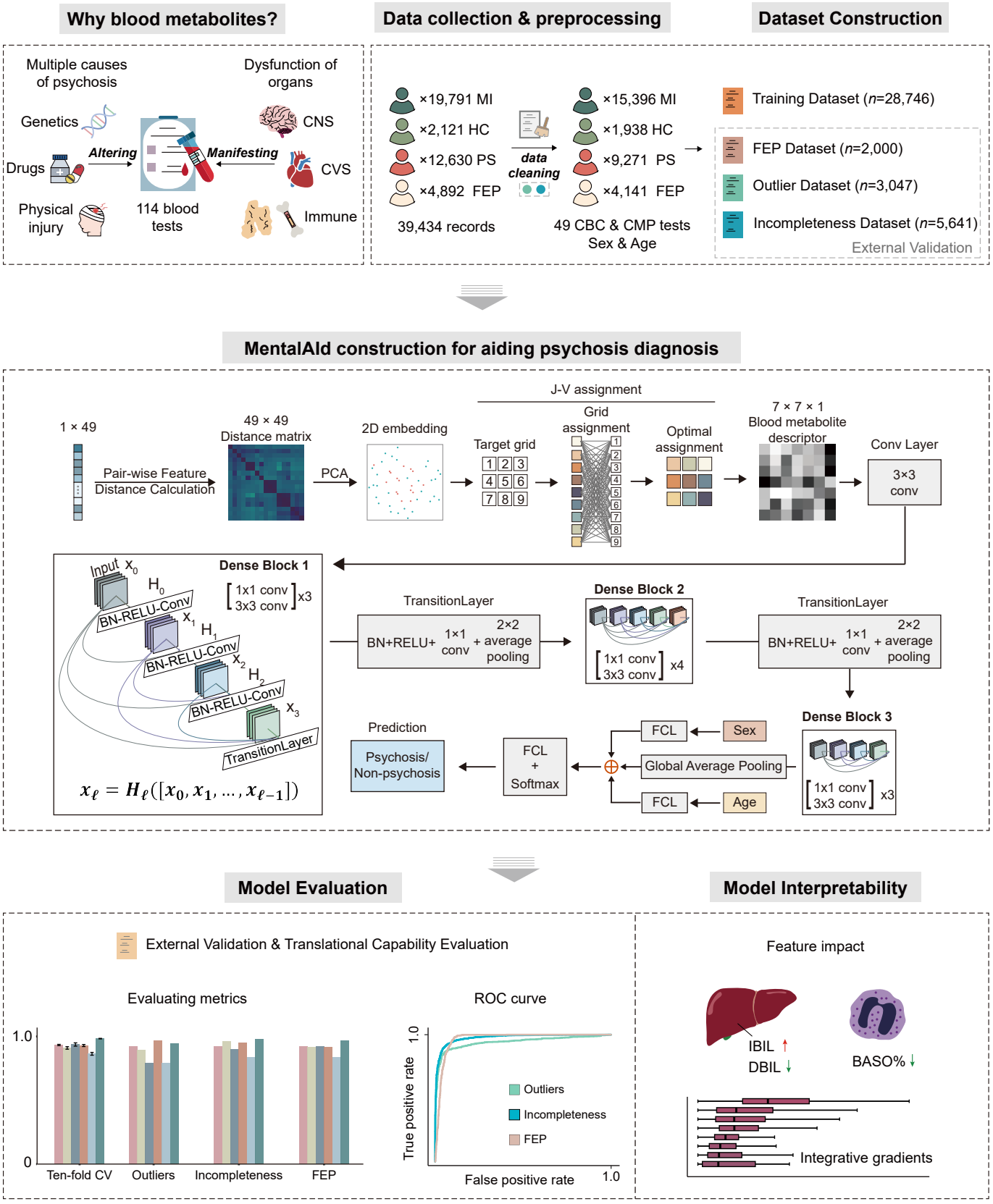
Why blood metabolites?
Multiple causes of psychosis
Dysfunction of organs
Genetics
CNS
Drugs
Altering
Manifesting
CVS
Physical injury
114 blood tests
Immune
Data collection & preprocessing
×19,791 MI
×2,121 HC
×12,630 PS
×4,892 FEP
39,434 records
data cleaning
×15,396 MI
×1,938 HC
×9,271 PS
×4,141 FEP
49 CBC & CMP tests
Sex & Age
Dataset Construction
Training Dataset (n=28,746)
FEP Dataset (n=2,000)
Outlier Dataset (n=3,047)
Incompleteness Dataset (n=5,641)
External Validation
MentalAId construction for aiding psychosis diagnosis
1 × 49
Pair-wise Feature Distance Calculation
49 × 49 Distance matrix
PCA
2D embedding
J-V assignment
Target grid
Grid assignment
Optimal assignment
7 × 7 × 1 Blood metabolite descriptor
Conv Layer
3×3 conv
Dense Block 1
Input x0
BN-RELU-Conv
H0
x1
H1
x2
H2
x3
TransitionLayer
[1x1 conv 3x3 conv]x3
$x_\ell = H_\ell([x_0, x_1, \ldots, x_{\ell-1}])$
TransitionLayer
BN+RELU+ 1×1 conv + 2×2 average pooling
Dense Block 2
[1x1 conv 3x3 conv] x4
TransitionLayer
BN+RELU+ 1×1 conv + 2×2 average pooling
Dense Block 3
[1x1 conv 3x3 conv] x3
FCL
Sex
Global Average Pooling
FCL
Age
FCL + Softmax
Prediction
Psychosis/ Non-psychosis
Model Evaluation
Model Interpretability
External Validation & Translational Capability Evaluation
Evaluating metrics
1.0
0
Ten-fold CV
Outliers
Incompleteness
FEP
ROC curve
True positive rate
1.0
Outliers
Incompleteness
FEP
False positive rate
1.0
Feature impact
IBIL
DBIL
BASO%
Integrative gradients