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LIST OF SYMBOLS AND ABBREVIATION

Symbols

$[A]$	-	Affine transformation matrix
ϕ	-	Angle
f_1	-	Angular second moment
$g(x,y)$	-	Binary image
Bk	-	Block name
x	-	Center pixel of the label
f_2	-	Contrast
C	-	Contrast value
f_3	-	Correlation
K_i, K_j	-	Crossover matrices
d_1, d_2	-	Diameter of disked shape structure
d_{ij}	-	Noise susceptibility
f_{11}	-	Difference entropy
f_{10}	-	Difference variance
θ	-	Direction
d_s	-	Distance
f_9	-	Entropy
T_{exe}	-	Execution time
G_{min}	-	Global minimum
b_i	-	Gray level value of background region
$g_w(i,j)$	-	Gray level value of the pixels in the window
f_{12}	-	Information measures of correlation I
f_{13}	-	Information measures of correlation II
τ_0	-	Initial pheromone value
$K(i,j)$	-	Intensity of the noisy image

$I(i,j)$	-	Intensity of the original image
y	-	Intensity value of pixels in the kernel
f_5	-	Inverse difference moment
$H(A,B)$	-	Joint entropy of images A and B
L_{\min}	-	Local minimum
$x*y$	-	Matrix size
f_{14}	-	Maximal correlation coefficient
MAX_i^2	-	Maximum possible pixel value of the original Image
B	-	Mean gray level value of background
f	-	Mean gray level value of foreground
μ	-	Mean value of the kernel
K_m	-	Mutation matrix
N_m	-	Negative pixels
τ_{new}	-	New Pheromone value
$NMI(A_i, B_i)$	-	Normalized mutual information of reference image and target image
K	-	Number of Ants
N_i	-	Number of Iteration
N_p	-	Number of processes
τ_{old}	-	Old Pheromone value
$f(x,y)$	-	Original image
P	-	Pixel Intensity value
BI	-	Binary matrix
M	-	Pixel matrix
M_{ij}	-	Pixel position
P_m	-	Positive pixels
$V(x)$	-	Potential function of Kernal
V	-	Potential function of the kernel

ρ	-	Rate of pheromone evaporation parameter
$Q(i,j)$	-	Relative intensity value
RM	-	Resultant matrix
$R(\theta), R(\phi)$	-	Rotation factors
$H(A)$	-	Shannon entropy of image A
$H(B)$	-	Shannon entropy of image B
$D(x)$	-	SSD of image
σ	-	Standard deviation of the kernel
f_6	-	Sum average
f_8	-	Sum entropy
f_4	-	Sum of squares (Variance)
f_7	-	Sum variance
$f_t(i,j)$	-	Template from reference image
N	-	Total number of pixel values
β	-	Visibility relative parameter
$w(x,y)$	-	Weighted median image
w_n	-	Weights of weighted median filter
$f_w(i+x,,j+y)$	-	Window function of target image
i	-	x position
J	-	y position

Abbreviations

ACWM	-	Adaptive Center Weighted Median
ACO	-	Ant Colony Optimization
BM	-	Binary Matrix
CSF	-	Cerebro Spinal Fluid
CT	-	Computed Tomography
CAD	-	Computer Aided Diagnosis
CBT	-	Cerebral Brain Tissue
CP	-	Control Points
DTM	-	Dual Threshold Morphology
ET	-	Euclidean Transformation
FIR	-	Finite Impulse Response
FCM	-	Fuzzy C-Means
GFO	-	Generalized Fuzzy Operator
GA	-	Genetic Algorithm
GAT	-	Global Affine Transformation
GET	-	Global Euclidean Transformation
GM	-	Gray Matter
HMM	-	Hidden Markov Model
HEM	-	Histogram Equalization and Modification
ICA	-	Independent Component Analysis
IPOP	-	Initial Population
LAT	-	Local Affine Transformation
MRI	-	Magnetic Resonance Imaging
MRF	-	Markov Random Field
MAP	-	Maximum A Posteriori
MSE	-	Mean Squared Error
MS	-	Multiple Sclerosis

NRRS	-	Non-Rigid Registration Segmentation
NCC	-	Normalized Cross Correlation
NMI	-	Normalized Mutual Information
PACO	-	Parallel Ant Colony Optimization
PSNR	-	Peak Signal to Noise Ratio
PSI	-	Pixel Similarity Index
PET	-	Positron Emission Tomography
ROC	-	Receiver Operating Characteristic
ROI	-	Region of Interest
RRS	-	Rigid - Registration Segmentation
RMSE	-	Root Mean Squared Error
SSD	-	Sum of Squared Difference
SVM	-	Support Vector Machine
WM	-	White Matter