List of Figures

List of Tables

Glossary of Terms

ABD	Angle Based Diversity
AL	Active Learning
AMD	Adaptive Maximum Disagreement
AP	Attribute Profile
ARC	Attribute Ratio Curve
BT	Breaking Ties
CBD	Cluster Based Diversity
CC	Classification Confidence
CNN	Convolutional Neural Network
CP	Closing Profile
EAP	Extended Attribute Profile
ECBD	Extended Cluster Based Diversity
EEMAP	Entire Extended Multi-Attribute Profile
EMAP	Extended Multi-Attribute Profile
EMP	Extended Morphological Profile
GA	Genetic Algorithms
GC	Gradient Curve
HSI	Hyperspectral Image
JSRC	Joint SRC
KLD	Kullbach Leibler Divergence
LAF	Leaf Attribute Function
MASR	Multi-scale Adaptive SR
MCLU	Multi Class Level Uncertainty
MI	Mutual Information
MP	Morphological Profile
MRF	Marcov Random Field
MS	Margin Sampling
NMI	Normalized Mutual Information
OAA	One-Against-All
OAO	One-Against-One

OP	Opening Profile
PC	Principal Component
PCA	Principal Component Analysis
SAS	Shape adaptive sparse model
SBSDM	Superpixel based Discriminative Sparse Model
SE	Structuring Element
SR	Sparse Representation
SRC	SR-based Classification
SVM	Support Vector Machine
USRC	Unmixing + SRC

Symbols and Notations

$a,\ b$	Spatial dimension
d	Spectral dimension
G_i	ith spectral band
C	Sequence of class labels
C_i	ith class label
c	Number of class label
p_i	ith pixel
$P(C_j/p_i)$	Probability of p_i to be of class C_j
H	A hyperspectral image
X	Data matrix without class labels
n	Number of pixels (patterns) ($n = a \times b$)
$Norm\_X$	Normalized data matrix X
$Cov(i, j)$	Covariance between the ith and jth feature
V_i	ith eigenvector
λ_i	Eigenvalue corresponding to the eigenvector
V	Eigenvector matrix
New_X	Transformed data matrix
U	Set of unlabelled samples
L	Set of labelled samples
EPT	Expert for proving class label of a pixel
$\hat{x}^{KLD-max}$	Sample selected by maximizing Kullbach-Leibler divergence between the distributions before and after adding the sample is maximized
$\hat{x}^{BT}$	Sample selected by maximizing Breaking Ties criterion
$H^{BAG}(x_i)$	Entropy for sample $x_i \in U$
$p^{BAG}(y_i^* = C_k \vert x_i)$	The probability that the committee of q classifier models will predict C_k as the class level for sample x_i
$\hat{x}^{nEQB}$	Sample selected by using normalized entropy query-by-bagging criterion
$K(.)$	Kernel function

$CC(x)$	Classification confidence of x
$Ang^{ABD}(x_i, x_j)$	The angle-based distance between x_i and x_j in feature space
$\delta_E(I)$	Dilation of image I using structuring element E
$\epsilon_E(I)$	Erosion of image I using starting element E
E	Structuring element
$\gamma_E(I)$	Opening of image I using structuring element E
$\phi_E(I)$	Closing of image I using structuring element E
$\gamma_R^E(I)$	Opening by reconstruction operation
$\phi_R^E(I)$	Closing by reconstruction operation
R_δ^E	Reconstruction by dilation operation
R_ε^E	Reconstruction by erosion operation
$MP(I)$	Morphological profile of image I
t	Number of filtering operation
$Tnp(I)$	Thinning profile for image I
$TkP(I)$	Thickening profile for image I
$AP(I)$	Attribute profile of image I
r	Number of attributes considered for constructing multi-attribute-profile
Cl_i	ith cluster formed by k-means clustering
$den(Cl_i)$	Density of the ith cluster
$den(x)$	Density of a sample x
Pen	Penalty in objective function of GAs
$H_e(I)$	Entropy of image I considering its gray-values
I_i	ith filtered image in EEMAP
$\mathcal{G}_v$	Set of distinct gray-values in an image
g	g $\in \mathcal{G}_v$, An specific gray-value
$P(g)$	Mass probability
$MI(I_i, I_j)$	Mutual information between images I_i and I_j
$NMI(I_i, I_j)$	Dissimilarity based on normalized mutual information
N_l	Leaf node of a max-tree or min-tree
Z	Number of nodes between a leaf and root on the path