LIST OF SYMBOLS

M	Moving Image general notation
S	Source Image general notation
F	Fixed Image general notation
T	Target Image general notation
R	Registered Image notation
$I_M(x, y)$	Moving Image mathematical notation
$I_F(x, y)$	Fixed Image mathematical notation
$u(x)$	Displacement Field
$T(x)$	Transformation
θ_i	Basis Functions (Radial) notation
μ, λ	Lame's elasticity coefficients (shear modulus & tensile stress resp.)
v	Velocity field
μ_f, λ_f	Viscosity coefficients (a version of Lame's)
Ω	Working image volume notation
ΔI	Temporal difference between images in a sequence
∇I	Spatial gradient of image (brightness intensity)
S'	Transformed Image notation (source image post transformation)
$I_\Sigma(x)$	Integral image of an input image (I) notation
$H(x, \sigma)$	Hessian Matrix notation
$L_{xx}(x, \sigma)$	Convolution of Gaussian second order derivative
H_{app}	Approximate hessian matrix
$I_N^{AP}(x, y, t)$	Input image notation
T_{RE}	Target Registration Error
μ_x, μ_y	Mean intensities of x, y signals
U_{SE}	Uncertainty of Spatial Error

SD_{SE}	Standard Deviation of spatial error
$T_v(x)$	Transformation by MLS
v	Point of evaluation (dynamic)
p_i, q_i	i^{th} source and target control point pair
w_i	Weighing function
α	Parameter of the weighing function
$f(x, y, t)$	Gray-level at (x, y) at time t
V_x, V_y	x, y components of optical flow/velocity
$\vec{v}$	Optical flow
I_t	Time derivative of the brightness intensity
$d_{N_{avg}}$	Average displacement of all marked points in frame N
E_{T-R}	Mean Registration Error
$\varepsilon_x, \varepsilon_y$	Normal strains in x, y directions
γ_{xy}	Shear strain in the x-y plane pointing towards the y direction
e	Unit change in image dimensions
U	Potential energy function of an elastic two dimensional system
U_{strain}	Strain energy function carved out of original U

LIST OF ABBREVIATIONS

GIS	Geographic Information System
CT	Computed Tomography
NMR	Nuclear Magnetic Resonance
MRI	Magnetic Resonance Imaging
PET	Positron Emission Tomography
SPECT	Single-Photon Emission Computed Tomography
MRS	Magnetic Resonance Spectroscopy
DEM	Digital Elevation Models
DIR	Deformable Image Registration
PDE	Partial Differential Equation (page 25)
ESM	Efficient Second-order Minimization
LDDMM	Large Deformation Diffeomorphic Metric Mapping
2D	Two Dimensional
3D	Three Dimensional
MLS	Moving Least Squares
SURF	Speeded Up Robust Features
SIFT	Scale Invariant Feature Transform
NMS	Non-Maximum Suppression
AP	Anatomical Plane
TRE	Target Registration Error
SNR	Signal to Noise Ratio
PSNR	Peak Signal to Noise Ratio
SSIM	Structural Similarity Index
MSSIM	Mean Structural Similarity Index
MSE	Mean Squared Error

NCC	Normalized Cross Correlation
FFT	Fast Fourier Transform
IGI	Image Guided Interventions
TPS	Thin Plate Splines
APRIL	Assisted Point Registration of Internal Landmarks
CDF	Cumulative Distribution Functions
EMPIRE10	Evaluation of Methods for Pulmonary Image REgistration 2010
OFM	Optical Flow Motion
4DCT	Four Dimensional CT
ABC	Active Breathing Coordinator
SSD	Sum of Squared Differences
APLDM	A Priori Lung Density Modification
4DLTM	4D Local Trajectory Modeling
CPP	Component Phase to Phase
4D-MMM	4D Mean Motion Model
2DST	Two Dimensional Spatial Transform
PCA	Principal Component Analysis
EE	End Expiration
PPI	Pixel Per Inch
MRF	Markov Random Field
IDM	Intensity Difference Mapping