

FGAPA Supplementary materials

Preface

This document aims to help readers who are not focused on hyperspectral image analysis quickly understand the basic concepts and task requirements. While addressing the questions raised by reviewers, it also presents all experiments and supplementary experiments conducted on FGAPA.

About FSL

FSL

Few-shot learning (FSL) has attracted attention for its ability to learn and generalize from very limited samples. FSL is essentially a meta-learning approach that can acquire transferable knowledge from different tasks to quickly adapt to new tasks. Typically, it operates under an N-way K-shot setting, where K labeled samples per class are used to train an N-class classifier.



Taking natural images as an example, an FSL task consists of a Support set, which is a collection of labeled samples, and a Query set, which is a collection of query samples. The query set and the support set are used to construct the FSL task and are fed into the feature extractor together for feature extraction. **Support features** represent the feature representations obtained from the support set through the feature extractor, while **Query features** are the feature representations obtained from the query set. The loss in FSL is calculated through metric learning, determining the class of a query feature by computing its distance to the support features of each class, bringing features of the same class closer and pushing features of different classes apart in the metric space. Through such FSL tasks, the model learns to classify query samples based on the given support set.

About the Source Domain, Target Domain, and Their Selection

Source Domain and Target Domain

In the context of cross-domain few-shot learning, the setting usually consists of source domain data D_s containing C_s classes and target domain data D_t containing C_t classes. The classes in D_s are referred to as base classes, while the classes in C_t are referred to as novel classes, and their actual categories are typically different. To ensure diversity in the training samples, C_s is usually larger than C_t . Unlike the abundant labeled samples in C_s , C_t contains only a few labeled samples D_l and a large number of unlabeled samples D_u . To meet the requirements for constructing meta-learning tasks, labeled samples D_l are augmented using random Gaussian noise. The proposed FGAPA method uses the labeled samples D_l from both the source domain D_s and the target domain D_t to train the feature extractor and ultimately evaluates classification performance on the target domain D_t using the unlabeled samples D_u .

In general, the source domain consists of data with abundant labeled samples, while the target domain contains only a small number of labeled samples for downstream classification tasks. What we aim to do is fully transfer the knowledge acquired by the model from training on the source domain to the target domain for classification tasks.

Regarding the selection of the source domain, in order to facilitate downstream tasks and reverse operations, the number of categories in the source domain is usually required to be greater than or equal to that of the target domain. This ensures that the metric space obtained from training can serve the tasks of the target domain. In this study, only Chikusei was used as the source domain, but our method demonstrates good robustness and reliability across different source domains. To this end, we conducted experiments using the Hanchuan source domain. Due to time constraints, only partial validation was performed, with further experiments to be completed later.

Due to time constraints, we chose **DCFSL** and **MLPA**, which are both domain adaptation methods, and compared them with **CTF-SSCL**, based on contrastive learning tasks, and **GCC-FSL**, which uses graphs to capture the correlation between the two domains.

Indian_pines-5shot

IP-5shot	DCFSL-2022年	GCCFSL: 2024年	CTF-SSCL-2024年	MLPA: 2025年	PGAPA: 2025年
train time per DataSet(s)	2023.52402	4478.06096	2587.71192	2126.25778	2347.09134
test time per DataSet(s)	0.47259	0.48637	0.75173	0.52211	0.97493
average OA	69.53 ± 2.85	67.09 ± 0.93	70.59 ± 4.221	68.13 ± 3.21	76.37 ± 2.56
average AA	80.72 ± 1.56	77.69 ± 1.42	81.69 ± 1.75	79.61 ± 1.84	85.76 ± 1.18
average Kappa	65.7726 ± 3.1936	63.0027 ± 1.0603	66.9550 ± 4.5188	64.2377 ± 3.5088	73.3409 ± 2.7795
Class 0	95.61 ± 7.54	90.49 ± 15.97	94.88 ± 7.75	95.37 ± 5.61	97.80 ± 3.69
Class 1	52.41 ± 13.50	46.45 ± 14.00	54.41 ± 7.07	52.28 ± 17.00	62.37 ± 8.81
Class 2	61.31 ± 10.94	51.90 ± 4.69	60.72 ± 5.99	58.56 ± 7.56	68.12 ± 6.07
Class 3	85.13 ± 6.98	81.08 ± 9.71	90.99 ± 5.31	83.41 ± 10.85	94.35 ± 4.28
Class 4	76.59 ± 6.16	72.99 ± 9.33	78.18 ± 8.33	74.48 ± 8.44	79.64 ± 7.46
Class 5	87.92 ± 8.11	82.88 ± 9.31	89.85 ± 5.98	83.34 ± 7.83	93.21 ± 3.72
Class 6	100.00 ± 0.00	97.83 ± 4.46	99.57 ± 1.30	100.00 ± 0.00	100.00 ± 0.00
Class 7	89.66 ± 12.21	90.21 ± 5.53	94.14 ± 8.09	85.69 ± 12.84	96.72 ± 4.56
Class 8	99.33 ± 2.00	100.00 ± 0.00	98.00 ± 4.27	99.33 ± 2.00	99.33 ± 2.00
Class 9	63.78 ± 9.02	63.22 ± 8.94	68.11 ± 10.04	63.02 ± 12.02	73.57 ± 9.70
Class 10	61.91 ± 10.35	63.18 ± 5.99	61.56 ± 13.51	59.83 ± 11.18	67.92 ± 10.76
Class 11	50.70 ± 11.94	45.70 ± 7.58	52.24 ± 11.89	50.15 ± 6.83	73.04 ± 15.30
Class 12	98.25 ± 2.40	98.45 ± 0.93	97.85 ± 2.06	98.40 ± 1.91	99.55 ± 0.91
Class 13	85.71 ± 7.63	87.32 ± 3.82	85.49 ± 7.29	86.37 ± 5.62	88.29 ± 7.62
Class 14	84.49 ± 10.42	74.59 ± 11.52	81.50 ± 9.29	84.91 ± 8.19	79.13 ± 13.71
Class 15	98.75 ± 1.79	96.70 ± 3.68	99.55 ± 1.04	98.64 ± 2.58	99.09 ± 1.22
seed:1309	73.32087718	66.9682368	75.326974	75.18930082	80.1848756
seed:1310	71.28527879	65.955335451	73.468384	64.85396794	78.65080146
seed:1332	64.79496509	67.46976104	67.450093	71.65896352	75.3958108
seed:1330	69.07267185	65.95535451	73.488052	68.66948569	75.71049267
seed:1236 (原为:1220)	69.38735372	67.21408201	61.648146	65.88651785	76.38902547
seed:1336	64.17543515	67.25341725	69.603698	65.07031173	74.20591995
seed:1337	70.31173173	69.14150851	74.176419	70.44940505	80.04720228
seed:1224	71.57045924	66.27003639	69.525027	67.48942866	72.41616678
seed:1246	69.1316747	67.97128528	74.736946	66.67322254	73.26187432
seed:1227	72.27849346	66.72239158	66.456879	65.40466123	77.39207395

Salinas-5shot

SA-5shot	DCFSL-2022年	GCCFSL: 2024年	CTF-SSCL-2024年	MLPA: 2025年	PGAPA: 2025年
train time per DataSet(s)	2077.18069	4547.31169	2675.90003	2264.48634	2510.91029
test time per DataSet(s)	2.57945	2.64535	3.93145	4.78978	7.51542
average OA	91.06 ± 0.99	89.90 ± 0.90	89.79 ± 1.703	90.99 ± 1.07	92.08 ± 0.87
average AA	94.95 ± 0.62	93.65 ± 0.65	93.82 ± 1.01	94.61 ± 0.85	95.22 ± 1.03
average kappa	90.0684 ± 1.1004	88.7739 ± 1.0019	88.6587 ± 1.8889	89.9792 ± 1.1822	91.1873 ± 0.9733
Class 0	99.66 ± 0.67	98.66 ± 1.85	99.34 ± 1.54	99.68 ± 0.55	98.53 ± 1.74
Class 1	99.20 ± 1.67	99.12 ± 1.17	97.20 ± 3.76	98.88 ± 1.50	98.47 ± 3.03
Class 2	94.68 ± 4.38	93.54 ± 4.99	93.16 ± 6.40	95.61 ± 5.58	94.17 ± 8.47
Class 3	99.32 ± 0.94	99.15 ± 0.96	99.50 ± 0.55	99.56 ± 0.42	98.92 ± 2.01
Class 4	90.41 ± 4.49	90.96 ± 3.47	91.21 ± 5.14	89.98 ± 5.18	96.89 ± 1.80
Class 5	99.58 ± 0.73	99.55 ± 0.90	99.31 ± 0.84	99.24 ± 1.26	99.42 ± 0.77
Class 6	98.97 ± 0.89	98.68 ± 0.93	99.64 ± 0.35	98.99 ± 0.84	99.80 ± 0.36
Class 7	78.94 ± 5.31	79.44 ± 6.06	77.18 ± 6.96	81.31 ± 6.70	84.93 ± 5.95
Class 8	99.44 ± 1.06	99.34 ± 0.84	99.30 ± 1.04	99.59 ± 0.34	99.62 ± 0.75
Class 9	87.40 ± 6.01	83.41 ± 4.43	83.67 ± 5.92	87.16 ± 4.45	88.10 ± 6.20
Class 10	99.20 ± 0.78	97.43 ± 2.20	96.60 ± 2.78	98.85 ± 1.25	97.73 ± 2.77
Class 11	99.70 ± 0.27	98.15 ± 2.68	99.20 ± 0.93	99.30 ± 0.93	99.50 ± 0.82
Class 12	98.52 ± 2.18	97.88 ± 3.39	97.42 ± 3.82	98.83 ± 0.72	98.94 ± 1.24
Class 13	98.98 ± 0.59	97.34 ± 2.22	97.85 ± 1.47	98.24 ± 2.02	97.99 ± 2.62
Class 14	80.48 ± 8.13	75.77 ± 8.68	77.93 ± 9.82	77.62 ± 8.16	77.29 ± 9.22
Class 15	94.74 ± 4.29	89.98 ± 6.08	92.61 ± 4.80	90.85 ± 6.63	93.20 ± 5.41
seed:1309	92.27922811	90.78428833	90.127477	92.73622084	93.22836685
seed:1310	89.50396862	88.55112953	90.995208	89.62052952	92.02390424
seed:1332	92.06460804	90.9508039	91.700124	92.24777517	92.63816167
seed:1330	90.51786342	89.38740772	88.954467	91.98875095	92.25147551
seed:1236	91.92584507	90.78058798	91.056264	90.18853263	90.58446965
seed:1336	89.29489907	89.03032434	88.961868	90.14597865	91.23203019
seed:1337	91.81298451	90.45680771	90.281041	91.09511739	92.8620326
seed:1224	90.89344854	88.68064164	89.801846	89.61127865	92.93603952
seed:1246	91.40594646	89.61312883	85.34848	90.56596792	90.83054266
seed:1227	90.90824992	90.7861385	90.701031	91.68162223	92.2588762

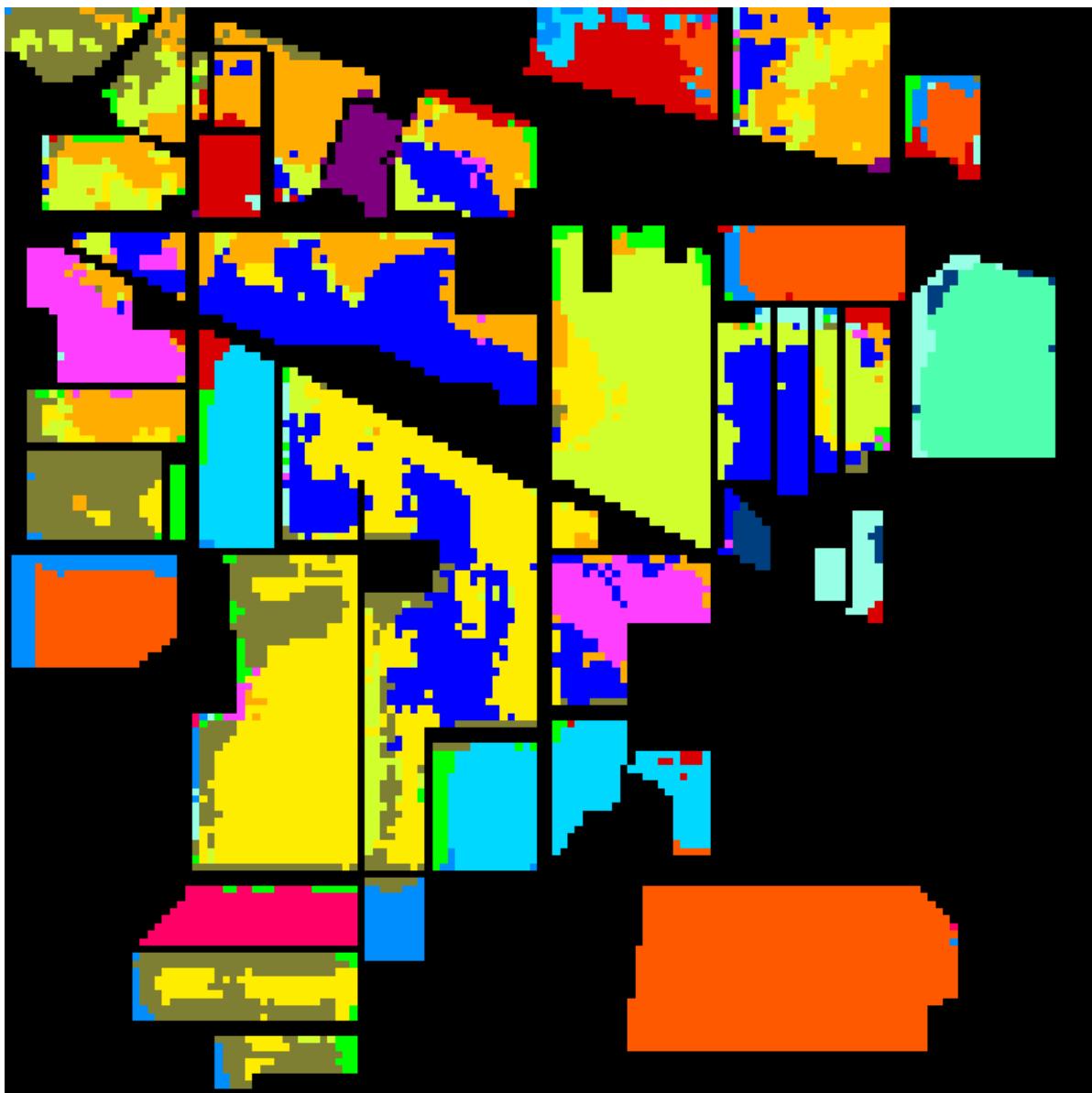
Botswana-5shot

Botswana-5shot	DCFSL-2022年	GCCFSL: 2024年	CTR-SSCL-2024年	MLPA: 2025年	PGAPA: 2025年
train time per DataSet(s)	1601.37918	3712.06456	1830.86138	1658.61524	2028.85821
test time per DataSet(s)	0.15149	0.15149	0.27293	0.13654	0.24728
average OA	97.15 ± 0.83	96.43 ± 0.84	95.34 ± 1.397	96.38 ± 1.13	97.65 ± 0.97
average AA	97.06 ± 0.96	96.45 ± 0.88	95.60 ± 1.36	96.31 ± 1.18	97.58 ± 1.09
average kappa	96.9074 ± 0.9049	96.1265 ± 0.9062	94.9482 ± 1.5119	96.0823 ± 1.2286	97.4494 ± 1.0475
Class 0	99.85 ± 0.25	99.25 ± 0.92	99.32 ± 1.27	99.55 ± 0.75	99.81 ± 0.30
Class 1	100.00 ± 0.00	99.58 ± 0.83	99.38 ± 1.33	99.17 ± 1.02	100.00 ± 0.00
Class 2	97.80 ± 3.62	98.21 ± 1.08	98.05 ± 1.96	96.91 ± 3.33	99.55 ± 0.86
Class 3	99.81 ± 0.44	98.29 ± 2.07	98.24 ± 3.03	98.57 ± 3.08	98.57 ± 2.53
Class 4	88.64 ± 7.43	87.01 ± 5.14	79.89 ± 8.54	87.20 ± 10.15	91.14 ± 6.44
Class 5	93.45 ± 7.53	89.81 ± 8.64	92.77 ± 8.78	94.13 ± 4.85	92.92 ± 8.26
Class 6	97.44 ± 4.07	97.60 ± 3.09	98.94 ± 1.58	96.61 ± 3.96	99.84 ± 0.36
Class 7	100.00 ± 0.00	100.00 ± 0.00	98.23 ± 3.81	98.28 ± 4.67	98.43 ± 4.70
Class 8	98.25 ± 2.59	97.28 ± 2.34	89.68 ± 8.77	95.28 ± 7.37	97.83 ± 3.56
Class 9	99.84 ± 0.27	98.68 ± 3.95	99.01 ± 1.82	99.84 ± 0.49	99.96 ± 0.12
Class 10	98.17 ± 2.15	99.23 ± 1.47	97.37 ± 2.84	98.23 ± 1.96	97.53 ± 2.20
Class 11	99.20 ± 1.35	96.31 ± 2.58	98.24 ± 1.51	96.25 ± 2.17	99.15 ± 1.17
Class 12	96.69 ± 3.95	96.73 ± 3.52	97.68 ± 3.04	97.91 ± 2.65	99.32 ± 1.06
Class 13	89.67 ± 7.22	92.33 ± 11.07	91.67 ± 7.78	90.44 ± 8.14	92.11 ± 8.45
seed:1309	96.82190057	95.31151668	94.808055	97.01069855	97.41976086
seed:1310	98.55254877	97.41976086	97.828823	97.32536186	99.27627439
seed:1332	95.90937697	97.16803021	94.052863	94.30459408	96.3499056
seed:1330	95.87791064	95.24858402	95.342983	96.19257395	96.47577093
seed:1236 (原为:1220)	97.35682819	96.19257395	96.9163	96.82190057	98.42668345
seed:1336	98.01762115	97.10509755	95.720579	94.30459408	96.72750157
seed:1337	96.97923222	96.00377596	95.531781	96.38137193	98.20641913
seed:1224	96.66456891	96.38137193	96.381372	96.82190057	97.16803021
seed:1246	97.95468848	97.70295784	93.266205	97.92322215	98.89867841
seed:1227	97.32536186	95.72057898	93.517936	96.7589679	97.51415985

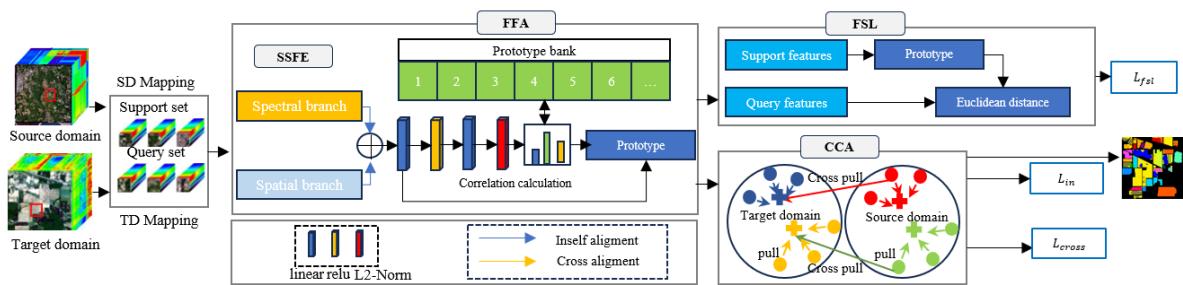
Obviously, our method not only performs well on the Chikusei source domain, but also shows strong robustness and stability on other source domains such as Hanchuan. **However, the performance has declined compared to before. This is precisely the issue we need to address next, such as adjusting the learning rate and re-optimizing the loss hyperparameters to develop an adversarial domain adaptation strategy for new source domains.**

About downstream tasks

Classification of hyperspectral images is precise down to each hyperspectral pixel, so the reviewer mistakenly thought it was image segmentation. However, image segmentation focuses on dividing regions, where a pixel and its neighboring pixels should be assigned to a representative area of a certain class. From the classification maps of the comparative methods in the paper, it can be seen that some regions have pixels of different classes scattered throughout. Therefore, this corresponds to a classification task rather than semantic segmentation.



Regarding the issue of text corresponding to the model diagram



We have revised the issue raised by the reviewer regarding the attention scores not being represented in the text, replacing it with **Correlation calculation**. Meanwhile, p_i represents the prototype of each class in the prototype library.

About the method

- FFA

Regarding the reviewer's question about why the transformation of features and prototypes is performed through the MLP layer, as well as the issue of the dimensions of the MLP's weights and biases:

First, features and prototypes come from different semantic levels. They are jointly mapped into the same comparable feature space through an MLP layer. At the same time, the intermediate ReLU in the MLP layer ensures that the model can learn more complex nonlinear relationships to enhance its expressive power.

The features obtained through feature extraction are ultimately unified into a feature dimension of 128*1. The MLP layer weights correspond to (64, 128), where 64 represents the output dimension, and the bias is 64. The weights of the second layer correspond to (128, 64), with a bias of 128. This design reduces the number of parameters while forcing the model to learn important features.

About Hyperparameters and Final Loss

For the temperature parameter, we set it to a universal value of 0.1 based on experience.

The final loss is defined as:

$$Loss = L_{\text{fsl}} + \lambda_1 L_{\text{in}} + \lambda_2 L_{\text{cross}}$$

λ_1 and λ_2 represent the weighting hyperparameters for the in-domain loss and cross-domain loss. Their values range from 0 to 1, with increments of 0.1. The optimal parameters obtained through tuning are $\lambda_1 = 0.5$ and $\lambda_2 = 0.3$.

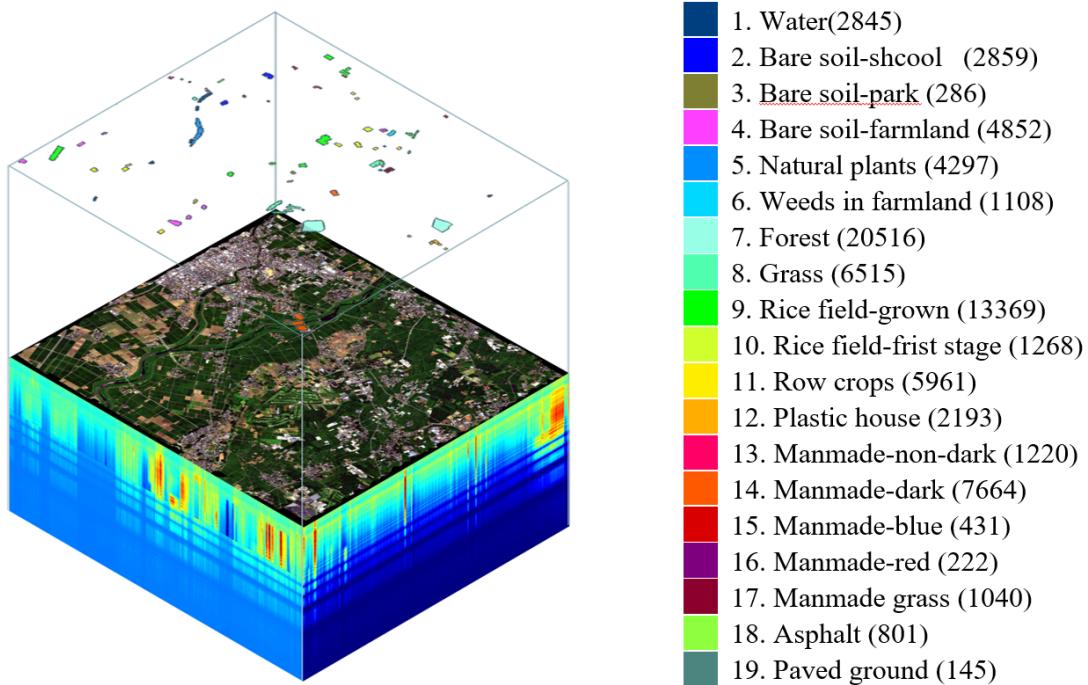
About the innovations of this paper

1. FFA: By updating through a moving average and incorporating the concept of momentum, we guide the model to improve its ability to extract discriminative features by injecting semantic correlation information of features. We distill between features and prototypes and inject the obtained semantic information to enhance feature representation and improve feature discriminability.
2. CCA: For the first time, we propose a dual-domain alignment function for cross-domain adaptation of hyperspectral images. The idea is that the essence of transfer learning is to find a common metric space where both the source and target domains perform well. In the field of hyperspectral image classification, domain adaptation is usually conducted within a single domain. For the first time, we approach it from a joint perspective, modeling the source and target domains together to achieve dual-domain alignment. Furthermore, in non-hyperspectral fields, dual-domain alignment requires that the categories of the source and target domains correspond. We remove this restriction, allowing the source and target domains to seek a metric space for universal domain adaptation even when their categories differ.

About the dataset

This study uses the publicly available Chikusei dataset as the source domain and validates it on three public datasets: Indian Pines, Salinas, and Botswana.

Chikusei

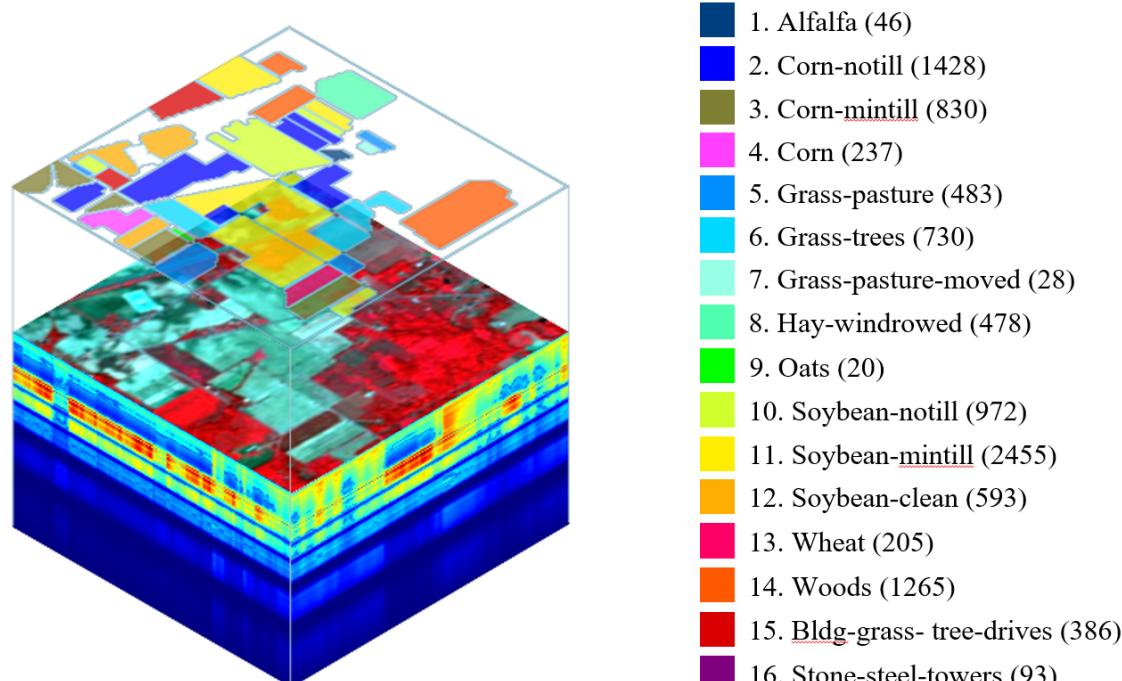


This dataset was captured by the Headwall Hyperspec-VNIR-C sensor in Chikusei City, Japan. It consists of 2517×2335 pixels with a spatial resolution of 2.5 m. A total of 128 bands are provided, covering wavelengths from 343 to 1018 nm, spanning 19 categories.

Publish Link: <https://naotoyokoya.com/Download.html>

Publish paper: https://www.researchgate.net/profile/Naoto-Yokoya/publication/304013716_Air_borne_hyperspectral_data_over_Chikusei/links/5762f36808ae570d6e15c026/Airborne-hyperspectral-data-over-Chikusei.pdf

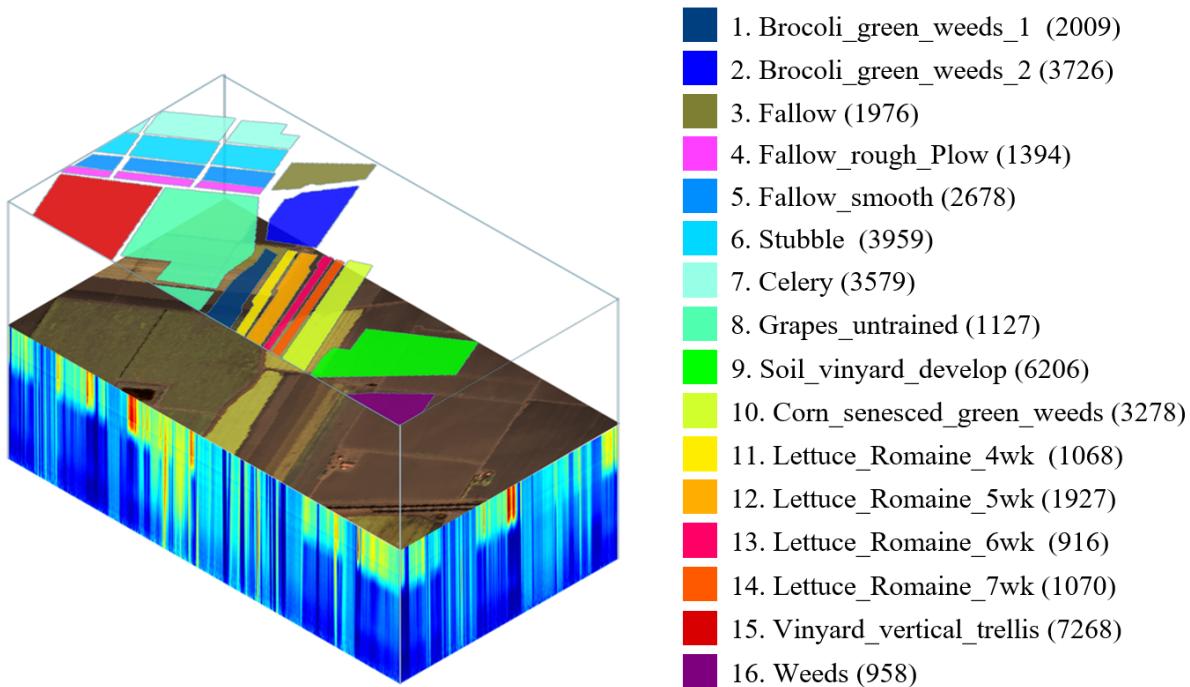
Indian_pines



This dataset was collected by the Airborne Visible/Infrared Imaging Spectrometer (AVIRIS) over Indiana, USA. It contains 145×145 pixels with a spatial resolution of about 20 m. After removing 20 water absorption bands (104-105, 150-163, and 220), 200 absorption bands in the range of 400 to 2500 nm are used. The dataset includes 16 classes.

Publish paper: <https://purr.purdue.edu/publications/1947/1>

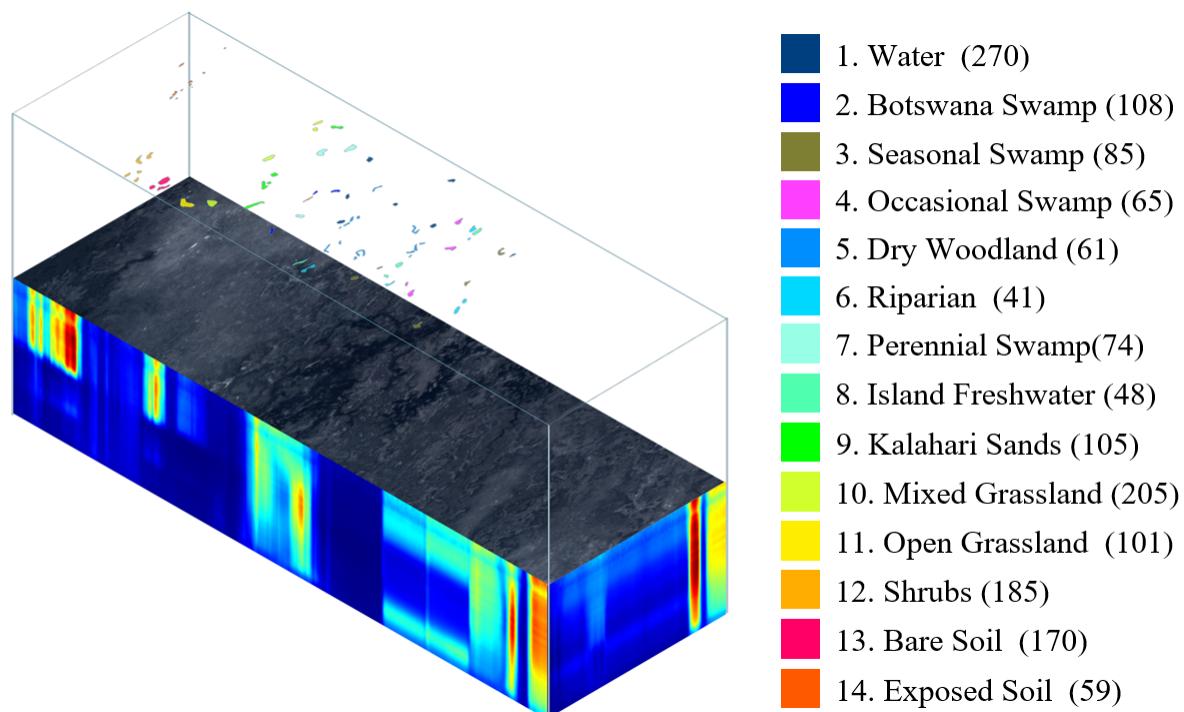
Salinas



This dataset was collected by the AVIRIS sensor in the Salinas Valley, California, USA. It consists of 512×217 pixels with a spatial resolution of approximately 3.7 m. A total of 204 bands covering 400-2500 nm were used, divided into 16 categories.

Publish Link: http://www.ehu.eus/ccwintco/index.php/Hyperspectral_Remote_Sensing_Scenes

Botswana



This dataset was acquired by NASA's EO1 satellite over the Okavango Delta in Botswana. It has a size of 1476×256 pixels and a spatial resolution of approximately 20m. Out of 242 spectral bands (400-2500 nm), 145 bands were used after removing noisy bands (1-9, 56-81, 98-101, 120-133, and 165-186). It contains 14 classes.

Publish Link: http://www.ehu.eus/ccwintco/index.php/Hyperspectral_Remote_Sensing_Scenes

During the experiment, we used a publicly available hyperspectral dataset with noise bands already removed.

About the experiment

Due to the strict length restrictions of the article, the experiments in the paper were not fully presented, which may have led to misunderstandings by the reviewers. To address this, we are now presenting all the experiments in full detail.

- **Three Metrics**

OA: The overall proportion of correctly classified samples by the model, that is, the percentage of all correctly classified samples out of the total number of samples.

$$OA = \frac{\text{Total number of correctly classified samples}}{\text{Total sample size}} = \frac{\sum_{i=1}^K TP_i}{N}$$

AA: The average classification accuracy for each category, eliminating the impact of the number of categories.

$$PA_i = \frac{TP_i}{\text{Number of actual samples in class } i} = \frac{TP_i}{TP_i + FN_i}$$

$$AA = \frac{1}{K} \sum_{i=1}^K PA_i$$

Kappa: Consider the consistency difference between classification results and random classification.

$$\kappa = \frac{OA - EA}{1 - EA}$$

OA: Overall Classification Accuracy EA: Expected Agreement

$$EA = \frac{\sum_{i=1}^K (\text{row sum}_i \times \text{column sum}_i)}{N^2}$$

R_i is the row sum for class i (actual number of samples in class i),

C_i is the column sum for class i (predicted number of samples in class i),

and N is the total number of samples.

Comparative Experiment

IP-5shot

IP-Sshot	DFSL+NN-2019年	DCFSL-2022年	HPSL-2022年	DM-MEN-2023年	FSCP-SSL-2023年	GCCPFL-2024年	CTP-SSL-2024年	MLPA-2025年	PGAPA-2025年
train time per DataSet(s)	456.08517	876.43519	350.8705031	83.30	590.214663	2152.57852	983.20153	935.41667	1284.10828
test time per DataSet(s)	0.49139	0.53322	2.45316	12.81	2.51515	0.47441	1.04364	0.491	0.56231
average OA	63.16 ± 2.92	65.74 ± 2.57	74.03 ± 2.71	69.28 ± 3.30	76.96 ± 2.74	64.79 ± 2.58	70.86 ± 3.215	66.59 ± 2.81	79.65 ± 2.76
average AA	75.64 ± 1.06	77.14 ± 1.70	83.17 ± 2.25	81.51 ± 1.84	85.29 ± 2.60	76.02 ± 2.07	81.32 ± 2.28	78.02 ± 1.43	87.74 ± 1.37
average Kappa	58.71 ± 3.08	61.47 ± 2.66	70.64 ± 2.98	65.66 ± 3.61	73.87 ± 3.06	60.30132 ± 6360	67.10 ± 3.49	62.43 ± 2.99	77.0143 ± 3.2716
Class 0	94.15 ± 8.18	94.15 ± 7.33	99.51 ± 0.98	99.02 ± 2.24	99.51 ± 0.98	88.54 ± 15.54	96.83 ± 5.78	92.20 ± 11.94	98.75 ± 2.25
Class 1	42.13 ± 9.90	47.48 ± 12.01	54.10 ± 11.53	64.45 ± 9.29	59.16 ± 11.24	43.18 ± 8.15	54.26 ± 13.26	50.51 ± 11.08	65.71 ± 14.53
Class 2	53.05 ± 7.41	52.69 ± 8.68	55.98 ± 13.67	45.25 ± 11.41	65.25 ± 13.64	51.56 ± 8.41	59.37 ± 7.54	50.69 ± 12.59	68.12 ± 7.94
Class 3	75.86 ± 11.08	78.06 ± 9.52	90.78 ± 12.87	90.00 ± 6.38	92.28 ± 11.50	76.81 ± 11.48	87.07 ± 11.37	82.41 ± 6.00	95.13 ± 2.76
Class 4	67.15 ± 13.42	70.84 ± 10.29	68.12 ± 12.68	73.74 ± 6.44	70.94 ± 12.17	73.62 ± 6.1	77.15 ± 10.82	72.24 ± 12.19	80.36 ± 7.71
Class 5	81.34 ± 6.45	86.50 ± 4.80	74.90 ± 14.07	92.79 ± 2.41	85.12 ± 6.54	81.90 ± 7.43	87.75 ± 6.09	87.20 ± 6.19	93.97 ± 3.90
Class 6	100.00 ± 0.00	99.13 ± 1.74	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	97.39 ± 3.98	100.00 ± 0.00	99.57 ± 1.30	100 ± 0.00
Class 7	84.95 ± 9.22	83.51 ± 11.89	99.92 ± 0.19	98.44 ± 1.20	99.83 ± 0.39	88.75 ± 7.83	93.78 ± 10.40	82.62 ± 12.68	93.26 ± 10.94
Class 8	100.00 ± 0.00	99.33 ± 2.00	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	94.00 ± 15.90	98.67 ± 2.67	100.00 ± 0.00	100 ± 0.00
Class 9	62.18 ± 9.40	67.44 ± 7.21	67.37 ± 13.11	61.25 ± 15.53	66.63 ± 10.74	61.22 ± 8.73	64.06 ± 11.13	66.06 ± 9.94	74.08 ± 11.39
Class 10	54.24 ± 13.85	58.64 ± 11.66	74.95 ± 7.44	54.56 ± 9.62	76.04 ± 8.94	58.69 ± 12.31	65.87 ± 13.85	57.64 ± 12.64	75.08 ± 11.43
Class 11	38.16 ± 9.16	40.97 ± 6.50	67.28 ± 10.78	53.33 ± 11.74	71.41 ± 16.33	43.30 ± 10.98	47.82 ± 11.09	46.00 ± 10.46	75.20 ± 15.70
Class 12	97.80 ± 3.79	98.10 ± 2.81	98.45 ± 2.44	98.55 ± 2.09	99.75 ± 0.46	99.10 ± 1.39	99.10 ± 1.70	97.85 ± 3.61	99.50 ± 1.05
Class 13	87.73 ± 5.86	84.33 ± 9.55	91.57 ± 6.84	88.77 ± 6.35	92.75 ± 4.51	85.62 ± 7.14	87.48 ± 5.40	87.33 ± 6.99	85.79 ± 9.26
Class 14	72.94 ± 5.26	73.70 ± 8.93	91.00 ± 4.76	87.38 ± 9.65	90.47 ± 10.47	74.62 ± 10.05	82.20 ± 9.77	77.43 ± 9.44	88.37 ± 10.54
Class 15	98.52 ± 2.10	99.43 ± 1.37	97.50 ± 3.69	96.70 ± 6.81	95.45 ± 6.06	98.07 ± 2.04	99.77 ± 0.45	98.52 ± 1.76	99.20 ± 1.25
seed:1309	66.61421969	69.65286656	77.9661717	0.724161668	82.39748254	64.21477038	0.68718655	70.69525027	83.8233848
seed:1310	64.93263841	64.63762415	77.80509391	0.734585505	78.43445767	67.52876389	0.657297177	70.80342217	83.29235913
seed:1322	58.84551087	66.93873537	74.28459042	0.670469073	77.30356967	62.78868813	0.69731537	65.36532599	76.58570164
seed:1330	62.8675386	69.15134231	72.92752483	0.649719736	78.57213099	68.36463762	0.74648441	66.97807061	75.43514603
seed:1236 (原为:1220)	65.31989379	66.72239158	73.24524138	0.676074344	75.26797129	64.87363556	0.7593667	62.60202576	81.6599469
seed:1336	60.37958501	63.18220407	70.57724457	0.754843131	71.5212902	64.1262661	0.7164913	65.61117121	74.79594847
seed:1337	67.36158914	65.71934831	69.1361747	0.671255777	74.36326089	69.01366899	0.66574884	66.26020258	81.72878356
seed:1224	58.44232471	60.46808929	77.85426296	0.657685121	76.30052119	61.51047301	0.72907857	62.37584817	80.7552365
seed:1246	63.79191661	64.82446652	72.51450487	0.694561904	77.74609106	61.2744616	0.73281542	69.34801849	76.4283607
seed:1227	65.01130888	66.12252926	75.0516275	0.694463566	77.64775297	64.21477038	0.69446357	65.84718261	81.97462877

IP-4shot

IP-4shot	DFSL+NN-2019年	DCFSL-2022年	HPSL-2022年	DM-MEN-2023年	FSCP-SSL-2023年	GCCPFL-2024年	CTP-SSL-2024年	MLPA-2025年	PGAPA-2025年
train time per DataSet(s)	862.86157	3527.34718	2.51267	【空缺!】	2.25754	0.50537	0.62579	【空缺!】	1286.73987
test time per DataSet(s)	0.50132	0.50132	0.50132	【空缺!】	0.50132	0.50132	0.50132	0.50132	0.519
average OA	60.44 ± 2.82	61.96 ± 3.98	69.96 ± 3.93	63.95 ± 3.07	72.92 ± 5.56	61.7042 ± 20	67.29 ± 3.043	63.31 ± 2.05	76.12 ± 2.76
average AA	72.24 ± 1.59	73.77 ± 2.32	80.76 ± 1.96	78.68 ± 1.96	82.52 ± 3.22	73.34 ± 2.28	75.00 ± 1.83	75.08 ± 1.82	85.84 ± 1.37
average kappa	55.60 ± 2.99	57.18 ± 4.33	66.11 ± 4.32	59.96 ± 3.29	69.43 ± 6.12	56.8880 ± 4.5170	65.17 ± 3.28	58.83 ± 2.02	72.7143 ± 3.2716
Class 0	90.24 ± 15.00	86.43 ± 10.54	99.76 ± 0.71	99.05 ± 1.58	100.00 ± 0.00	95.00 ± 6.94	94.76 ± 11.11	88.81 ± 15.43	97.86 ± 3.60
Class 1	40.80 ± 11.68	45.18 ± 13.20	53.74 ± 15.04	48.04 ± 15.63	57.86 ± 12.01	45.53 ± 16.66	47.07 ± 11.19	42.58 ± 11.65	65.79 ± 15.85
Class 2	44.82 ± 7.19	38.32 ± 10.88	55.88 ± 9.25	43.93 ± 8.52	56.37 ± 11.60	48.16 ± 9.53	53.68 ± 8.32	50.68 ± 8.16	65.06 ± 9.67
Class 3	65.92 ± 12.43	73.26 ± 9.82	87.94 ± 15.84	86.22 ± 8.21	89.01 ± 14.67	69.70 ± 15.88	80.21 ± 12.33	82.83 ± 8.65	93.52 ± 6.88
Class 4	69.16 ± 11.45	68.12 ± 14.11	74.95 ± 7.93	74.95 ± 10.47	73.07 ± 13.27	65.91 ± 15.71	74.95 ± 6.91	69.10 ± 13.09	80.58 ± 7.72
Class 5	77.13 ± 8.61	82.02 ± 8.84	73.00 ± 12.18	90.01 ± 5.32	74.93 ± 12.58	76.61 ± 6.93	89.52 ± 3.32	83.07 ± 7.82	95.94 ± 1.66
Class 6	97.50 ± 5.34	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	98.75 ± 2.67	99.58 ± 1.25	96.67 ± 6.40	100 ± 0.00
Class 7	79.37 ± 10.73	78.42 ± 16.23	97.43 ± 4.51	98.90 ± 0.94	99.03 ± 1.66	79.77 ± 9.70	92.62 ± 12.17	76.77 ± 15.75	93.65 ± 6.84
Class 8	99.38 ± 1.88	99.38 ± 1.88	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	98.75 ± 2.50	99.38 ± 1.88	100 ± 0.00
Class 9	57.85 ± 10.01	59.09 ± 11.33	57.94 ± 12.72	69.57 ± 12.16	64.49 ± 9.30	56.38 ± 9.71	60.50 ± 12.06	60.92 ± 9.30	69.38 ± 8.73
Class 10	54.63 ± 11.53	56.26 ± 16.09	66.82 ± 11.57	46.04 ± 13.46	71.63 ± 14.39	59.22 ± 29	59.75 ± 12.33	56.94 ± 11.59	66.17 ± 12.83
Class 11	35.87 ± 5.62	53.01 ± 7.70	59.85 ± 16.22	50.15 ± 6.86	60.19 ± 16.70	36.91 ± 7.28	47.35 ± 13.50	37.28 ± 7.62	70.08 ± 18.38
Class 12	97.01 ± 3.74	98.01 ± 2.13	98.16 ± 2.65	98.86 ± 1.07	97.56 ± 6.02	96.17 ± 7.77	99.30 ± 0.87	97.36 ± 3.37	99.20 ± 0.81
Class 13	85.47 ± 7.48	85.47 ± 7.56	88.27 ± 8.41	81.69 ± 16.42	88.83 ± 8.17	78.34 ± 10.29	87.94 ± 8.17	85.51 ± 5.80	86.52 ± 8.71
Class 14	61.65 ± 11.50	75.94 ± 11.51	90.45 ± 9.94	76.36 ± 10.82	91.20 ± 9.95	68.77 ± 9.79	78.38 ± 7.80	76.02 ± 7.87	88.56 ± 10.65
Class 15	99.10 ± 1.31	99.44 ± 0.75	94.27 ± 5.87	95.06 ± 5.95	96.07 ± 5.78	98.20 ± 2.20	99.66 ± 1.01	97.30 ± 4.53	99.33 ± 1.68
seed:1309	64.2107658	75.581737852	77.71232204	0.873059769	64.01570938	64.6691217	66.9908542	78.79234168	78.79232332
seed:1310	58.47815415	64.7520864	70.41728031	0.7812469918	54.16789396	60.6756014	65.87137948	78.78231253	75.11045655
seed:1322	55.46391753	61.21747668	64.22189494	0.664884634	59.99018164	66.6941581	61.851251218	75.69955817	75.69955817
seed:1330	58.85125184	61.52184585	68.61610201	71.428571143	60.333282425	70.0147655	65.31173294	75.04172803	75.04172803
seed:1236 (原为:1220)	58.87088856	51.89985272	77.71232204	0.873059769	64.01570938	64.6691217	66.9908542	78.79234168	78.79234168
seed:1336	61.7574865	67.09867452	70.60382916	0.873059769	60.59891998	0.70004909	63.38733452	73.81443299	73.81443299
seed:1337	64.89936181	63.10260187	69.9734541	69.95881738	66.971018584	0.65102602	62.60186349	75.57191949	75.57191949
seed:1224	58.0952381	60.35346097	65.09572901	67.11831124	55.985522828	0.69769269	62.16985763	81.36475209	81.36475209
seed:1246	61.59057437	60.36327933	68.37506136	68.54197349	59.93127148	0.67943054	63.50515464	74.74171722	74.74171722
seed:1227	62.21894944	65.31173294	69.05252823	72.57731959	68.89543446	0.69297987	61.16938488	72.27295042	72.27295042

IP-3shot	DFSL+NN-
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IP-2shot	DPSL+NN-2019年	DCPSL-2022年	HPSL-2022年	DM-MN-2023年	FSCP-SSL-2023年	GCCPSL-2024年	CTP-SSCL-2024年	MLPA-2025年	PGAPA-2025年
train time per DataSet(s)	【空缺!】	870.97141	351.31511	【空缺!】	5880.18484	2055.27654	731.93303	【空缺!】	1267.22414
test time per DataSet(s)	0.51318	2.60139	2.48475	0.50999	0.7				0.52235
average OA	50.98 ± 3.09	51.60 ± 4.53	53.78 ± 5.59	55.41 ± 3.88	60.14 ± 4.84	49.79 ± 3.85	56.82 ± 0.04915	53.47 ± 4.82	64.81 ± 4.32
average AA	63.52 ± 1.86	64.12 ± 2.44	67.59 ± 3.97	70.84 ± 3.51	71.40 ± 3.66	62.42 ± 3.35	69.47 ± 2.64	64.85 ± 2.81	77.63 ± 2.19
average kappa	45.19 ± 3.52	45.79 ± 5.19	48.64 ± 5.91	50.88 ± 4.15	55.09 ± 5.24	43.83724±2.252	51.79 ± 5.26	47.91 ± 5.25	60.6580 ± 4.5898
Class 0	76.82 ± 17.92	77.95 ± 12.03	96.59 ± 4.34	97.05 ± 4.32	99.77 ± 0.68	68.41 ± 13.35	94.32 ± 8.82	70.23 ± 17.29	97.05 ± 3.38
Class 1	31.94 ± 14.32	32.81 ± 14.82	33.46 ± 12.67	40.05 ± 15.52	37.17 ± 10.24	29.00 ± 13.22	36.53 ± 17.16	38.18 ± 12.77	51.65 ± 13.21
Class 2	31.67 ± 9.10	37.60 ± 12.97	40.83 ± 15.09	25.22 ± 8.86	42.53 ± 10.69	34.37 ± 13.24	39.23 ± 8.84	38.18 ± 10.21	49.12 ± 16.58
Class 3	53.36 ± 11.10	53.40 ± 14.39	60.34 ± 21.73	83.11 ± 12.85	67.36 ± 18.97	60.72 ± 14.03	61.87 ± 17.07	59.74 ± 10.32	81.06 ± 20.61
Class 4	46.20 ± 18.38	44.74 ± 18.07	49.23 ± 15.87	53.08 ± 24.81	54.32 ± 19.37	46.11 ± 16.40	61.77 ± 17.24	47.84 ± 18.35	62.82 ± 20.62
Class 5	78.82 ± 9.98	74.08 ± 12.26	46.96 ± 16.98	85.38 ± 4.49	54.07 ± 18.63	66.48 ± 9.83	80.65 ± 14.09	75.55 ± 13.82	91.34 ± 8.38
Class 6	97.69 ± 4.93	98.83 ± 1.76	98.08 ± 4.63	99.23 ± 2.31	99.62 ± 1.15	88.85 ± 12.22	95.38 ± 6.84	96.54 ± 5.29	100 ± 0.00
Class 7	59.43 ± 15.73	62.16 ± 15.02	80.95 ± 14.75	85.82 ± 11.68	80.38 ± 22.90	71.66612.21	73.99 ± 18.21	69.22 ± 9.48	80.42 ± 18.50
Class 8	98.89 ± 2.22	97.22 ± 2.78	100.00 ± 0.00	98.33 ± 5.00	95.00 ± 6.78	88.33 ± 14.58	97.78 ± 4.44	96.67 ± 7.11	
Class 9	45.71 ± 18.64	48.63 ± 15.79	56.14 ± 20.61	55.41 ± 13.89	52.14 ± 22.48	46.33 ± 17.75	56.63 ± 16.43	45.55 ± 18.75	59.55 ± 22.49
Class 10	47.05 ± 10.87	47.34 ± 14.38	48.72 ± 16.93	39.62 ± 12.28	62.28 ± 13.13	44.21 ± 12.46	48.72 ± 13.71	49.20 ± 13.06	51.55 ± 15.95
Class 11	32.23 ± 9.57	29.00 ± 10.89	36.09 ± 9.37	38.83 ± 13.36	38.93 ± 10.17	25.97 ± 7.31	43.38 ± 14.17	28.66 ± 11.59	62.32 ± 15.89
Class 12	88.87 ± 10.72	92.51 ± 6.50	97.68 ± 3.71	85.52 ± 12.38	98.03 ± 3.36	89.11 ± 15.52	99.51 ± 0.82	88.28 ± 13.62	98.82 ± 1.95
Class 13	74.20 ± 12.74	74.81 ± 16.85	79.24 ± 18.03	84.89 ± 6.08	90.98 ± 6.50	74.96615.20	79.41 ± 11.53	76.10 ± 17.04	83.70 ± 11.16
Class 14	56.25 ± 13.27	55.13 ± 18.04	65.81 ± 29.32	65.80 ± 7.64	72.84 ± 19.55	58.23614.00	52.89 ± 17.17	60.91 ± 18.52	76.77 ± 16.65
Class 15	97.25 ± 2.66	96.97 ± 0.50	91.32 ± 5.26	93.41 ± 8.90	93.41 ± 5.34	99.23 ± 1.10	99.34 ± 1.12	95.60 ± 9.41	99.67 ± 0.70
seed:1309	55.92639718	56.24938827	58.12860918	65.07781149	51.05216796	0.60595087	56.84643242	68.1706959	
seed:1310	48.00822159	47.84183224	54.81060977	65.58676715	50.62151316	0.57531565	53.1864539	63.36497994	
seed:1332	53.56758344	54.38974259	53.65567192	58.48096361	51.27728299	0.60193795	56.69961828	62.76793579	
seed:1330	51.85475188	55.70128128	58.60820202	61.97513947	53.24459235	0.56278751	59.68483899	67.5013849	
seed:1236 (原为1220)	47.42096506	45.55153176	48.60326573	55.71106979	45.12087697	0.63639033	46.04091221	57.59029069	
seed:1336	51.66878732	47.34266419	65.17568758	63.33561711	52.65733381	0.49075071	52.36370755	68.00430655	
seed:1337	54.49740628	54.30509215	45.02300088	48.3507879	43.31995693	0.52187531	55.59261848	68.93412939	
seed:1224	51.61984927	58.86267985	54.54634433	61.99471469	54.69315846	0.51061956	58.47117549	71.22442987	
seed:1246	49.39806205	46.94137222	50.26915924	61.46618381	44.12254086	0.63629245	44.54340805	60.3503964	
seed:1227	45.87452285	48.76186748	48.98698248	59.40099834	51.78623862	0.54047176	50.96407948	60.14485661	

IP-1shot

IP-1shot	DPSL+NN-2019年	DCPSL-2022年	HPSL-2022年	DM-MN-2023年	FSCP-SSL-2023年	GCCPSL-2024年	CTP-SSCL-2024年	MLPA-2025年	PGAPA-2025年
train time per DataSet(s)	【空缺!】	880.47375	370.061426	【空缺!】	593.846091	1741.64057	826.75358	【空缺!】	1273.26774
test time per DataSet(s)	0.51001	2.7637	2.43595	0.46207	0.95069				0.55045
average OA	40.93 ± 4.82	41.32 ± 5.75	42.95 ± 6.74	41.65 ± 5.36	46.44 ± 5.10	39.91 ± 5.34	43.52 ± 0.04843	41.83 ± 5.51	52.16 ± 4.48
average AA	52.23 ± 3.77	49.53 ± 2.39	54.60 ± 6.55	60.48 ± 4.77	58.26 ± 5.25	50.83 ± 4.43	57.84 ± 3.69	49.55 ± 3.36	65.16 ± 3.25
average kappa	34.15 ± 5.09	34.41 ± 5.95	36.32 ± 7.24	36.46 ± 5.58	39.76 ± 5.68	33.19705.6347	37.59 ± 4.95	35.06 ± 5.77	46.6891 ± 4.5809
Class 0	62.89 ± 16.18	52.22 ± 14.61	83.33 ± 15.08	93.56 ± 6.00	92.00 ± 9.39	70.67 ± 19.16	66.00 ± 28.86	60.00 ± 20.82	90.22 ± 10.29
Class 1	23.52 ± 10.30	23.55 ± 11.93	26.89 ± 14.29	19.80 ± 6.78	23.64 ± 11.58	24.18 ± 13.00	23.46 ± 14.37	22.61 ± 10.65	27.30 ± 14.00
Class 2	27.73 ± 14.01	20.58 ± 10.39	26.65 ± 9.37	24.07 ± 4.77	21.80 ± 8.10	21.63 ± 9.72	29.95 ± 10.71	24.45 ± 10.21	38.64 ± 13.27
Class 3	37.50 ± 18.13	28.85 ± 7.10	35.38 ± 11.37	71.31 ± 14.29	36.10 ± 14.19	26.65 ± 10.68	45.97 ± 14.10	27.50 ± 9.38	60.08 ± 19.12
Class 4	30.27 ± 24.12	29.13 ± 22.86	32.84 ± 20.32	41.54 ± 22.61	30.62 ± 17.77	31.16 ± 21.85	42.80 ± 25.69	28.84 ± 24.39	34.54 ± 24.23
Class 5	67.16 ± 15.96	64.10 ± 20.24	61.63 ± 17.37	63.79 ± 14.48	53.70 ± 11.37	64.28 ± 13.36	76.64 ± 10.85	65.49 ± 8.17	85.13 ± 10.94
Class 6	91.11 ± 9.55	67.75 ± 15.98	92.59 ± 10.48	85.93 ± 16.55	98.15 ± 1.85	75.56 ± 20.83	96.67 ± 4.52	73.70 ± 16.01	99.26 ± 1.48
Class 7	45.12 ± 17.69	46.25 ± 17.21	46.16 ± 21.88	80.25 ± 12.21	52.01 ± 19.34	44.05 ± 21.63	53.48 ± 17.45	49.90 ± 16.84	56.33 ± 21.78
Class 8	96.84 ± 4.21	95.79 ± 3.94	92.11 ± 15.30	97.37 ± 6.34	96.84 ± 9.47	95.79 ± 8.09	87.89 ± 13.73	88.42 ± 12.85	97.89 ± 4.82
Class 9	34.75 ± 16.17	31.60 ± 16.04	36.84 ± 21.69	38.30 ± 19.83	39.63 ± 23.74	32.15 ± 14.92	37.72 ± 20.37	37.00 ± 14.33	54.46 ± 22.71
Class 10	42.65 ± 16.56	48.49 ± 19.26	42.53 ± 21.24	28.46 ± 13.06	52.32 ± 21.77	40.81 ± 15.33	36.04 ± 19.74	46.43 ± 15.47	48.73 ± 20.01
Class 11	21.62 ± 12.69	26.00 ± 6.18	23.67 ± 6.57	28.38 ± 4.20	23.45 ± 9.43	20.64 ± 10.84	28.80 ± 7.82	19.51 ± 9.64	32.09 ± 13.48
Class 12	70.25 ± 19.40	68.75 ± 21.10	93.24 ± 6.72	93.63 ± 6.37	96.42 ± 4.25	82.30 ± 21.88	98.33 ± 2.19	62.16 ± 17.71	98.14 ± 1.84
Class 13	57.30 ± 36.18	59.30 ± 38.50	78.81 ± 30.36	63.73 ± 19.37	80.01 ± 22.60	63.92 ± 29.64	64.41 ± 33.81	65.71 ± 31.99	77.97 ± 22.34
Class 14	39.45 ± 19.23	35.69 ± 15.52	35.92 ± 28.39	40.47 ± 13.55	46.21 ± 29.55	25.82 ± 14.38	38.13 ± 20.94	30.49 ± 15.22	44.57 ± 18.76
Class 15	87.50 ± 14.95	94.33 ± 5.56	85.00 ± 12.36	97.07 ± 5.35	99.24 ± 9.68	93.70 ± 7.32	99.57 ± 1.00	90.65 ± 10.89	99.24 ± 1.20
seed:1309	46.213217	46.07641943	50.49350142	51.27528584	46.04710251	0.41590931	46.06647112	50.71826444	
seed:1310	40.6625623	40.115312	39.76530121	47.66935019	39.92630519	0.52633636	42.1381804	48.27518812	
seed:1332	36.85136324	36.35629825	38.18039676	37.68200919	37.58428613	0.49526043	37.65269227	46.04710251	
seed:1336	32.75676732	34.54587149	45.48030888	45.43144728	42.91019251	0.40965504	38.88400274	55.10602951	
seed:1337	37.23493414	37.23493414	36.90024276	38.98172579	32.87403498	0.35756865	35.59073585	44.68875208	
seed:1224	44.64966286	47.49340369	47.897860227	43.08607401	48.46671976	44.06670401	48.44131731	53.93335288	
seed:1246	46.95659921	48.70516955	50.39577836	51.95934721	46.78979771	0.39587609	49.61399394	58.62405942	
seed:1227	36.06957881	34.39851461	33.56786866	41.20981139	29.85439265	0.40662562	32.94244112	58.04749394	

Salinas-5shot

SA-5shot	DPSL+NN	DCPSL-2022年	HPSL-2022年	DM-MN-2023年	FSCP-SSL-2023年	GCCPSL-2024年	CTP-SSCL-2024年	MLPA-2025年	PGAPA-2025年
train time per DataSet(s)	472.40637	895.13205	1535.947012	96.20	2677.327241	2184.37481	747.94554	956.0544	1299.31266
test time per DataSet(s)	2.56784	2.66784	155.56796	65.71	145.33205	2.59853	2.67912	2.61181	2.91105
average OA	89.74 ± 1.26	90.12 ± 1.22	89.14 ± 2.09	91.08 ± 2.39	90.96 ±				

SA-4shot	DPSL+NN	DCFSI-2022年	HPSL_2022年	DM-MEN_2023年	FSCF-SSL_2023年	GCCPSL_2024年	CTP-SSCL-2024年	MPLA_2025年	FGAPA-2025年
train time per DataSet(s)	【空缺】	889.53971	1549.827509	【空缺】	2852.190233	2217.53756	744.17312	【空缺】	1292.10148
test time per DataSet(s)	2.64946	131.8554	86.98 ± 2.57	90.04 ± 2.03	88.11 ± 3.66	86.60 ± 2.53	88.58 ± 1.59	89.04 ± 1.50	91.83 ± 1.09
average OA	88.61 ± 1.53	88.05 ± 1.90	86.98 ± 2.57	90.04 ± 2.03	88.11 ± 3.66	86.60 ± 2.53	88.58 ± 1.59	89.04 ± 1.50	91.83 ± 1.09
average AA	92.81 ± 1.09	92.77 ± 1.11	92.65 ± 1.27	94.31 ± 1.16	94.44 ± 1.09	91.21 ± 1.66	92.75 ± 1.18	93.04 ± 1.14	95.10 ± 0.84
average kappa	87.31 ± 1.70	86.72 ± 2.09	85.56 ± 2.84	88.95 ± 2.23	86.83 ± 3.99	85.0964 ± 2.7969	87.33 ± 1.75	87.81 ± 1.66	90.0964 ± 1.2236
Class 0	98.73 ± 1.68	98.19 ± 3.07	98.34 ± 3.61	98.89 ± 1.52	99.21 ± 2.35	98.30 ± 2.05	99.31 ± 0.99	98.93 ± 0.81	99.26 ± 0.74
Class 1	98.33 ± 3.04	99.74 ± 0.41	91.73 ± 10.88	99.19 ± 2.35	94.30 ± 6.28	99.14 ± 1.83	98.78 ± 1.96	98.98 ± 1.93	99.17 ± 1.18
Class 2	92.95 ± 6.17	94.74 ± 5.56	91.60 ± 7.75	98.66 ± 3.73	96.78 ± 4.76	92.26 ± 9.56	90.23 ± 11.89	92.52 ± 7.42	92.21 ± 8.40
Class 3	98.60 ± 1.79	98.96 ± 1.60	98.81 ± 2.43	98.71 ± 1.50	99.51 ± 1.16	98.19 ± 3.11	98.40 ± 2.46	98.94 ± 1.35	99.59 ± 0.66
Class 4	90.13 ± 4.60	88.56 ± 5.88	96.03 ± 2.58	93.49 ± 4.71	96.49 ± 3.69	88.93 ± 5.56	89.61 ± 8.22	90.63 ± 4.97	96.29 ± 3.20
Class 5	99.02 ± 1.05	99.22 ± 0.53	99.05 ± 2.06	98.06 ± 1.66	99.70 ± 0.50	98.17 ± 1.73	98.52 ± 1.62	99.33 ± 0.86	99.89 ± 0.30
Class 6	99.30 ± 0.53	99.28 ± 0.72	98.02 ± 3.77	98.95 ± 1.96	99.48 ± 0.89	98.98 ± 1.92	99.43 ± 0.51	99.27 ± 0.81	99.68 ± 0.41
Class 7	79.37 ± 7.30	74.05 ± 9.38	67.90 ± 11.47	75.39 ± 7.89	64.46 ± 21.32	75.36 ± 14.19	75.46 ± 8.85	79.35 ± 7.50	83.20 ± 4.83
Class 8	99.73 ± 0.32	99.32 ± 0.64	99.10 ± 0.97	99.83 ± 0.19	99.50 ± 0.59	98.99 ± 1.54	98.93 ± 1.19	99.13 ± 0.86	99.88 ± 0.19
Class 9	76.12 ± 9.79	79.03 ± 6.94	88.06 ± 7.58	92.51 ± 7.07	91.02 ± 6.01	72.75 ± 8.20	80.67 ± 10.04	78.75 ± 10.00	86.74 ± 7.90
Class 10	95.58 ± 6.79	95.95 ± 4.62	98.57 ± 1.52	99.32 ± 0.60	99.14 ± 0.60	91.90 ± 9.06	95.79 ± 4.57	95.88 ± 4.86	98.67 ± 1.71
Class 11	99.01 ± 1.18	98.68 ± 2.65	94.51 ± 7.14	93.57 ± 4.17	97.33 ± 5.06	98.63 ± 2.57	98.91 ± 1.47	98.84 ± 1.14	99.72 ± 0.55
Class 12	98.56 ± 1.72	99.01 ± 0.71	99.09 ± 0.88	95.36 ± 4.99	99.62 ± 0.34	97.40 ± 3.75	97.74 ± 2.82	98.88 ± 0.75	97.91 ± 1.98
Class 13	98.30 ± 1.25	97.80 ± 1.65	93.21 ± 6.04	92.88 ± 4.98	96.98 ± 3.36	97.63 ± 1.91	95.39 ± 4.61	98.14 ± 2.35	98.78 ± 1.65
Class 14	69.47 ± 10.75	72.70 ± 10.73	73.11 ± 13.37	77.02 ± 8.88	78.44 ± 13.28	66.08 ± 14.04	75.34 ± 7.99	72.11 ± 11.11	78.40 ± 10.89
Class 15	91.77 ± 5.29	89.10 ± 6.90	95.31 ± 3.84	97.07 ± 4.01	99.05 ± 1.09	86.71 ± 7.98	91.49 ± 5.60	88.90 ± 6.99	92.15 ± 6.87
seed:1309	89.28695693	88.946513456	87.85720982	90.33217299	85.74863559	90.91332655	89.71793212	92.93443078	
seed:1310	87.70923888	87.32821604	81.653521927	81.83529782	87.69962915	87.87034149	89.93056905	91.63784343	
seed:1322	90.75187275	91.27346712	86.1333538	91.15509109	89.91214279	87.87070757	90.9812263	93.07685194	
seed:1330	90.1451956	89.32951077	86.52547859	86.61611024	89.72902987	91.05105281	90.87579765	91.02931656	
seed:1236 (原为1220)	88.4157958	87.94229169	85.11236475	81.29103856	83.80467955	87.80809119	89.64579673	90.45963192	
seed:1336	87.86275779	87.52242671	88.29741977	91.48617405	88.16239711	88.88282623	88.38890105	91.42883566	
seed:1337	90.6706196	89.93433883	91.78596375	92.00036993	88.29741977	88.82104087	89.76972163	91.35115139	
seed:1224	85.96784133	85.37501156	89.53666882	88.43799131	86.71044114	86.8647554	86.46444095	90.23767687	
seed:1246	86.73078072	84.61481515	86.04287522	87.65929899	81.96800148	88.8579721	86.85656155	92.51271617	
seed:1227	88.57301396	88.21788588	86.85656155	90.3412559	83.96374734	87.8728276	87.8128179	93.62434107	

Salinas-3shot

SA-3shot	DPSL+NN	DCFSI-2022年	HPSL_2022年	DM-MEN_2023年	FSCF-SSL_2023年	GCCPSL_2024年	CTP-SSCL-2024年	MPLA_2025年	FGAPA-2025年
train time per DataSet(s)	【空缺】	810.45712	1521.74448	2.62127	161.13557	27567.50503	2130.16034	875.9935	1209.67799
test time per DataSet(s)	【空缺】	84.99 ± 1.53	84.88 ± 1.84	85.28 ± 2.65	87.48 ± 3.23	84.33 ± 3.52	84.04 ± 2.32	85.57 ± 2.17	90.70 ± 1.86
average OA	80.85 ± 1.22	90.74 ± 1.56	91.24 ± 1.82	92.21 ± 2.03	91.94 ± 1.33	88.79 ± 2.46	90.39 ± 1.43	90.41 ± 1.98	94.03 ± 1.28
average AA	83.36 ± 1.67	83.23 ± 2.00	83.63 ± 2.93	86.14 ± 3.55	82.66 ± 5.84	82.2955 ± 2.5605	84.01 ± 2.38	83.75 ± 2.22	89.6603 ± 1.0589
Class 0	99.23 ± 0.90	98.67 ± 2.41	95.80 ± 8.88	98.66 ± 1.84	99.03 ± 2.53	98.33 ± 1.67	99.21 ± 1.03	99.09 ± 1.14	99.40 ± 0.77
Class 1	96.47 ± 4.88	96.69 ± 4.73	93.71 ± 7.97	97.67 ± 3.94	93.77 ± 7.40	95.18 ± 4.52	95.87 ± 4.94	95.84 ± 7.40	95.32 ± 6.89
Class 2	88.00 ± 13.19	87.88 ± 11.58	86.55 ± 13.63	99.76 ± 0.65	90.33 ± 12.52	83.00 ± 13.20	85.98 ± 12.16	89.87 ± 11.40	86.07 ± 11.15
Class 3	97.94 ± 2.47	98.59 ± 1.88	98.85 ± 2.19	98.20 ± 2.20	99.31 ± 1.24	97.14 ± 3.92	98.40 ± 2.94	97.35 ± 3.15	99.51 ± 0.86
Class 4	87.64 ± 5.31	86.64 ± 6.82	94.24 ± 7.52	94.61 ± 3.61	96.78 ± 3.51	85.03 ± 8.61	88.84 ± 6.01	88.25 ± 7.11	95.58 ± 4.35
Class 5	99.23 ± 0.92	99.61 ± 0.48	99.74 ± 0.19	97.58 ± 2.47	97.90 ± 1.74	99.48 ± 0.64	98.98 ± 1.24	99.93 ± 0.18	
Class 6	99.22 ± 0.58	99.05 ± 0.80	97.22 ± 3.16	99.18 ± 1.48	96.34 ± 5.50	98.91 ± 1.21	98.75 ± 1.98	98.83 ± 1.15	99.81 ± 0.13
Class 7	63.09 ± 10.71	63.64 ± 13.00	72.88 ± 17.87	65.65 ± 13.18	58.29 ± 22.96	65.66 ± 10.23	66.62 ± 10.69	69.90 ± 9.66	79.87 ± 6.78
Class 8	99.24 ± 0.91	98.49 ± 2.03	99.37 ± 0.59	99.49 ± 0.68	98.86 ± 2.84	96.36 ± 2.95	98.65 ± 1.72	98.27 ± 1.40	99.00 ± 1.65
Class 9	71.10 ± 16.43	72.42 ± 15.63	86.01 ± 9.88	86.69 ± 7.53	83.44 ± 15.47	67.28 ± 15.27	73.87 ± 18.44	67.64 ± 19.19	81.95 ± 12.10
Class 10	93.83 ± 7.53	95.35 ± 6.95	98.54 ± 1.16	98.60 ± 1.88	99.10 ± 0.94	89.00 ± 12.36	96.89 ± 1.74	95.31 ± 7.21	98.44 ± 1.73
Class 11	98.60 ± 2.30	98.19 ± 2.22	94.27 ± 4.60	80.60 ± 9.63	96.28 ± 5.75	95.47 ± 5.47	94.95 ± 5.17	98.59 ± 1.80	99.51 ± 1.03
Class 12	98.74 ± 1.86	98.51 ± 1.81	99.20 ± 0.43	89.30 ± 6.87	99.63 ± 0.36	97.32 ± 3.04	97.51 ± 5.72	98.50 ± 1.20	98.58 ± 1.46
Class 13	97.21 ± 3.11	96.79 ± 3.39	94.03 ± 6.43	90.84 ± 6.34	96.57 ± 3.38	94.24 ± 5.22	96.49 ± 2.89	95.26 ± 7.96	98.80 ± 1.05
Class 14	74.70 ± 11.79	73.67 ± 11.20	55.36 ± 22.73	80.84 ± 7.98	69.62 ± 15.91	75.51 ± 10.94	73.69 ± 7.13	70.92 ± 11.05	82.30 ± 8.40
Class 15	89.41 ± 5.84	87.64 ± 5.98	94.11 ± 3.33	97.62 ± 2.04	98.23 ± 8.03	90.57 ± 5.81	83.92 ± 7.27	90.40 ± 6.72	
seed:1309	87.6774265	87.65553371	83.2214641	88.22691888	85.99508145	89.894561	87.70547882	92.8810488	
seed:1310	83.18633161	81.42231098	80.05584216	78.22340563	81.39827296	87.8775744	83.73550785	92.39474122	
seed:1322	85.79907916	85.97298251	85.01392356	84.81906769	84.31611841	83.8918567	88.84081285	91.538618	
seed:1330	86.96399845	86.67424985	86.74642938	85.14450544	87.80532904	84.871367	86.69588221	90.14256393	
seed:1236 (原为1220)	85.71587064	85.58603884	85.01506999	84.44118573	82.36909303	85.6541908	83.53026017	88.80937852	
seed:1336	85.1075239	85.4665964	89.24761007	83.86309425	84.84761269	85.48584876	90.52532313		
seed:1337	84.63785803	84.97254119	88.2994857	82.45409663	87.39113552	84.8621216	87.11192471	91.26310534	
seed:1224	83.7909802	84.81536954	82.91266803	86.24655609	84.30687302	84.675453	84.62676356	87.30977608	
seed:1246	82.55949409	83.29912539	84.89957806	78.92420628	82.30617037	88.8539713	83.39342838	88.82786931	
seed:1227	84.48253546	82.81651597	87.45770234	80.65864167	81.86864167	81.6863031	82.65009893	93.32112942	

Salinas-2shot

SA-2shot	DPSL+NN	DCFSI-2022年	HPSL_2022年	DM-MEN_2023年	FSCF-SSL_2023年	GCCPSL_2024年	CTP-SSCL-2024年	MPLA_2025年	FGAPA-2025年
train time per DataSet(s)	【空缺】	899.87388	1567.639302	2.67091	173.37068	158.44393	2.51533	3.15556	1296.62445
test time per DataSet(s)	【空缺】	82.04 ± 3.26	80.18 ± 2.76	84.89 ± 3.23	\$1.40 ± 2.99	81.05 ± 2.42	81.79 ± 3.26	81.63 ± 2.86	87.55 ± 3.13

SA-1shot	DPSL+NN	DCFSL-2022年	HPSL_2022年	DM-MSL_2023年	FSCP-SSL_2023年	GCCPSL_2024年	CTP-SSCL-2024年	MLPA_2025年	PGAPA_2025年
train time per DataSet(s)		896.28813	14891.94456	【空缺】	2685.233882	1789.23007	755.10528	【空缺】	1293.71043
test time per DataSet(s)		2.81962	141.26512	【空缺】	135.36955	2.63571	3.37544	【空缺】	2.84454
average OA	75.65 ± 2.46	74.81 ± 4.12	68.41 ± 4.76	76.77 ± 5.72	68.30 ± 4.83	73.85 ± 3.43	74.19 ± 3.14	73.37 ± 3.08	79.47 ± 3.30
average AA	82.45 ± 2.95	81.46 ± 3.97	73.29 ± 3.15	80.52 ± 3.67	72.46 ± 3.76	79.66 ± 2.95	80.68 ± 3.59	79.90 ± 3.22	86.82 ± 1.55
average kappa	73.06 ± 2.68	72.16 ± 4.53	65.10 ± 5.05	74.40 ± 6.13	64.96 ± 5.03	71.0931 ± 3.7265	71.58 ± 3.38	70.57 ± 3.44	77.3052±3.5380
Class 0	97.95 ± 1.98	97.78 ± 2.12	90.18 ± 14.03	94.49 ± 5.98	66.48 ± 23.00	97.98 ± 2.74	99.21 ± 0.79	96.96 ± 3.11	98.82 ± 1.27
Class 1	92.44 ± 7.94	95.29 ± 5.54	74.82 ± 22.56	90.25 ± 8.95	72.51 ± 21.61	89.83 ± 11.30	91.99 ± 8.00	86.97 ± 13.96	91.72 ± 10.57
Class 2	50.62 ± 10.55	50.52 ± 15.01	42.10 ± 16.40	82.97 ± 18.32	50.62 ± 23.09	43.31 ± 12.26	45.44 ± 16.21	46.23 ± 14.37	54.06±9.31
Class 3	98.92 ± 1.93	99.69 ± 0.30	93.98 ± 7.61	86.73 ± 11.06	95.03 ± 8.44	96.15 ± 6.74	98.67 ± 2.19	98.49 ± 1.54	99.83±0.15
Class 4	83.23 ± 7.55	82.16 ± 5.66	90.30 ± 9.22	83.02 ± 10.91	88.24 ± 14.48	78.00 ± 11.07	82.91 ± 11.73	79.94 ± 14.36	90.90±7.87
Class 5	99.08 ± 1.31	99.22 ± 1.20	87.30 ± 28.83	91.77 ± 10.38	89.94 ± 27.82	97.97 ± 2.64	99.56 ± 0.57	98.75 ± 1.59	99.87 ± 0.35
Class 6	99.05 ± 1.37	98.65 ± 1.62	95.73 ± 6.60	93.92 ± 4.72	82.56 ± 21.21	98.44 ± 0.94	97.55 ± 4.17	97.90 ± 2.06	99.78 ± 0.32
Class 7	45.43 ± 24.00	42.63 ± 25.40	55.41 ± 20.41	52.90 ± 24.66	54.25 ± 34.83	44.32 ± 23.90	42.94 ± 18.68	43.14 ± 23.07	44.63±18.65
Class 8	95.06 ± 8.30	93.85 ± 4.88	80.51 ± 20.12	90.65 ± 12.13	87.75 ± 20.07	96.69 ± 2.88	97.68 ± 3.37	95.73 ± 2.71	99.28 ± 1.12
Class 9	56.88 ± 17.54	51.50 ± 22.62	45.54 ± 28.56	74.94 ± 16.34	51.80 ± 20.41	52.39 ± 17.05	42.79 ± 19.20	47.23 ± 20.67	67.73 ± 15.24
Class 10	70.25 ± 23.35	68.64 ± 27.31	65.42 ± 22.50	94.63 ± 7.32	80.08 ± 25.22	66.55 ± 24.07	79.53 ± 21.56	61.25 ± 21.70	93.74±4.95
Class 11	95.91 ± 3.11	92.97 ± 7.89	76.27 ± 27.98	53.49 ± 16.47	69.15 ± 26.69	92.85 ± 10.33	88.18 ± 12.42	91.43 ± 5.00	96.43± 8.91
Class 12	98.49 ± 1.40	97.38 ± 2.94	96.92 ± 4.37	79.34 ± 15.90	87.62 ± 25.09	89.60 ± 12.32	89.78 ± 25.20	95.45 ± 4.88	97.25±2.44
Class 13	89.32 ± 21.33	90.42 ± 10.94	71.80 ± 22.38	65.66 ± 26.14	77.51 ± 25.64	91.38 ± 8.60	88.40 ± 25.35	95.43 ± 4.94	98.38 ± 1.72
Class 14	63.66 ± 30.85	66.92 ± 31.48	45.95 ± 18.35	72.16 ± 20.16	50.27 ± 33.76	63.16 ± 30.95	65.06 ± 21.27	62.89 ± 30.91	76.05±22.25
Class 15	82.92 ± 6.76	75.67 ± 16.00	60.48 ± 19.65	81.48 ± 9.49	55.48 ± 18.72	75.91 ± 19.41	81.17 ± 12.28	80.62 ± 6.34	80.42± 10.37
seed:1309	79.52987267	80.2841092	71.26568477	71.41906751	78.91634173	0.72485355	75.98174191	84.01862769	
seed:1310	73.24118049	72.60962575	67.69907416	67.51612367	69.76327315	0.771663	70.71498531	73.75766574	
seed:1322	76.78007133	79.19169146	66.83791326	64.45216491	75.76552769	0.72416979	79.25973906	81.70679874	
seed:1330	73.93047881	72.08290248	68.49001164	70.071188661	68.80047030	0.76547225	71.2461146	80.79759023	
seed:1226 (原为1220)	79.67401549	80.99162363	72.84016178	68.46783583	77.53035315	0.72407739	76.65995232	84.41224844	
seed:1336	72.0991259	67.44202408	59.33324709	61.33091863	71.07171902	0.81422209	69.49716334	77.83896661	
seed:1337	75.96326206	76.39199453	72.7182008	72.31718811	75.81172731	0.70101454	69.77990501	79.59640013	
seed:1224	73.79178995	71.86627982	72.7182008	70.11623824	70.82771238	0.71788664	72.11157577	75.65247279	
seed:1246	76.95747787	74.87110306	60.37920648	60.39214237	77.1718441	0.73557186	74.96719827	77.30120304	
seed:1227	74.55324968	72.5241624	71.82562416	76.94084601	72.79766415	0.74028422	73.34651562	79.7941345	

Botswana-5shot

Botswana-5shot	DPSL+NN	DCFSL-2022年	HPSL_2022年	DM-MSL_2023年	FSCP-SSL_2023年	GCCPSL_2024年	CTP-SSCL-2024年	MLPA_2025年	PGAPA_2025年
train time per DataSet(s)	0.14846	581.81145	1626.26683	116.59	2854.27055	1472.79012	384.52205	654.81142	1030.54856
test time per DataSet(s)	0.14846	0.144	0.43386	3.40	0.44905	0.13953	0.15554	0.14	0.159
average OA	96.48 ± 0.84	96.90 ± 1.03	94.56 ± 1.61	92.55 ± 1.79	95.81 ± 1.43	96.24 ± 0.87	96.05 ± 1.32	96.65 ± 1.04	98.22 ± 1.31
average AA	96.58 ± 0.83	97.01 ± 1.13	94.77 ± 1.33	93.32 ± 1.76	95.58 ± 1.46	96.00 ± 1.01	96.04 ± 1.41	96.74 ± 1.08	98.33±1.36
average kappa	96.18 ± 0.90	96.63 ± 1.12	94.10 ± 1.73	91.99 ± 1.94	95.45 ± 1.55	95.9290 ± 0.9392	95.71 ± 1.43	96.37 ± 1.12	98.6655±1.4181
Class 0	99.74 ± 0.59	99.77 ± 0.68	100.00 ± 0.00	94.75 ± 6.43	100.00 ± 0.00	99.77 ± 0.56	99.66 ± 0.78	99.85 ± 0.35	99.89 ± 0.24
Class 1	100.00 ± 0.00	96.98 ± 0.06	99.90 ± 0.31	89.27 ± 13.98	99.27 ± 1.48	99.48 ± 1.07	99.38 ± 1.06	100.00 ± 0.00	
Class 2	98.64 ± 2.08	98.41 ± 1.70	97.15 ± 4.02	97.85 ± 3.12	97.56 ± 4.02	97.97 ± 2.06	96.91 ± 4.34	95.89 ± 6.22	98.13 ± 5.22
Class 3	99.14 ± 1.04	99.33 ± 0.86	91.00 ± 12.61	99.86 ± 0.22	93.76 ± 10.41	97.00 ± 3.09	98.19 ± 2.39	98.10 ± 3.36	98.95 ± 1.60
Class 4	82.77 ± 10.24	86.40 ± 7.93	84.77 ± 9.19	75.34 ± 10.60	90.64 ± 6.82	81.97 ± 7.52	82.16 ± 7.39	82.69 ± 7.41	95.49 ± 3.05
Class 5	90.00 ± 11.33	88.81 ± 8.64	86.44 ± 8.61	89.77 ± 6.78	83.48 ± 11.89	93.22 ± 6.67	91.44 ± 8.64	94.28 ± 8.13	94.77 ± 7.53
Class 6	98.74 ± 2.15	99.17 ± 1.37	95.47 ± 5.70	100.00 ± 0.00	97.05 ± 3.33	99.29 ± 0.70	98.82 ± 2.54	99.69 ± 0.55	98.90 ± 2.49
Class 7	99.04 ± 2.88	99.75 ± 0.76	93.74 ± 11.44	91.16 ± 11.38	98.18 ± 5.45	99.70 ± 0.76	98.23 ± 4.50	98.69 ± 2.71	100.00 ± 0.00
Class 8	95.40 ± 2.01	96.47 ± 3.76	93.75 ± 6.07	91.04 ± 9.23	95.08 ± 7.09	95.89 ± 3.92	96.54 ± 3.74	96.25 ± 3.48	96.63 ± 5.37
Class 9	99.71 ± 0.49	99.55 ± 0.72	99.26 ± 1.65	99.88 ± 0.26	99.71 ± 0.74	99.59 ± 0.86	98.89 ± 1.59	99.84 ± 0.33	99.92 ± 0.16
Class 10	98.90 ± 1.05	99.17 ± 1.05	96.33 ± 5.17	85.83 ± 10.04	99.67 ± 0.68	99.07 ± 0.87	96.73 ± 4.36	98.37 ± 1.93	98.80 ± 1.57
Class 11	98.75 ± 1.93	99.49 ± 0.54	99.94 ± 0.17	93.07 ± 9.06	98.69 ± 3.23	98.58 ± 2.68	99.32 ± 0.84	98.75 ± 1.78	99.89 ± 0.23
Class 12	99.54 ± 0.61	97.76 ± 3.49	97.26 ± 4.80	91.90 ± 9.69	99.73 ± 0.54	97.53 ± 2.39	99.09 ± 1.79	99.24 ± 1.55	99.85± 0.35
Class 13	91.89 ± 6.69	93.22 ± 7.28	94.67 ± 6.88	96.11 ± 7.24	95.33 ± 6.32	85.11 ± 8.88	91.11 ± 6.57	93.33 ± 6.46	94.33 ± 6.69
seed:1309	97.0363121	96.53870359	96.47577093	93.6123348	97.01069855	96.96633103	94.02139711	98.30081812	
seed:1310	97.07365121	97.94562618	94.87098804	95.01221787	96.09817495	96.57016992	94.9845813	97.19946564	
seed:1322	97.01069853	96.60667082	94.10433984	93.92699811	94.99683337	94.94430459	97.32536181	96.69603524	
seed:1330	95.28003035	95.55324733	94.39899308	93.95179358	93.76966646	95.59471366	94.0840433	96.8533669	95.50031466
seed:1226 (原为1220)	97.57709251	98.23788546	95.68911265	98.87665198	96.8353669	97.41760636	96.00377596	99.30774072	
seed:1336	96.97923222	97.57024531	94.87098804	95.93808685	94.83952171	95.93409324	98.04908748	96.84843323	
seed:1237	96.00377596	96.09817495	94.1157961	93.9308665	97.45122719	96.79043424	96.94757711	96.50723276	98.74134676
seed:1224	94.83952171	96.85336669	90.59156702	90.8974764	95.37071899	95.72057898	95.95363247	96.63310258	98.61548143
seed:1246	96.82190057	98.77281309	95.84644443	93.931718062	97.13656388	97.19949654	97.941761	96.47577093	99.43360604
seed:1227	96.09817495	96.54562618	96.954971366	91.62995599	97.10509755	96.28697294	94.9996853	97.45122719	99.24480806

Botswana-4shot

Botswana-4shot	DPSL+NN	DCFSL-2022年	HPSL_2022年	DM-MSL_2023年	FSCP-SSL_2023年	GCCPSL_2024年	CTP-SSCL-2024年	MLPA_2025年	PGAPA_2025年
train time per DataSet(s)	75.18925	588.96043	1636.47192	2881.9636	1516.88411	385.79938	642.70551	1030.19631	
test time per DataSet(s)	0.33694	0.147	0.42013	0.42706	0.13854	0.156	0.13716	0.173	
average OA	95.54 ± 1.46	95.98 ± 1.23	94.19 ± 2.49	88.82 ± 2.46	93.32 ± 2.36	95.18 ± 1.12	94.93 ± 0.85	95.30 ± 1.34	97.16 ± 1.35

Botswana-3shot	DPSL+NN	DPSL-2022	HPSL - 2022	DM-MN4 - 2023	FSPCF-SSL - 2023	GCPSSL - 2024	CTP-SSCI-2024	MPLA - 2025	FGAPA - 2025
train time per DataSet(s)	751.7711	583.23487	1647.09595	丢失!	2726.32088	1472.51226	381.32142	642.64696	1020.2113
test time per DataSet(s)	0.45355	0.1435	0.43605		0.43229	0.14551	0.158	0.14164	0.178
average OA	94.44 ± 1.94	94.67 ± 1.36	88.83 ± 3.45	86.91 ± 1.93	90.19 ± 3.24	93.72 ± 1.85	93.31 ± 1.65	94.42 ± 1.98	96.90 ± 1.31
average AA	94.67 ± 1.64	94.83 ± 1.04	89.78 ± 2.78	87.86 ± 1.64	90.44 ± 2.96	93.75 ± 1.64	93.50 ± 1.48	94.82 ± 1.69	96.95±0.31
average kappa	93.97 ± 2.10	94.22 ± 1.47	87.91 ± 3.72	85.83 ± 2.08	89.37 ± 3.50	93.2038 ± 2.0051	92.75 ± 1.79	93.95 ± 2.13	96.6404 ± 1.4249
Class 0	99.85 ± 0.45	99.93 ± 0.15	99.74 ± 0.67	91.09 ± 10.70	99.81 ± 0.16	99.74 ± 0.58	99.48 ± 0.81	99.65 ± 0.56	99.70 ± 0.69
Class 1	99.18 ± 1.10	99.18 ± 2.13	92.24 ± 12.75	99.59 ± 0.68	87.24 ± 14.22	99.69 ± 0.65	99.90 ± 0.31	100.00 ± 0.00	100.00 ± 0.00
Class 2	91.90 ± 8.28	95.93 ± 3.31	88.55 ± 18.07	90.40 ± 7.88	91.61 ± 10.35	94.60 ± 7.83	96.25 ± 3.71	94.96 ± 4.08	97.54 ± 4.37
Class 3	99.15 ± 1.21	97.03 ± 4.16	86.04 ± 12.88	91.56 ± 12.10	75.09 ± 22.42	95.57 ± 5.70	97.45 ± 5.43	98.44 ± 1.86	98.77 ± 3.22
Class 4	76.95 ± 11.90	77.71 ± 15.50	80.04 ± 12.40	71.62 ± 9.40	88.91 ± 7.75	71.84 ± 18.44	71.84 ± 12.04	74.10 ± 20.15	91.58 ± 8.63
Class 5	87.14 ± 11.14	88.20 ± 11.86	65.60 ± 13.13	68.76 ± 12.53	73.68 ± 18.05	88.72 ± 11.69	86.35 ± 9.35	85.75 ± 13.69	90.15±9.77
Class 6	96.68 ± 4.12	98.55 ± 1.69	94.57 ± 5.16	95.82 ± 5.83	93.24 ± 6.49	95.59 ± 5.83	98.24 ± 3.54	97.81 ± 3.34	99.53 ± 0.62
Class 7	99.10 ± 2.70	98.20 ± 5.40	92.40 ± 13.13	90.70 ± 8.59	92.65 ± 8.09	96.60 ± 6.19	97.35 ± 5.45	97.80 ± 3.78	97.20±8.40
Class 8	93.22 ± 6.64	92.67 ± 7.17	70.93 ± 28.81	81.90 ± 14.08	78.55 ± 21.30	92.93 ± 6.52	89.61 ± 10.64	94.92 ± 6.54	95.21 ± 4.37
Class 9	98.53 ± 3.64	98.65 ± 2.10	98.98 ± 2.08	99.35 ± 1.19	99.43 ± 1.71	98.04 ± 3.74	95.84 ± 8.43	98.04 ± 4.07	99.92 ± 0.24
Class 10	98.64 ± 1.58	97.55 ± 3.94	95.56 ± 7.98	86.16 ± 10.16	96.16 ± 7.22	97.98 ± 1.85	96.19 ± 3.26	96.56 ± 4.27	96.26 ± 2.54
Class 11	99.21 ± 0.80	98.31 ± 1.49	97.55 ± 4.27	82.13 ± 13.62	97.02 ± 4.45	99.49 ± 0.92	96.63 ± 3.90	98.37 ± 2.08	99.78 ± 0.28
Class 12	96.42 ± 4.01	96.57 ± 3.89	98.49 ± 3.45	90.30 ± 11.95	97.25 ± 5.08	97.81 ± 3.48	98.57 ± 3.44	98.15 ± 1.75	99.96±0.11
Class 13	89.46 ± 5.65	89.13 ± 7.19	96.30 ± 5.26	90.65 ± 8.30	95.54 ± 4.22	83.91 ± 8.81	85.33 ± 5.31	92.93 ± 6.00	91.74±5.78
seed:1309	92.8517426	93.9484591	83.03181535		85.65190268	91.48471616	0.91703057	92.8883437	96.63131628
seed:1310	95.2558895	94.66625078	84.46662508		84.68496569	95.47723019	0.95131424	93.23518403	98.12850905
seed:1332	97.19276357	95.00935745	91.79663132		91.20399251	95.35246413	0.95446039	92.29569557	96.63131628
seed:1330	92.79475983	93.51216469	89.33320156		87.77292576	92.04616344	0.94198378	95.53961323	96.91203993
seed:1236 (原为1220)	95.85152838	95.47723019	92.66999376		94.54148472	94.72683351	0.9176544	92.66999376	98.47161572
seed:1336	90.33063007	91.32875858	86.4628821		91.20399251	91.35995009	0.92326887	0.970918902	96.41279567
seed:1337	95.04054897	95.60199626	92.077353496		93.82407985	96.6625078	0.95851528	94.79101684	97.19276357
seed:1224	94.07361198	95.07174049	88.89582034		91.07922645	92.10854648	0.92857143	94.8220836	95.13412352
seed:1246	96.6625078	95.80203687	93.29824808		93.44978166	95.19650655	0.92981909	95.39365565	98.93948946
seed:1227	94.3231441	96.22582658	86.2275733		88.49030363	92.82595134	0.90829694	97.47348721	94.54148472

Botswana-2shot

Bottom-5-2shot	DPSL+NN	DPCSL-2022	HPSL_2022	DM-MGN_2023	FSPC-SLL_2023	GCCPSL_2024	CTP-SSCL_2024	MPLA_2025	FGPA_2025
train time per DataSet(s)	291.41512	584.45027	1635.11273	丢失!	2730.77842	1473.33883	381.63695	645.48966	1019.75608
train time per DataSet(s)	0.145	0.14314	0.4277		0.42324	0.14252	0.16721	0.1424	0.15914
average OA	91.64 ± 2.69	92.79 ± 1.92	82.84 ± 3.75	81.07 ± 3.70	81.55 ± 3.14	90.45 ± 2.51	89.67 ± 3.57	92.65 ± 1.55	94.95 ± 2.15
average AA	92.05 ± 2.59	93.10 ± 1.84	84.21 ± 3.43	81.55 ± 3.80	82.36 ± 2.80	91.19 ± 2.16	90.33 ± 3.41	92.79 ± 1.74	95.22 ± 2.05
average kappa	90.94 ± 2.90	92.19 ± 2.07	84.44 ± 4.02	79.50 ± 4.01	80.02 ± 3.37	89.6675 ± 2.7115	88.82 ± 3.86	92.01 ± 1.67	94.5250 ± 3.3329
Class 0	99.93 ± 0.15	99.56 ± 0.11	97.57 ± 1.15	79.20 ± 21.00	99.89 ± 0.34	99.85 ± 0.34	99.78 ± 0.56	99.74 ± 0.47	99.96 ± 0.11
Class 1	98.18 ± 4.54	98.69 ± 2.36	88.08 ± 17.02	96.77 ± 4.40	82.02 ± 20.20	98.38 ± 3.50	100.00 ± 0.00	96.16 ± 6.04	100.00 ± 0.00
Class 2	93.09 ± 9.69	94.98 ± 2.63	83.21 ± 18.85	85.70 ± 11.76	85.18 ± 13.57	92.09 ± 7.70	89.40 ± 7.74	92.33 ± 10.51	97.67 ± 4.05
Class 3	96.85 ± 4.57	93.05 ± 9.18	68.59 ± 21.25	93.10 ± 12.21	62.07 ± 22.17	93.80 ± 7.60	92.49 ± 9.20	96.34 ± 5.59	96.67 ± 7.36
Class 4	70.30 ± 17.32	71.09 ± 12.27	70.90 ± 19.25	57.04 ± 9.79	72.88 ± 20.41	66.22 ± 15.84	65.47 ± 14.09	69.51 ± 15.11	90.79 ± 7.39
Class 5	82.81 ± 8.63	86.97 ± 9.00	61.12 ± 15.28	56.93 ± 17.50	56.93 ± 18.54	76.44 ± 13.25	73.82 ± 17.04	83.33 ± 8.40	85.36 ± 11.40
Class 6	93.23 ± 6.88	95.21 ± 7.34	90.00 ± 7.49	95.56 ± 6.09	89.11 ± 5.63	93.23 ± 5.93	91.40 ± 11.85	96.46 ± 6.05	94.79 ± 6.76
Class 7	94.93 ± 8.41	96.37 ± 6.13	88.81 ± 19.04	75.12 ± 10.56	90.05 ± 16.03	96.87 ± 3.79	92.69 ± 10.97	93.23 ± 11.27	97.11 ± 9.54
Class 8	84.10 ± 13.46	91.19 ± 6.57	65.77 ± 25.74	78.97 ± 10.02	69.65 ± 28.67	84.29 ± 14.83	88.11 ± 11.45	93.88 ± 4.74	90.51 ± 7.67
Class 9	98.37 ± 2.80	97.20 ± 6.81	99.76 ± 6.01	93.50 ± 9.85	98.05 ± 5.72	96.91 ± 6.81	93.62 ± 11.36	98.37 ± 2.43	94.67 ± 11.12
Class 10	95.45 ± 6.23	98.58 ± 1.22	81.29 ± 11.88	88.94 ± 11.33	83.04 ± 14.17	95.25 ± 3.94	95.94 ± 4.30	95.12 ± 5.33	95.31 ± 4.70
Class 11	97.21 ± 2.79	97.93 ± 2.47	93.35 ± 10.14	68.04 ± 20.17	81.23 ± 23.12	97.26 ± 3.55	97.82 ± 2.93	98.72 ± 1.30	99.50 ± 1.16
Class 12	97.93 ± 2.23	92.56 ± 6.66	93.65 ± 9.41	93.27 ± 8.11	86.88 ± 20.35	96.02 ± 4.95	96.09 ± 3.82	97.67 ± 1.95	99.81 ± 0.30
Class 13	86.34 ± 12.67	89.68 ± 5.77	96.77 ± 5.00	79.46 ± 21.57	96.13 ± 5.21	90.11 ± 7.62	87.96 ± 5.67	88.17 ± 7.97	90.86 ± 5.32
seed:1309	92.26708075	91.95652174	80.55990621	78.44720497	89.22360248	0.92236025	93.50931677	96.21118012	
seed:1310	86.9857764	90.83809392	83.32298137	80.83850932	88.01242236	0.94782609	91.89449094	96.39715153	
seed:1332	91.92546584	93.34037267	87.36024845	85.74534161	89.44093979	0.86521739	91.24223602	93.91895758	
seed:1330	92.67080745	91.18012422	82.60896565	81.61490683	87.82608965	0.87546594	93.22981366	95.62111801	96.98757764
seed:1236 (原为:1220)	94.56521739	94.09937888	86.73913043	84.00621118	94.09937888	0.86304348	90.62111801		
seed:1336	88.35403727	92.04968944	85.31059501	75.80745342	90.49659441	0.8673913	94.55416149	94.34782609	
seed:1337	93.32298137	95.0310559	86.52179319	84.09937888	93.88197858	0.93478261	91.24223602	96.45962733	
seed:1224	88.63354037	89.47204969	76.64596273	80.40372671	87.14285714	0.8447703	94.65838509	94.00621118	
seed:1246	95.86956522	95.96273292	76.42857143	85.65217391	93.85093168	0.93881988	90.83850932	96.27329193	
seed:1227	91.77018634	93.78881988	82.88819876	78.85093168	90.55900621	0.90776398	94.50310559	99.34782609	

Botswana-1shot

Botswana-1shot	DPSL+NN	DPSL-2022	HPSL_2022	DM-MEN_2023	FSPC-SSL_2023	GCPSL_2024	CTP-SSC_2024	MPLA_2025年	FGPA-2025年
train time per DataSet(s)	291.32242	580.17656	1634.89161	半天!	2854.09322	1409.85607	713.50491	639.9531	1024.35317
test time per DataSet(s)	0.144	0.14251	0.14042	0.44456	0.13953	0.315	0.1374	0.169	
average OA	86.88 ± 3.37	85.14 ± 2.96	68.85 ± 5.00	59.91 ± 4.66	68.76 ± 4.89	81.69 ± 3.92	79.20 ± 3.64	82.72 ± 2.81	90.62 ± 1.71
average AA	87.52 ± 2.97	85.74 ± 2.96	70.19 ± 4.63	61.64 ± 4.05	70.22 ± 4.92	82.75 ± 3.13	80.80 ± 3.36	83.23 ± 2.72	91.01 ± 1.82
average kappa	85.80 ± 3.64	83.92 ± 3.19	66.33 ± 5.37	56.66 ± 5.01	66.21 ± 5.27	80.1937 ± 4.2256	77.50 ± 3.93	81.29 ± 3.04	89.845 ± 1.8526
Class 0	99.85 ± 0.34	99.96 ± 0.11	100.00 ± 0.00	73.98 ± 18.39	98.85 ± 3.34	99.48 ± 0.67	100.00 ± 0.00	99.70 ± 0.78	100.00 ± 0.00
Class 1	98.30 ± 3.00	97.80 ± 3.19	64.10 ± 21.31	84.60 ± 12.19	71.60 ± 24.66	97.80 ± 4.17	97.40 ± 7.47	94.70 ± 6.35	100.00 ± 0.00
Class 2	72.12 ± 27.44	74.36 ± 23.17	61.28 ± 27.29	49.24 ± 16.41	70.32 ± 28.17	74.68 ± 27.82	72.12 ± 23.87	76.80 ± 25.06	88.56 ± 7.50
Class 3	88.97 ± 5.66	94.58 ± 4.73	48.55 ± 20.71	82.20 ± 10.57	45.42 ± 19.34	89.16 ± 7.52	90.37 ± 13.51	80.05 ± 12.08	94.67 ± 4.88
Class 4	62.99 ± 22.65	54.44 ± 22.43	60.56 ± 24.59	37.91 ± 15.62	57.57 ± 21.21	56.49 ± 22.60	42.50 ± 14.09	51.87 ± 23.46	79.07 ± 10.95
Class 5	74.66 ± 17.77	78.13 ± 15.07	37.20 ± 16.27	30.49 ± 5.06	46.68 ± 18.71	64.29 ± 21.19	58.73 ± 24.19	73.17 ± 10.52	74.03 ± 18.40
Class 6	95.31 ± 4.99	93.10 ± 7.83	82.13 ± 10.67	91.09 ± 7.14	87.25 ± 10.47	89.69 ± 8.73	91.32 ± 9.26	96.40 ± 6.26	93.76 ± 6.86
Class 7	87.92 ± 9.43	67.23 ± 19.18	62.82 ± 22.08	44.21 ± 13.97	60.79 ± 29.59	76.88 ± 19.63	69.46 ± 13.66	64.26 ± 25.81	79.14 ± 20.16
Class 8	87.70 ± 15.37	79.17 ± 28.85	54.03 ± 25.91	41.63 ± 14.27	51.28 ± 22.86	71.95 ± 27.50	71.50 ± 25.11	78.21 ± 16.62	90.99 ± 7.28
Class 9	88.91 ± 16.70	92.47 ± 9.24	84.45 ± 20.96	57.57 ± 19.03	77.04 ± 23.68	86.23 ± 12.97	76.76 ± 19.94	90.93 ± 10.71	90.04 ± 17.32
Class 10	93.26 ± 7.03	97.37 ± 2.70	64.24 ± 25.92	67.01 ± 21.86	64.87 ± 22.24	96.55 ± 3.55	90.13 ± 11.33	92.40 ± 5.61	95.39 ± 6.17
Class 11	95.94 ± 4.81	97.83 ± 2.40	82.33 ± 13.97	68.83 ± 13.99	75.61 ± 21.47	97.17 ± 1.92	89.94 ± 7.27	97.56 ± 2.89	98.67 ± 2.36
Class 12	93.00 ± 7.67	89.81 ± 7.96	83.45 ± 17.80	69.93 ± 12.57	79.03 ± 18.08	77.12 ± 15.61	89.36 ± 6.87	86.89 ± 9.33	99.81 ± 0.75
Class 13	86.38 ± 8.13	84.15 ± 8.09	97.55 ± 4.69	64.26 ± 16.56	96.70 ± 3.73	80.74 ± 15.09	91.60 ± 5.54	82.34 ± 9.55	90.11 ± 45.71
seed:1309	88.86627458	87.87878878	66.57390229	68.76932591	78.29313544	0.76345083	79.87012987	89.20841064	
seed:1310	82.12739564	82.17490414	69.66604824	58.71985158	78.35497835	0.77860235	82.28020371	88.65128437	
seed:1332	90.2288188	86.585387972	80.33395176	67.53246753	83.05896166	0.7585034	80.82869511	88.71366729	
seed:1330	87.69325912	85.93075395	73.09833024	70.16079159	86.86889301	0.84570192	78.35497835	91.15646239	
seed:1236 (原为1220)	84.44650588	87.38440453	70.40816527	74.21150278	80.09647495	0.80983302	85.93075393	90.32138318	
seed:1336	88.18800247	84.69387755	70.5318491	66.23632061	85.03401361	0.78489722	83.48794063	90.78540507	
seed:1337	82.40568955	78.1694496	64.31663575	77.05627206	74.48979592	0.75108225	88.28076685	94.68150897	
seed:1224	90.63079777	85.15769944	61.81199753	70.56277056	81.66354752	0.79128015	84.1991342	91.03277675	
seed:1246	83.05504042	86.37346939	64.93506494	70.47000618	79.63567965	0.76592455	83.20964745	89.70315399	
seed:1227	91.18738404	88.96103896	66.85219542	63.82189239	88.34260977	0.86703772	80.73592074	91.99134199	

Ablation experiment

The fluctuations in training and testing time are related to other tasks running on the computer, but they do not affect the rest of the data.

	IP	SA	BW
FSL(baseline)	76.89	91.80	97.63
FSL+ACA	78.71	92.74	98.16
FSL+ACA+FFA	79.65	93.15	98.22

	IP	SA	BW
L_{fsl}	78.28	92.28	97.87
$L_{fsl} + L_{cross}$	77.72	91.76	98.18
$L_{fsl} + L_{in}$	78.69	92.13	98.16
$L_{fsl} + L_{cross} + L_{in}$	79.65	93.15	98.22

Module Ablation

IP-5shot	only FSL	FSL+ACA	FGAPA:2025年
train time per DataSet(s)	1109.18583	1230.67684	1284.10828
test time per DataSet(s)	0.51955	0.74141	0.56231
average OA	76.89 ± 2.30	78.71 ± 2.61	79.65 ± 2.76
average AA	86.09 ± 1.18	87.02 ± 1.75	87.74 ± 1.37
average Kappa	73.9429 ± 2.4451	75.8707 ± 2.9376	77.0143 ± 3.2716
Class 0	98.78 ± 2.25	98.05 ± 4.34	98.75 ± 2.25
Class 1	62.13 ± 8.26	61.89 ± 13.41	65.71 ± 14.53
Class 2	63.64 ± 7.66	69.31 ± 8.31	68.12 ± 7.94
Class 3	94.31 ± 4.93	93.97 ± 4.83	95.13 ± 2.76
Class 4	80.44 ± 7.67	81.61 ± 7.51	80.36 ± 7.71
Class 5	95.45 ± 2.55	94.43 ± 4.98	93.97 ± 3.90
Class 6	100.00 ± 0.00	100.00 ± 0.00	100 ± 0.00
Class 7	95.58 ± 4.26	98.71 ± 1.30	93.26 ± 10.94
Class 8	100.00 ± 0.00	100.00 ± 0.00	100 ± 0.00
Class 9	73.95 ± 9.95	73.47 ± 11.25	74.08 ± 11.39
Class 10	70.29 ± 7.84	75.72 ± 8.08	75.08 ± 11.43
Class 11	72.30 ± 16.56	73.69 ± 13.56	78.20 ± 15.70
Class 12	99.75 ± 0.51	99.50 ± 1.10	99.50 ± 1.05
Class 13	88.47 ± 10.35	87.52 ± 9.64	85.79 ± 9.26
Class 14	84.36 ± 13.53	85.43 ± 12.63	88.37 ± 10.54
Class 15	97.95 ± 4.68	99.09 ± 2.37	99.20 ± 1.25
seed:1309	77.29373586	82.31881208	83.8233848
seed:1310	76.81187924	79.80135707	83.29235913
seed:1332	76.29068738	77.52974727	76.58570164
seed:1330	78.11977579	76.70370735	75.43514603
seed:1236 (原为:1220)	79.67351755	82.41715016	81.6599469
seed:1336	72.40633297	74.74677943	74.79594847
seed:1337	80.55856033	81.80745403	81.72878356
seed:1224	76.07434359	77.54941489	80.7552365
seed:1246	73.99940997	75.86783361	76.4283607
seed:1227	77.6772544	78.32628577	81.97462877

SA-5shot	only FSL	FSL+ACA	FGAPA:2025年
train time per DataSet(s)	1191.7251	1256.15013	1299.31266
test time per DataSet(s)	2.61558	4.64168	2.91105
average OA	91.80 ± 1.21	92.74 ± 0.92	93.15 ± 1.00
average AA	95.45 ± 0.61	95.85 ± 0.56	95.99 ± 0.50
average kappa	90.8795 ± 1.3431	91.9211 ± 1.0162	92.3767 ± 1.1041
Class 0	99.50 ± 0.62	98.95 ± 1.53	99.40 ± 0.49
Class 1	99.55 ± 1.07	99.63 ± 0.51	99.54 ± 0.98
Class 2	94.22 ± 6.27	95.96 ± 5.48	94.15 ± 6.21
Class 3	99.50 ± 0.69	99.71 ± 0.40	99.82 ± 0.23
Class 4	96.82 ± 2.04	97.71 ± 1.57	96.95 ± 2.17
Class 5	99.95 ± 0.11	99.87 ± 0.26	99.93 ± 0.16
Class 6	99.88 ± 0.19	99.86 ± 0.15	99.85 ± 0.16
Class 7	81.82 ± 7.73	84.84 ± 5.60	85.56 ± 5.51
Class 8	99.38 ± 1.44	99.75 ± 0.33	99.97 ± 0.05
Class 9	86.77 ± 8.01	89.43 ± 5.20	89.58 ± 4.37
Class 10	98.63 ± 2.03	98.59 ± 1.56	99.44 ± 0.74
Class 11	99.86 ± 0.24	99.88 ± 0.19	99.90 ± 0.16
Class 12	99.08 ± 1.07	98.49 ± 1.45	98.87 ± 0.78
Class 13	98.62 ± 1.13	98.85 ± 1.24	98.38 ± 1.47
Class 14	78.82 ± 9.18	79.46 ± 8.55	81.67 ± 6.64
Class 15	94.76 ± 4.79	92.67 ± 6.42	92.84 ± 6.07
seed:1309	91.12842051	92.79727655	94.1090492
seed:1310	92.42539177	93.52809488	93.20246443
seed:1332	93.56139799	94.12755093	94.44578068
seed:1330	92.46424541	91.88514126	92.36988658
seed:1236	91.39114507	91.57986272	92.48644748
seed:1336	89.176488	91.83333642	92.87313364
seed:1337	92.15711669	93.85372532	93.50404263
seed:1224	90.47900979	91.55025995	90.87124646
seed:1246	92.86388277	93.19506374	93.84262429
seed:1227	92.35693537	93.026698	93.80192048

Botswana-5shot	only FSL	FSL+ACA	FGAPA:2025年
train time per DataSet(s)	880.56682	1029.00649	1030.54856
test time per DataSet(s)	0.23366	0.158	0.159
average OA	97.63 ± 1.38	98.16 ± 1.08	98.22 ± 1.31
average AA	97.50 ± 1.51	98.09 ± 1.17	98.231 ± 1.36
average kappa	97.4318 ± 1.5002	98.0086 ± 1.1651	98.0655 ± 1.4181
Class 0	99.85 ± 0.25	99.89 ± 0.24	99.89 ± 0.24
Class 1	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00
Class 2	97.24 ± 5.54	99.47 ± 1.00	98.13 ± 5.22
Class 3	99.14 ± 1.39	98.48 ± 1.85	98.95 ± 1.60
Class 4	95.11 ± 4.71	94.51 ± 4.88	95.49 ± 3.05
Class 5	91.89 ± 11.38	93.75 ± 6.33	94.77 ± 7.53
Class 6	99.29 ± 1.67	99.96 ± 0.12	98.90 ± 2.49
Class 7	97.93 ± 6.21	100.00 ± 0.00	100.00 ± 0.00
Class 8	95.86 ± 7.06	97.44 ± 3.80	96.63 ± 5.37
Class 9	100.00 ± 0.00	99.47 ± 0.78	99.92 ± 0.16
Class 10	98.50 ± 2.05	98.07 ± 2.06	98.40 ± 1.57
Class 11	100.00 ± 0.00	99.83 ± 0.26	99.89 ± 0.23
Class 12	100.00 ± 0.00	99.77 ± 0.39	99.85 ± 0.35
Class 13	90.22 ± 8.13	92.67 ± 7.69	94.33 ± 6.69
seed:1309	97.04216488	97.35682819	98.30081812
seed:1310	99.15040906	99.27627439	99.43360604
seed:1332	97.2624292	96.47577093	96.69603524
seed:1330	94.77658905	96.41283826	95.50031466
seed:1236 (原为:1220)	98.86721208	98.99307741	99.30774072
seed:1336	96.3499056	97.57709251	96.88483323
seed:1337	98.83574575	98.5840151	98.74134676
seed:1224	98.55254877	98.39521712	98.61548143
seed:1246	98.89867841	99.37067338	99.43360604
seed:1227	96.57016992	99.18187539	99.24480806

Loss Ablation

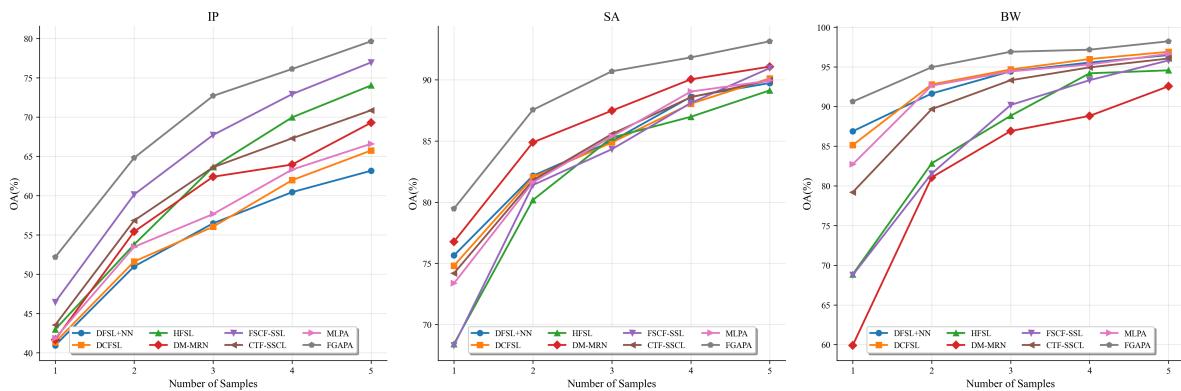
IP-5shot	L_{fsl}	L_{fsl}+L_{cross}	L_{fsl}+L_{in}	FGAPA:2025年
train time per DataSet(s)	1445.9208	1264.70895	1266.59177	1284.10828
test time per DataSet(s)	0.79374	0.527	0.56724	0.56231
average OA	78.28 ± 1.40	77.72 ± 2.32	78.69 ± 3.11	79.65 ± 2.76
average AA	86.86 ± 1.45	86.16 ± 1.55	87.37 ± 1.86	87.74 ± 1.37
average Kappa	75.4691 ± 1.6181	74.7963 ± 2.6384	75.9377 ± 3.4522	77.0143 ± 3.2716
Class 0	98.78 ± 2.25	98.78 ± 2.25	98.78 ± 2.25	98.75 ± 2.25
Class 1	62.56 ± 12.34	59.49 ± 15.24	61.44 ± 14.15	65.71 ± 14.53
Class 2	69.02 ± 8.06	70.36 ± 8.95	68.12 ± 8.95	68.12 ± 7.94
Class 3	93.15 ± 8.28	90.82 ± 6.81	93.58 ± 7.12	95.13 ± 2.76
Class 4	80.48 ± 7.57	80.36 ± 6.86	81.09 ± 7.49	80.36 ± 7.71
Class 5	96.30 ± 2.36	95.59 ± 3.34	97.06 ± 1.68	93.97 ± 3.90
Class 6	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	100 ± 0.00
Class 7	97.46 ± 2.82	94.19 ± 5.81	98.63 ± 2.10	93.26 ± 10.94
Class 8	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	100 ± 0.00
Class 9	73.01 ± 9.84	72.66 ± 12.03	74.57 ± 12.34	74.08 ± 11.39
Class 10	72.59 ± 5.53	73.87 ± 9.19	73.56 ± 8.57	75.08 ± 11.43
Class 11	76.07 ± 14.64	78.40 ± 9.63	78.15 ± 14.08	78.20 ± 15.70
Class 12	99.55 ± 0.72	99.40 ± 1.18	99.70 ± 0.75	99.50 ± 1.05
Class 13	89.67 ± 9.06	87.64 ± 10.00	88.75 ± 9.37	85.79 ± 9.26
Class 14	82.52 ± 12.94	79.11 ± 15.82	85.25 ± 12.92	88.37 ± 10.54
Class 15	98.64 ± 3.73	97.95 ± 4.00	99.20 ± 1.76	99.20 ± 1.25
seed:1309	80.44055463	79.53584423	80.25371226	83.8233848
seed:1310	79.32933425	81.90579211	81.73861737	83.29235913
seed:1332	78.27711673	77.19539778	78.72947192	76.58570164
seed:1330	76.40869309	74.06824663	75.50398269	75.43514603
seed:1236 (原为:1220)	78.94581571	76.89054971	81.3255974	81.6599469
seed:1336	76.91021733	76.310355	72.33749631	74.79594847
seed:1337	79.496509	77.92309962	82.31881208	81.72878356
seed:1224	79.53584423	80.28321369	81.02074934	80.7552365
seed:1246	76.49719736	74.63860753	75.77932933	76.4283607
seed:1227	76.92988494	78.41479005	77.903432	81.97462877

SA-5shot	L_{fsl}	L_{fsl}+L_{cross}	L_{fsl}+L_{in}	FGAPA:2025年
train time per DataSet(s)	1448.48782	1298.28034	1288.6314	1299.31266
test time per DataSet(s)	3.27709	3.18479	2.85097	2.91105
average OA	92.28 ± 0.93	91.76 ± 1.17	92.13 ± 0.81	93.15 ± 1.00
average AA	95.71 ± 0.47	95.29 ± 0.56	95.70 ± 0.47	95.99 ± 0.50
average kappa	91.4114 ± 1.0370	90.8271 ± 1.2928	91.2462 ± 0.8963	92.3767±1.1041
Class 0	99.49 ± 0.70	98.66 ± 2.02	99.43 ± 0.69	99.40 ± 0.49
Class 1	99.78 ± 0.49	98.81 ± 1.72	98.65 ± 3.95	99.54 ± 0.98
Class 2	93.71 ± 4.98	95.49 ± 5.89	94.96 ± 5.24	94.15± 6.21
Class 3	99.69 ± 0.53	99.43 ± 0.96	99.83 ± 0.22	99.82± 0.23
Class 4	96.90 ± 1.81	96.59 ± 2.26	97.11 ± 1.77	96.95 ± 2.17
Class 5	99.94 ± 0.14	99.67 ± 0.48	99.94 ± 0.12	99.93 ± 0.16
Class 6	99.83 ± 0.23	99.60 ± 0.53	99.85 ± 0.16	99.85 ± 0.16
Class 7	84.04 ± 5.32	83.39 ± 7.78	81.95 ± 5.67	85.56± 5.51
Class 8	99.27 ± 1.20	99.49 ± 0.66	99.85 ± 0.21	99.97 ± 0.05
Class 9	89.10 ± 3.50	88.47 ± 5.19	91.31 ± 3.64	89.58 ± 4.37
Class 10	98.97 ± 1.41	98.90 ± 1.03	99.13 ± 0.60	99.44 ± 0.74
Class 11	99.88 ± 0.22	99.89 ± 0.23	99.86 ± 0.27	99.90 ± 0.16
Class 12	99.18 ± 0.71	98.78 ± 1.10	98.99 ± 0.79	98.87 ± 0.78
Class 13	98.98 ± 1.31	98.94 ± 1.07	98.70 ± 1.09	98.38 ± 1.47
Class 14	77.89 ± 7.05	76.49 ± 8.75	79.27 ± 8.32	81.67 ± 6.64
Class 15	94.69 ± 3.10	92.03 ± 7.85	92.38 ± 6.71	92.84± 6.07
seed:1309	93.42633536	92.75102222	93.27832152	94.1090492
seed:1310	91.60021462	91.3615423	91.97209939	93.20246443
seed:1332	94.04244297	92.77507447	92.89903606	94.44578068
seed:1330	91.98320043	92.49384817	91.78338175	92.36988658
seed:1236	91.58356306	91.67977206	91.6834724	92.48644748
seed:1336	91.79633296	89.10618143	90.98410701	92.87313364
seed:1337	91.96839905	92.34398416	91.88329109	93.50404263
seed:1224	91.01000944	90.54191567	90.90639975	90.87124646
seed:1246	93.40228311	93.1636108	93.05630076	93.84262429
seed:1227	92.00910285	91.37264334	92.84723122	93.80192048

Botswana-5shot	L_{fsl}	L_{fsl}+L_{cross}	L_{fsl}+L_{in}	FGAPA:2025年
train time per DataSet(s)	1022.8629	1029.78451	1029.00649	1030.54856
test time per DataSet(s)	0.16	0.18329	0.158	0.159
average OA	97.87 ± 1.28	98.18 ± 0.98	98.16 ± 1.08	98.22 ± 1.31
average AA	97.87 ± 1.26	98.11 ± 1.12	98.09 ± 1.17	98.231 ± 1.36
average kappa	97.6879 ± 1.3832	98.0289 ± 1.0662	98.0086 ± 1.1651	98.0655 ± 1.4181
Class 0	99.85 ± 0.35	99.74 ± 0.34	99.89 ± 0.24	99.89 ± 0.24
Class 1	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00	100.00 ± 0.00
Class 2	96.18 ± 7.10	99.76 ± 0.73	99.47 ± 1.00	98.13 ± 5.22
Class 3	99.57 ± 0.58	99.05 ± 1.82	98.48 ± 1.85	98.95 ± 1.60
Class 4	93.22 ± 3.79	94.09 ± 6.22	94.51 ± 4.88	95.49 ± 3.05
Class 5	94.09 ± 7.99	94.36 ± 6.57	93.75 ± 6.33	94.77 ± 7.53
Class 6	100.00 ± 0.00	99.61 ± 1.06	99.96 ± 0.12	98.90 ± 2.49
Class 7	98.18 ± 5.45	99.95 ± 0.15	100.00 ± 0.00	100.00 ± 0.00
Class 8	98.22 ± 2.40	97.70 ± 3.92	97.44 ± 3.80	96.63 ± 5.37
Class 9	99.88 ± 0.26	99.84 ± 0.20	99.47 ± 0.78	99.92 ± 0.16
Class 10	97.47 ± 2.16	97.60 ± 2.17	98.07 ± 2.06	98.40 ± 1.57
Class 11	99.83 ± 0.26	99.83 ± 0.26	99.83 ± 0.26	99.89 ± 0.23
Class 12	99.62 ± 0.80	99.58 ± 0.58	99.77 ± 0.39	99.85 ± 0.35
Class 13	94.11 ± 5.98	92.44 ± 7.76	92.67 ± 7.69	94.33 ± 6.69
seed:1309	98.01762115	97.23096287	97.35682819	98.30081812
seed:1310	99.62240403	99.68533669	99.27627439	99.43360604
seed:1332	96.69603524	96.8533669	96.47577093	96.69603524
seed:1330	94.65072373	96.8533669	96.41283826	95.50031466
seed:1236 (原为:1220)	98.42668345	99.05601007	98.99307741	99.30774072
seed:1336	98.14348647	97.98615481	97.57709251	96.88483323
seed:1337	98.48961611	98.70988043	98.5840151	98.74134676
seed:1224	97.98615481	97.45122719	98.39521712	98.61548143
seed:1246	98.6784141	99.15040906	99.37067338	99.43360604
seed:1227	97.95468848	98.83574575	99.18187539	99.24480806

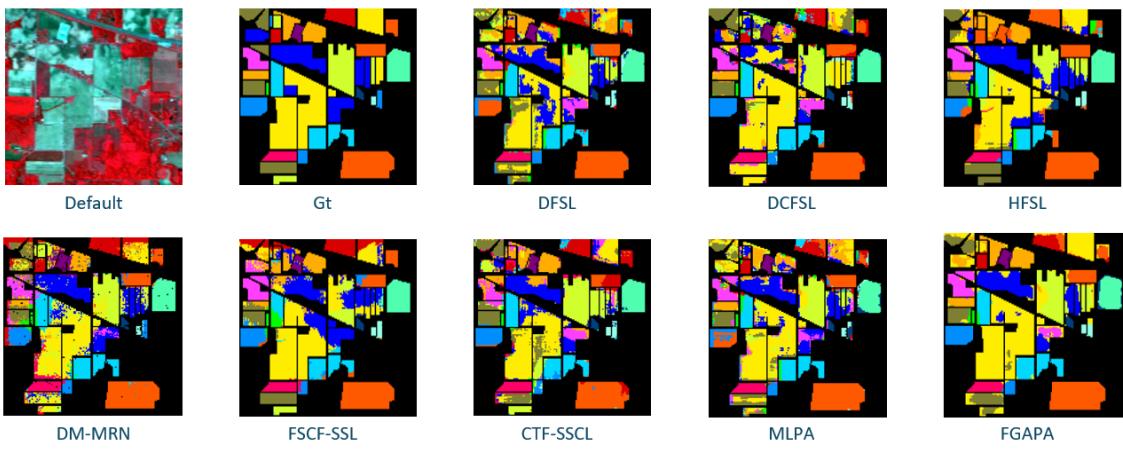
About the paper images

We apologize for the lack of clarity caused by the inability to display images across columns due to the length constraints of the paper.

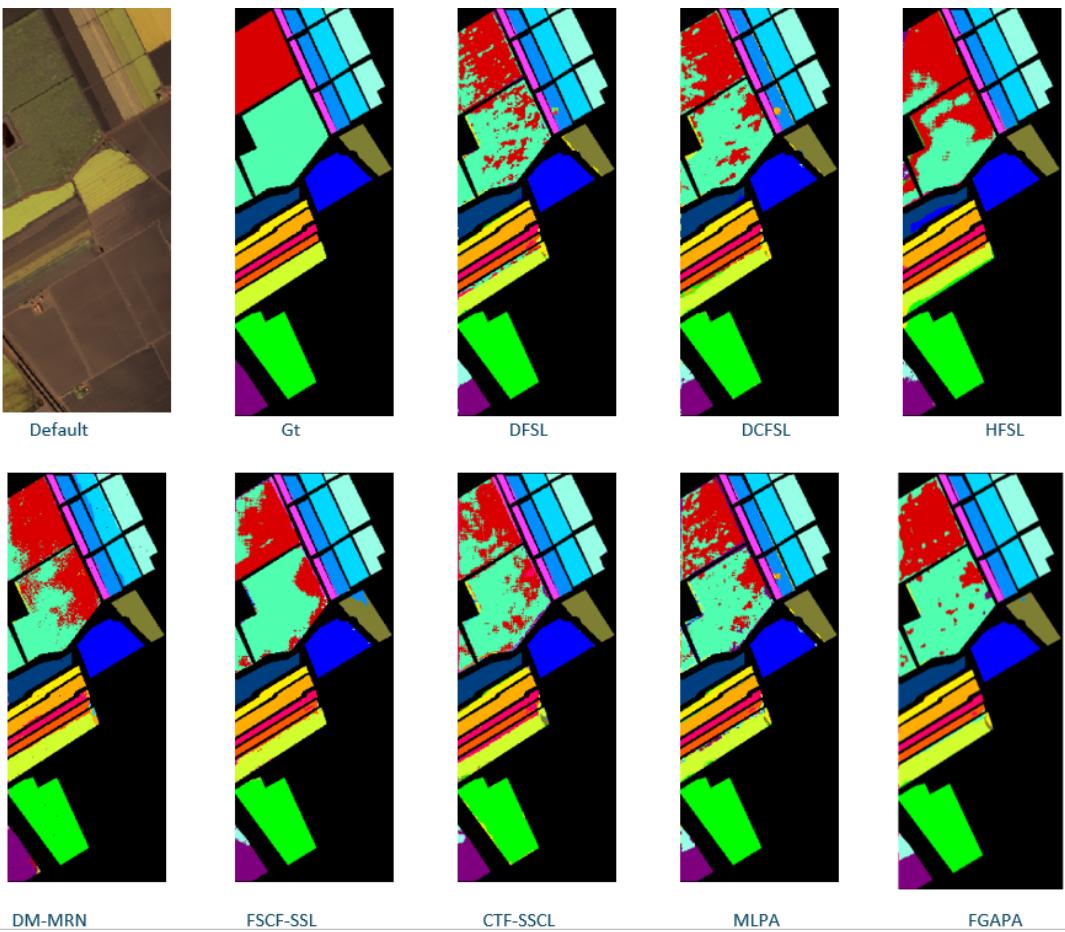


Classification map

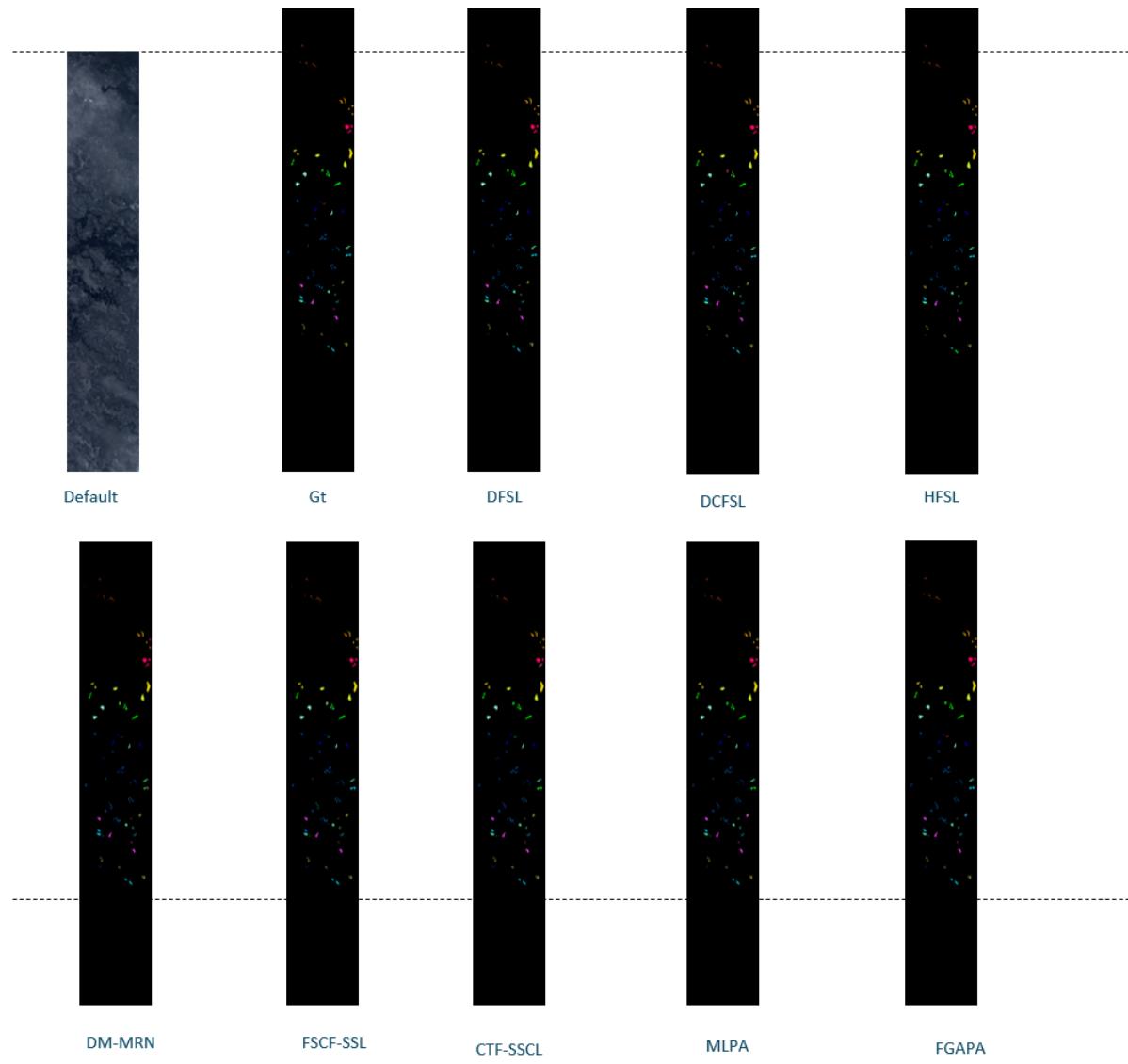
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Salinas



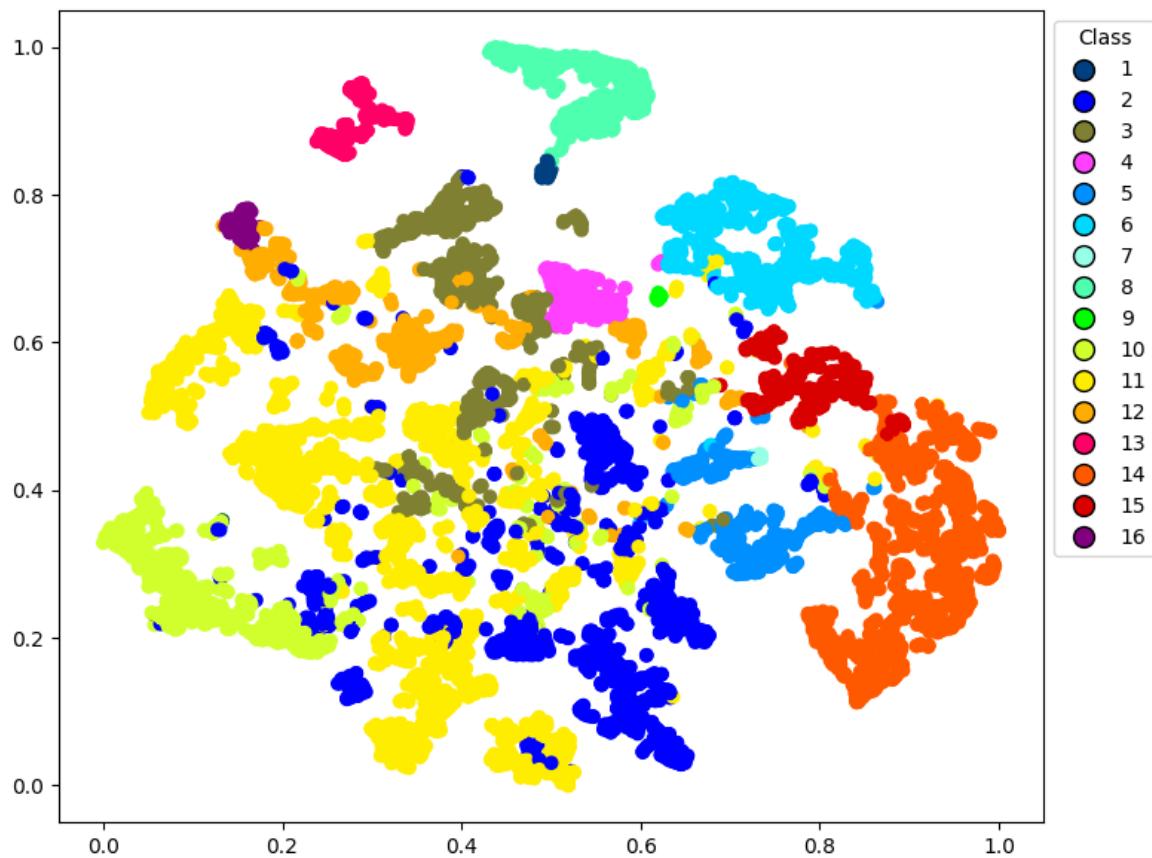
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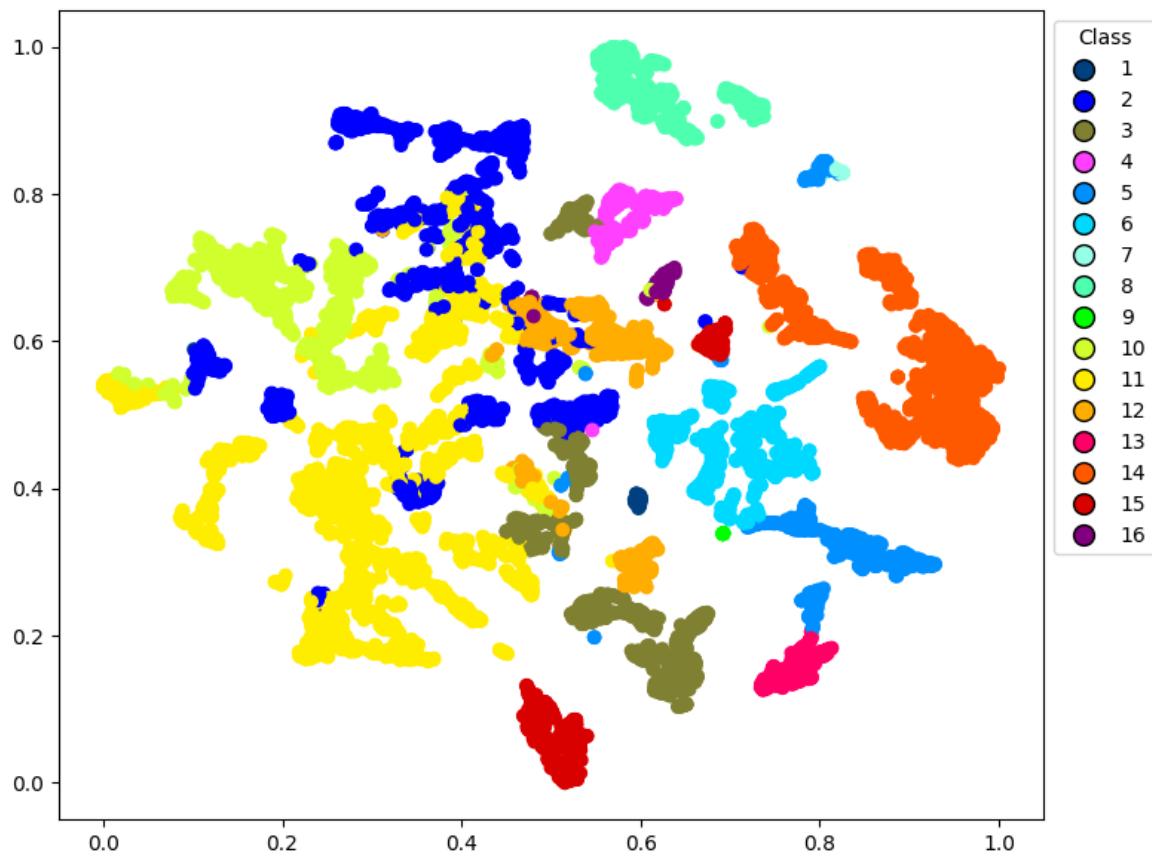
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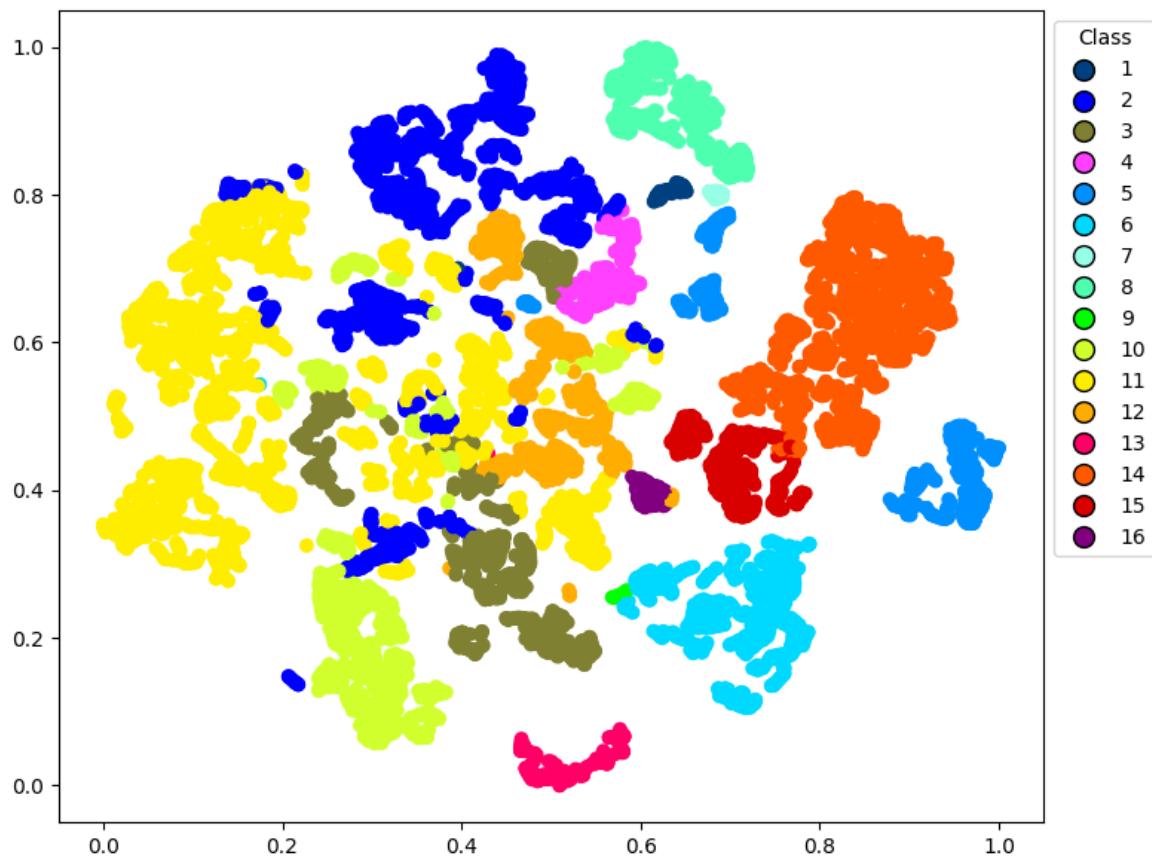
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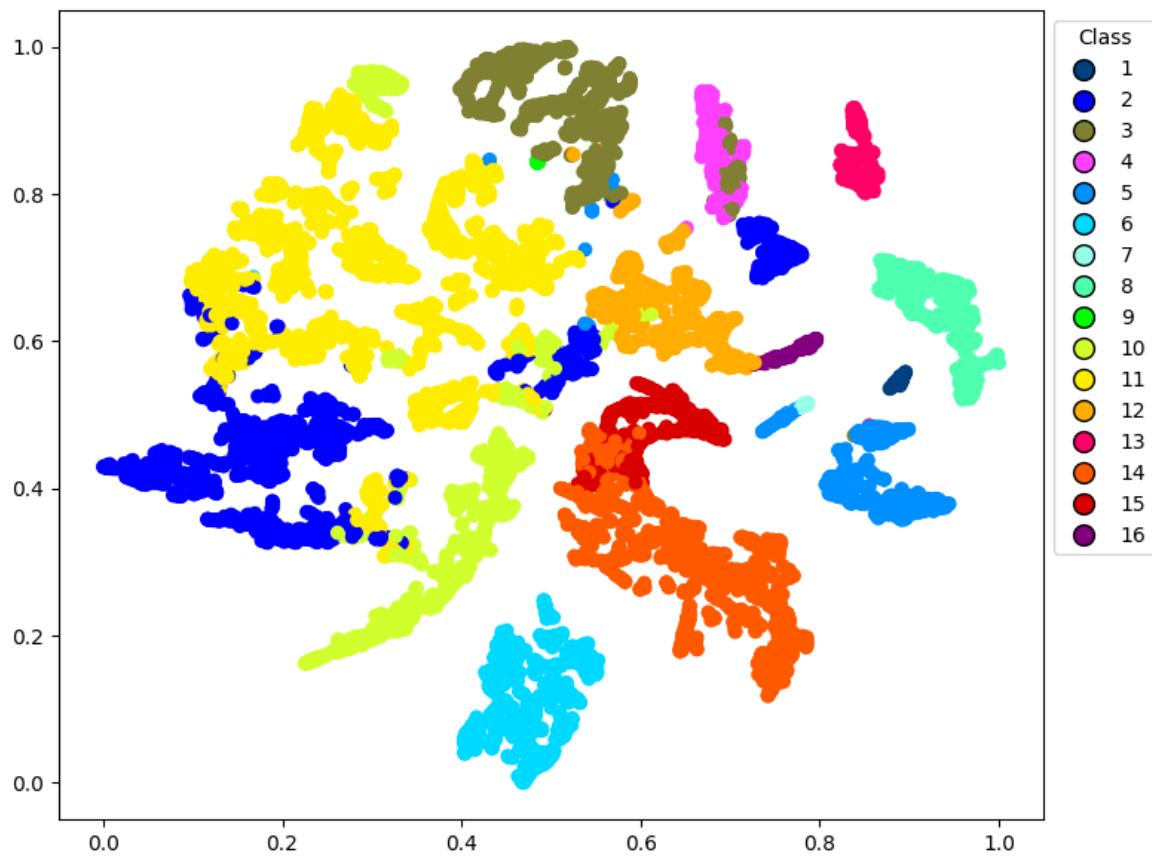
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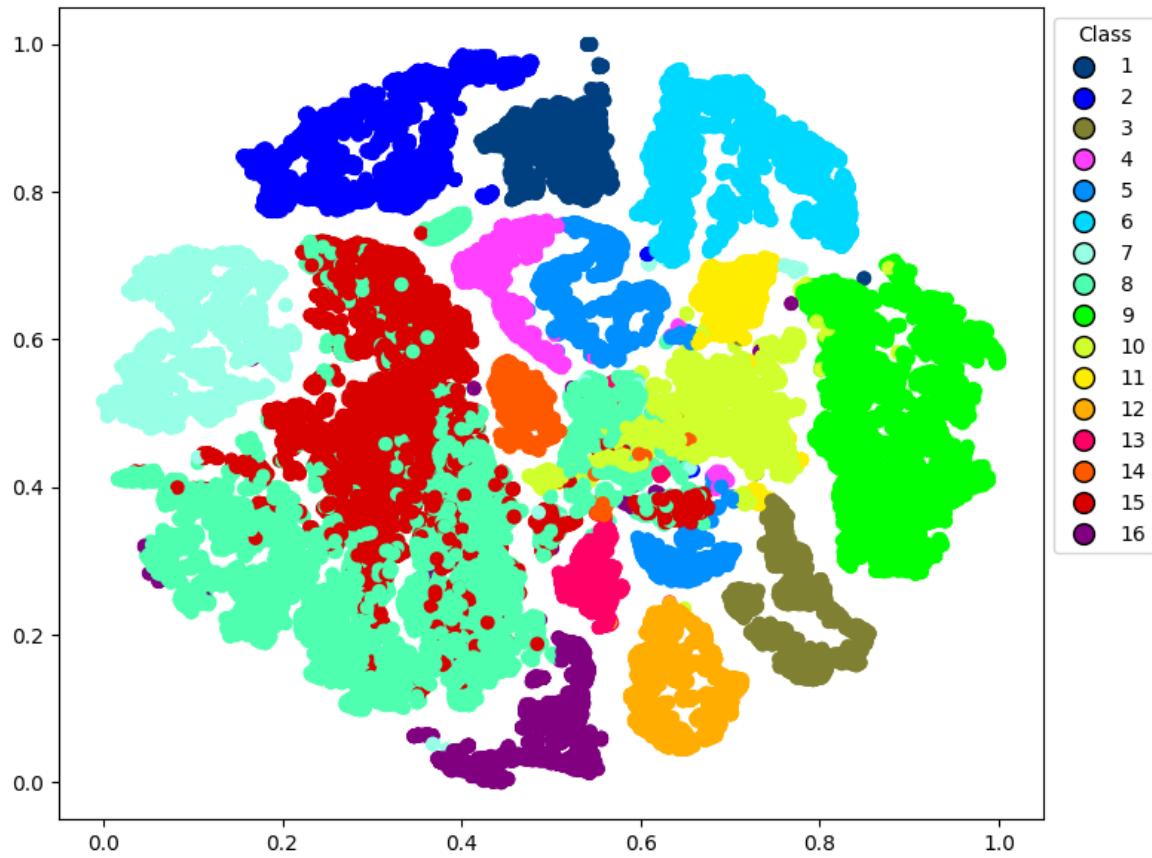


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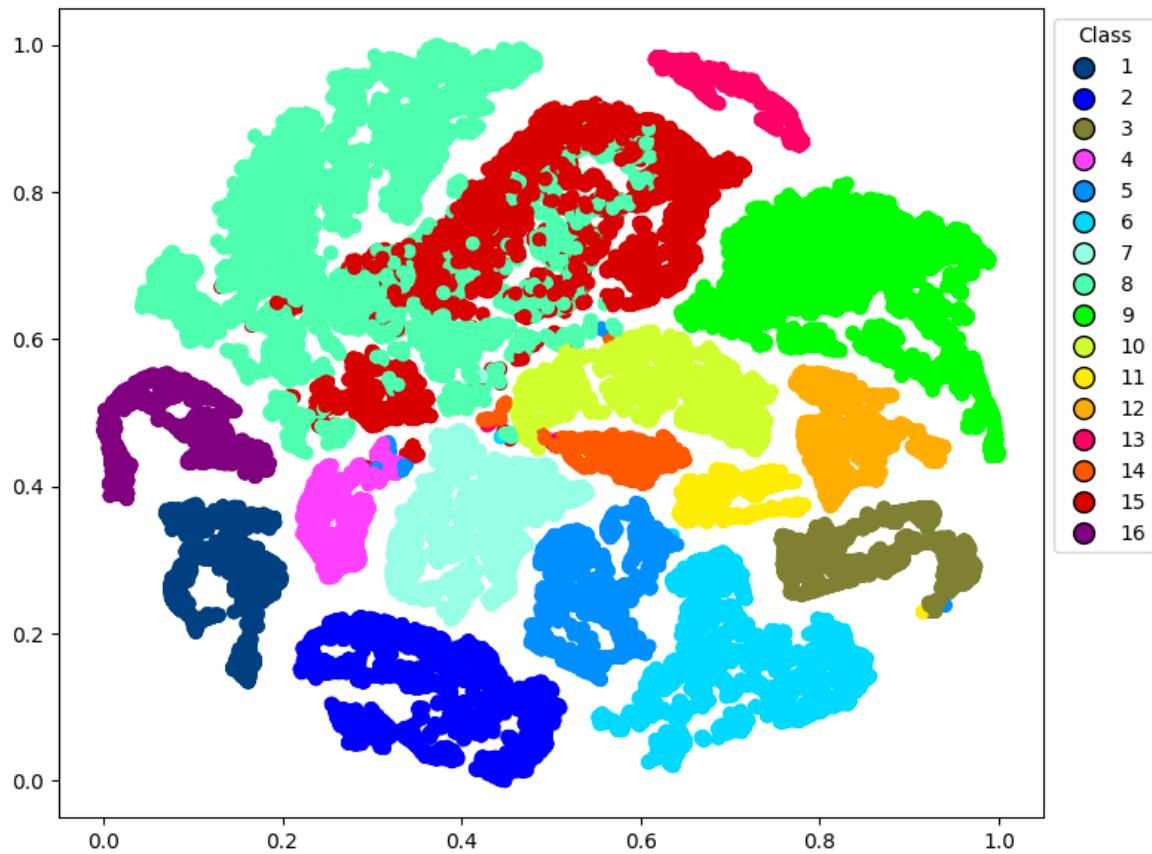


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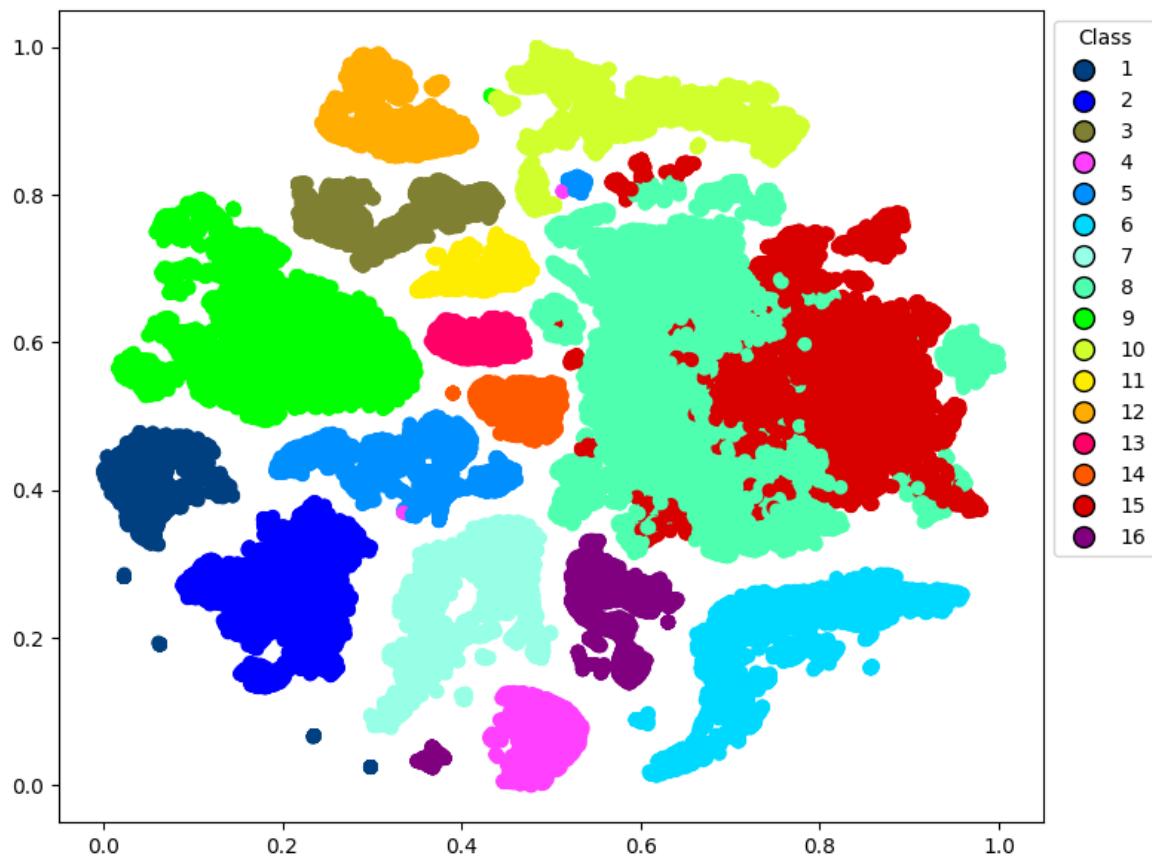
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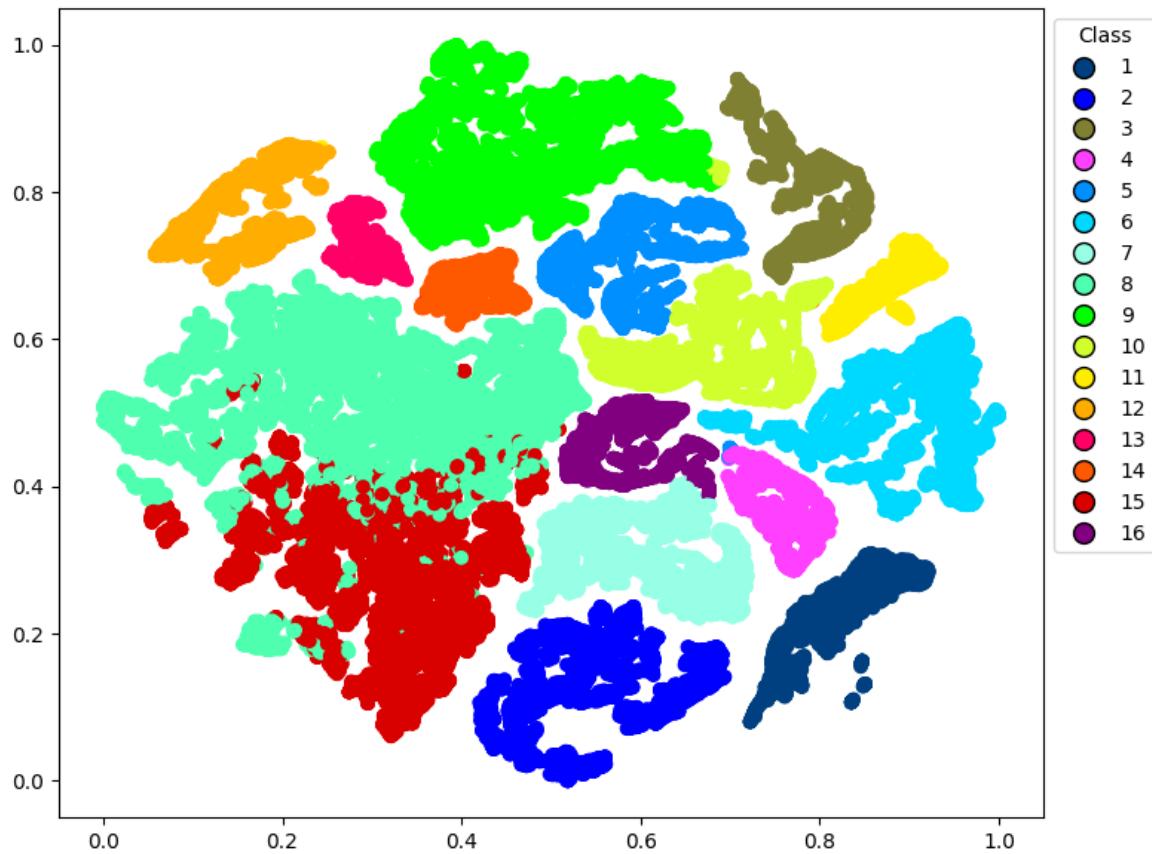
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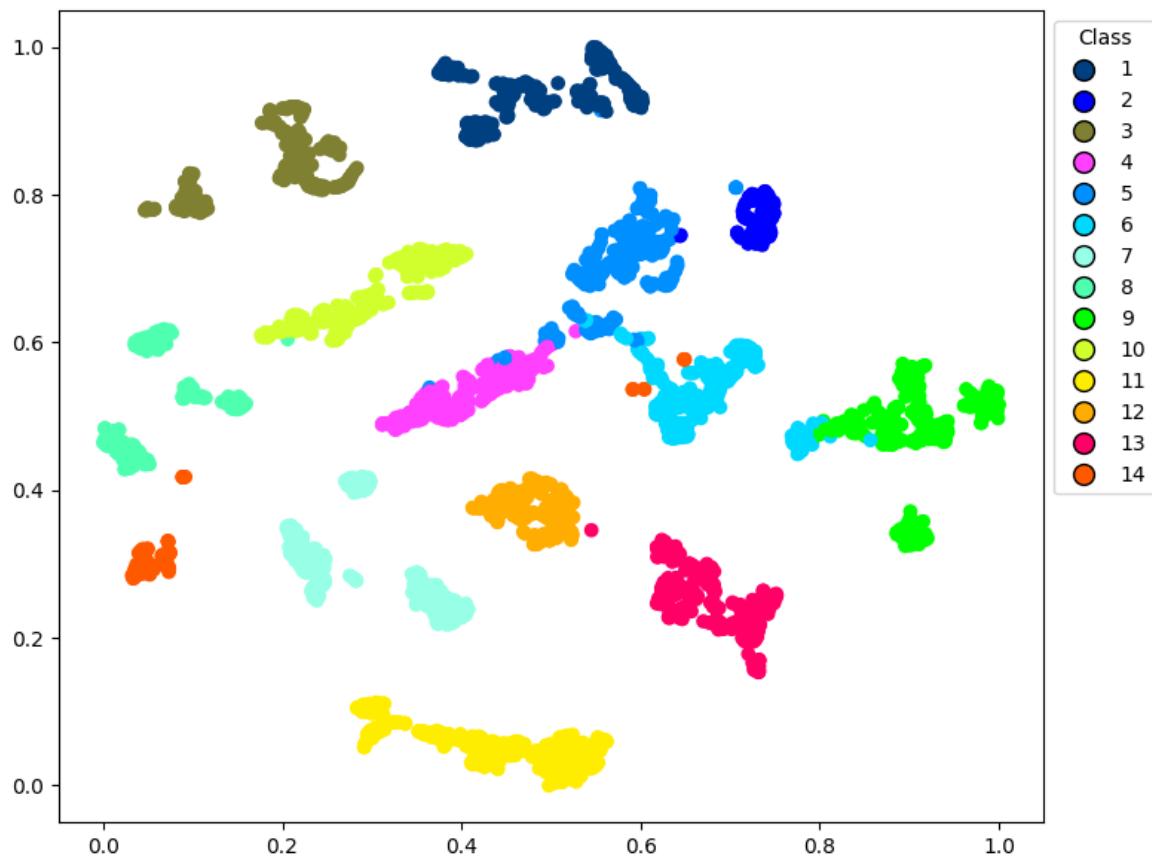


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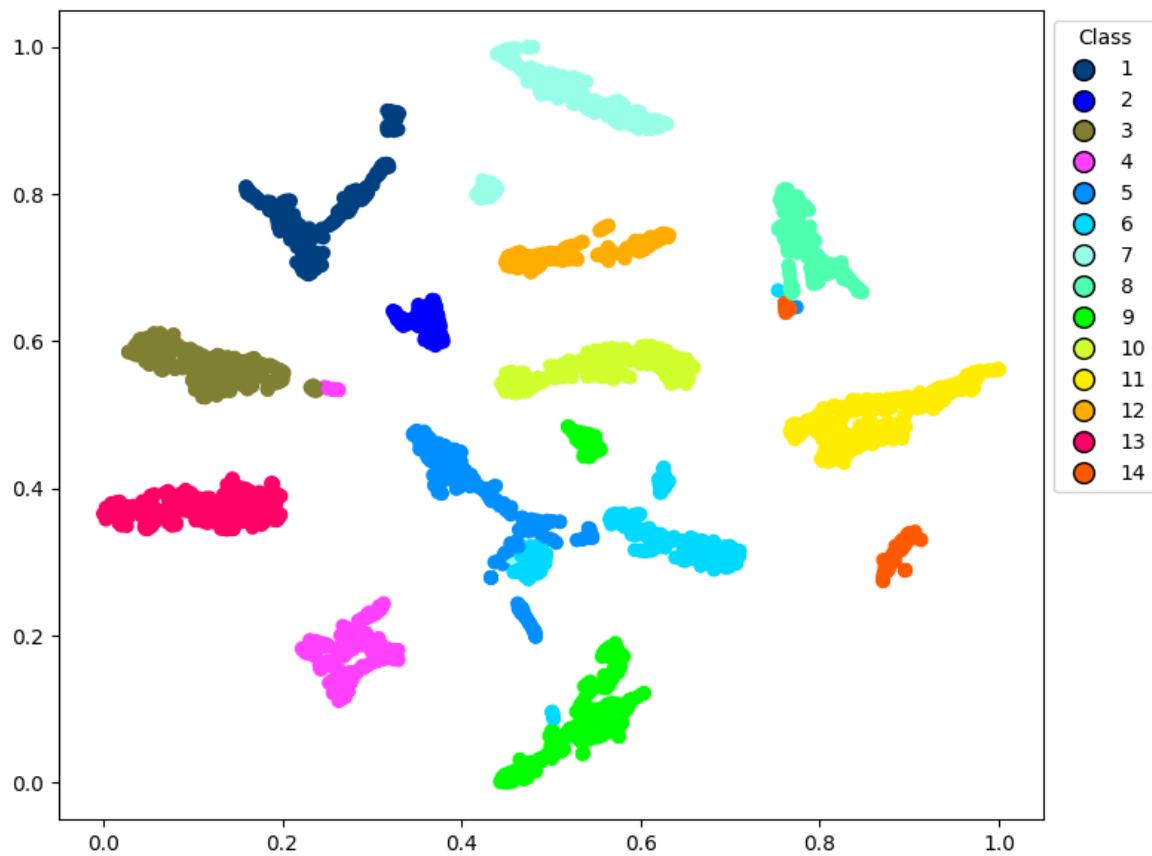


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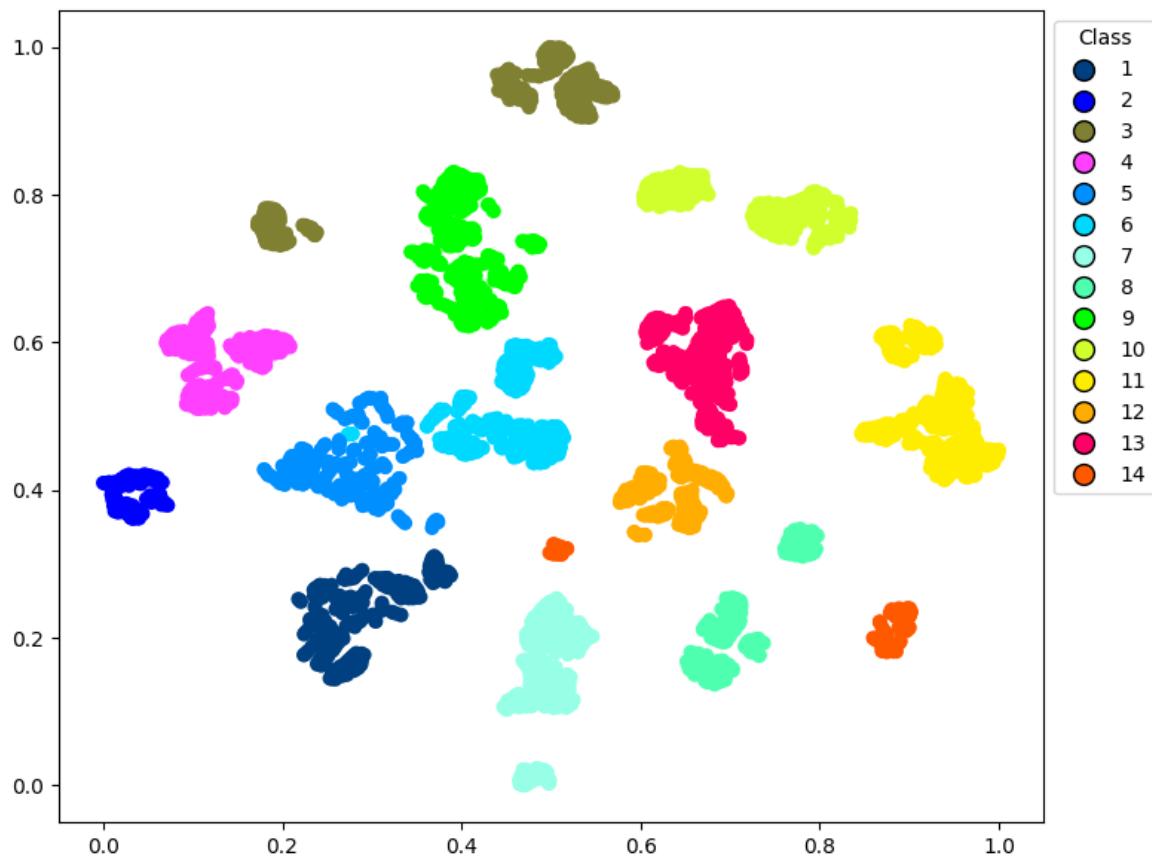
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FSCF-SSL



MLPA



FGAPA

