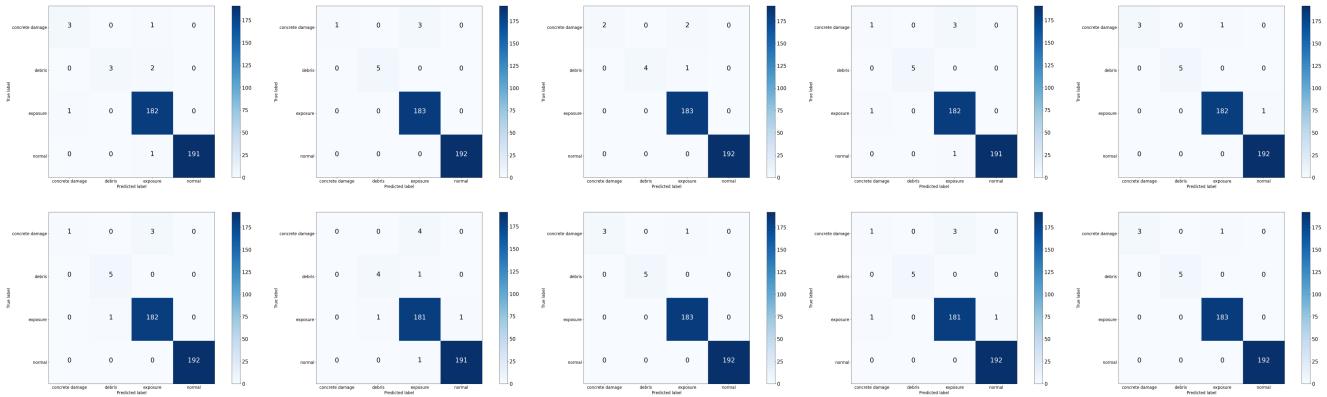


Figure S3: Confusion matrix of the base classifiers and the proposed ensemble on Dataset C

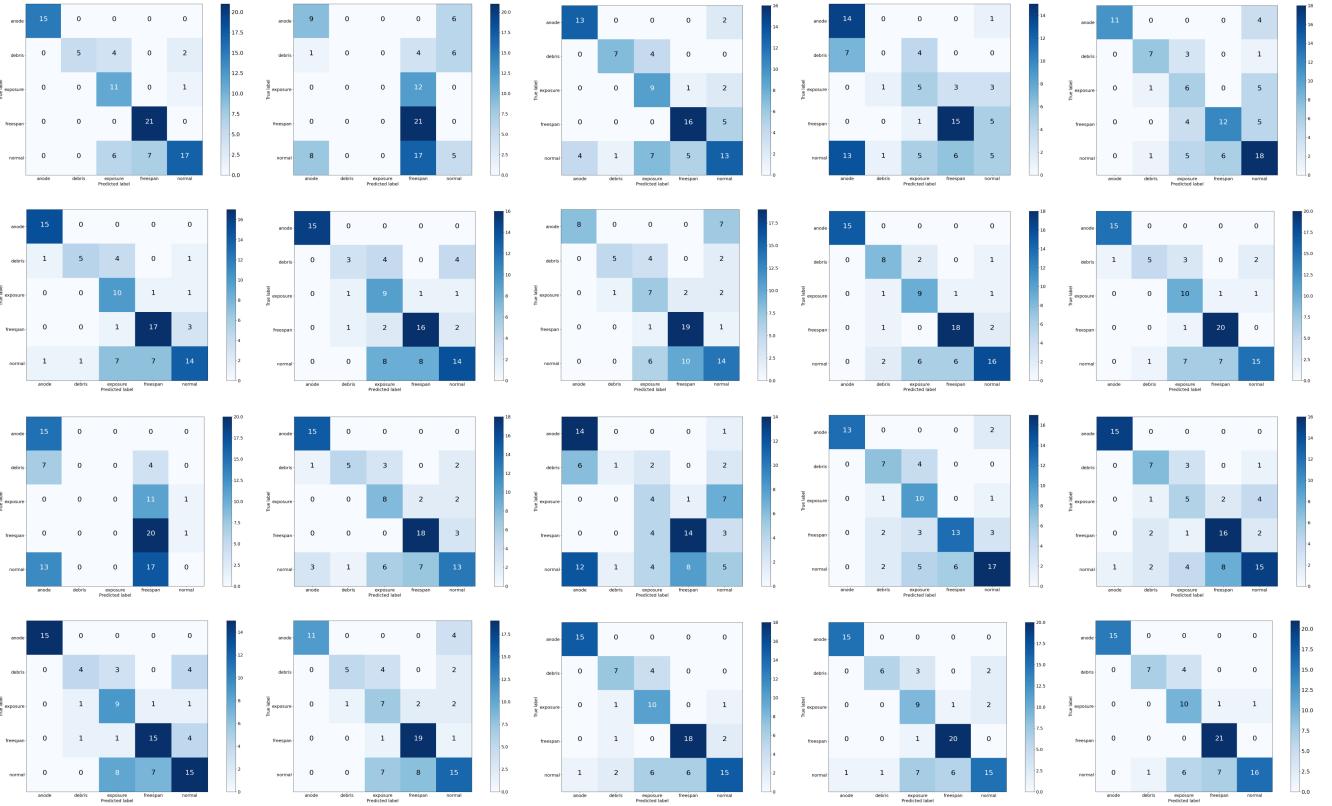


Figure S4: Confusion matrix of sum rule, the snapshot ensemble models and the proposed ensemble on Dataset A



Figure S5: Confusion matrix of sum rule, the snapshot ensemble models and the proposed ensemble on Dataset B

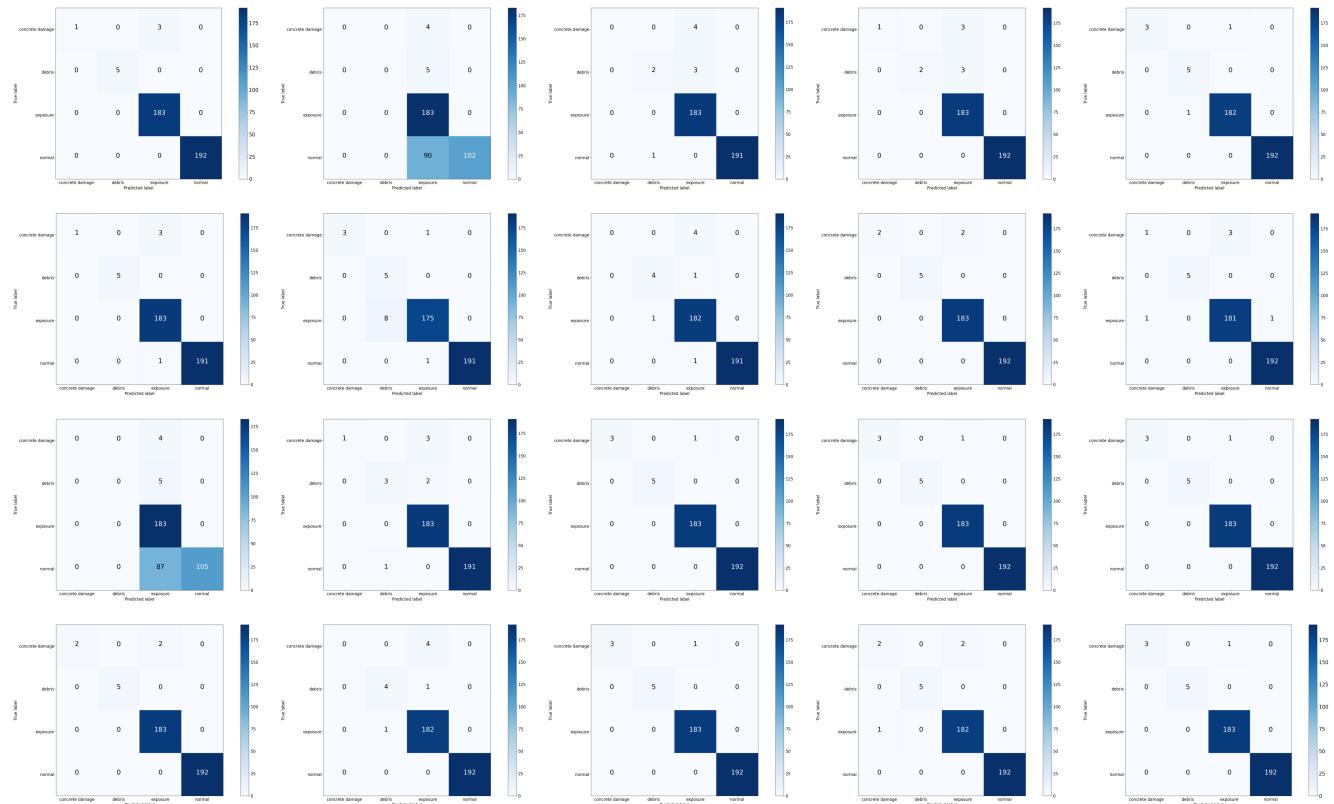


Figure S6: Confusion matrix of sum rule, the snapshot ensemble models and the proposed ensemble on Dataset C