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• Supplementary File •

Two-stage instance selection domain adaptation for diagnostic classification of neuropsychiatric disorders

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Appendix A Datasets

For analysis of SCZ, six datasets consisting of 411 SCZ patients and 592 demographically matched healthy controls are included: the AMU (The First Affiliated Hospital of Anhui Medical University), COBRE (The Center for Biomedical Research Excellence), FMMU#I, FMMU#II (Xijing Hospital, Fourth Military Medical University), PUTH (Peking University Third Hospital) and UCLA (The University of California, Los Angeles) datasets. It is worth noting that FMMU#I and FMMU#II are regarded as two different sites due to their different scanning parameters.

For analysis of MDD, six datasets with 573 MDD patients and 470 demographically matched healthy controls are chosen: the AMU (The First Affiliated Hospital of Anhui Medical University), FMMU#I, FMMU#II (Xijing Hospital, Fourth Military Medical University), SMU (The First Hospital of Shanxi Medical University), CSU#I and CSU#II (The Second Xiangya Hospital of Central South University) datasets. Note that FMMU#I and FMMU#II are regarded as two separate sites due to their different scanning parameters, which also applies to CSU#I and CSU#II.

Similarly, we select six sites from the ABIDE I database [1] for analysis of ASD, *i.e.*, the LEUVEN, NYU, UM, USM, YALE and MAX_MUN datasets. Notably, both the LEUVEN and UM sites are mixed from two datasets collected by the same organization at different time to expand sample size. The six sites consist of 321 ASD patients and 286 healthy controls totally.

The detailed demographic information of the included subjects and the specific image scanning parameters of the selected datasets are shown in Table A1 and Table A2.

Table A1 Detailed demographic information of the included subjects.

Disorder	Site	Patients		Healthy Controls	
		Age(yrs)	Sex(M/F)	Age(yrs)	Sex(M/F)
SCZ	AMU	30.14±8.48	38/48	30.89±10.84	42/52
	COBRE	37.84±13.83	50/13	36.10±11.60	49/23
	FMMU#I	25.88±6.31	48/40	30.19±6.69	61/44
	FMMU#II	27.07±7.87	26/20	28.08±8.76	55/44
	PUTH	26.59±6.60	53/32	25.26±5.37	54/46
	UCLA	35.47±8.58	33/10	30.44±8.39	64/58
MDD	AMU	39.39±13.52	31/72	30.89±10.84	42/52
	FMMU#I	34.92±12.85	38/22	28.16±4.38	30/20
	FMMU#II	35.23±11.23	13/30	32.29±10.80	30/26
	SMU	31.18±10.24	59/87	31.78±11.06	43/54
	CSU#I	37.07±10.43	86/93	31.75±9.42	70/53
	CSU#II	23.76±5.58	21/21	21.46±2.64	24/26
ASD	LEUVEN	18.17±4.91	30/5	17.75±4.91	26/3
	NYU	15.81±6.22	79/26	14.52±6.92	68/11
	UM	14.79±3.55	59/18	13.13±2.39	58/10
	USM	21.36±7.55	43/0	22.65±7.66	58/0
	YALE	12.68±2.70	20/8	12.75±2.99	20/8
	MAX_MUN	26.21±9.65	29/4	26.08±14.58	21/3

yrs = years, M = male, F = female, SCZ = schizophrenia, MDD = major depressive disorder, ASD = autism spectrum disorder

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Table A2 Specific image scanning parameters of the selected datasets.

Disorder	Site	machine model	TR(ms)	TE(ms)	FA(°)	thickness/gap	slices	voxel(mm^3)	FOV(mm^2)	time point
SCZ	AMU	GE Signa 3.0T	2000	22.5	30	4/0.6	33	3.44×3.44 ×4.60	220×220	240
	COBRE	Siemens Tim Trio 3.0T	2000	29	75	4/0.55	33	3.75×3.75 ×4.55	192×192	150
	FMMU#I	Siemens Tim Trio 3.0T	2000	30	90	4/0.6	33	3.44×3.44 ×4.60	220×220	240
	FMMU#II	Siemens Tim Trio 3.0T	2000	22.5	30	4/0.6	33	3.75×3.75 ×3.50	220×220	210
	PUTH	Siemens Tim Trio 3.0T	2000	30	90	4/0.6	33	3.44×3.44 ×4.60	220×220	240
	UCLA	Siemens Tim Trio 3.0T	2000	30	90	4/0	34	3.0×3.0 ×4.0	192×192	152
MDD	AMU	GE Signa 3.0T	2000	22.5	30	4/0.6	33	3.44×3.44 ×4.60	220×220	240
	FMMU#I	Siemens Tim Trio 3.0T	2000	30	90	4/0.6	33	3.44×3.44 ×4.60	220×220	240
	FMMU#II	GE Signa 3.0T	2000	22.5	30	4/0.6	33	3.44×3.44 ×4.60	220×220	240
	SMU	Siemens Tim Trio 3.0T	2500	30	90	3/1	32	3.75×3.75 ×4.00	230×230	180
	CSU#I	Siemens Magnetom Symphony 1.5T	2000	40	90	5/1.25	26	3.75×3.75 ×6.25	240×240	150
	CSU#II	GE Signa 1.5T	2000	40	90	5/1	20	3.75×3.75 ×6.00	240×240	150
ASD	LEUVEN	Philips Intera 3.0T	1667	33	90	4/0	32	3.59×3.59 ×4.00	230×230	250
	NYU	Siemens Allegra 3.0T	2000	15	90	4/0	33	3.0×3.0 ×4.0	240×240	180
	UM	GE Signa 3.0T	2000	30	90	3/0	40	3.438×3.438 ×3.000	220×220	300
	USM	Siemens Magnetom Trio Tim syngo MR B17	2000	28	90	3/0	40	3.4×3.4 ×3.0	220×220	240
	YALE	Siemens Magnetom Trio Tim syngo MR B17	2000	25	60	4/0	34	3.4×3.4 ×4.0	220×220	200
	MAX_MUN	Siemens Magnetom Verio syngo MR B17	3000	30	80	4/0	28	3.0×3.0 ×4.0	192×192	120

TR = repetition time, TE = echo time, FA = flip angle, FOV = field of view

Appendix B Preprocessing pipeline

We utilize the statistical parametric mapping software package SPM8[1)] to preprocess the acquired fMRI data according to previously described pipeline [2–4]. Firstly, the first five frames of the scanned data are discarded due to magnetic saturation. The preprocessing steps include:

1) slice timing correction;
2) motion correction, excluding scans with excessive head motion (>2.5 mm translation and/or 2.5° rotation);
3) normalization with an EPI template in the Montreal Neurological Institute (MNI) atlas space (3-mm isotropic voxels);
4) spatial smoothing with the Gaussian kernel (fullwidth half-maximum = 6 mm);
5) linear detrending and bandpass temporal filtering (0.01-0.08 Hz);
6) regression of nuisance variables.

References

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1) https://www.fil.ion.ucl.ac.uk/spm