Dedicated to the scientific community

Declaration

I hereby certify that

- The work presented in this dissertation is my own original work, conducted under the general supervision of my advisor.
- This work has not been submitted to any other institution for any degree or diploma.
- I have adhered to the guidelines provided by Tezpur University in writing this thesis.
- I have followed the norms and guidelines outlined in the Ethical Code of Conduct of the university.
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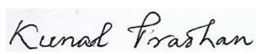

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Certificate of Supervisor

This is to certify that the thesis entitled **"Semantic-Aware Structure Preserving Image Filtering Techniques"** submitted to Tezpur University in the Department of Computer Science and Engineering under the School of Engineering, in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Computer Science and Engineering, is a record of research work carried out by **Kunal Pradhan** under my supervision and guidance.

All assistance received from various sources has been duly acknowledged. No part of this thesis has been submitted elsewhere for the award of any other degree.

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This is to certify that the thesis entitled **"Semantic-Aware Structure Preserving Image Filtering Techniques"** submitted by **Kunal Pradhan** to Tezpur University in the Department of Computer Science and Engineering under the School of Engineering, in partial fulfillment of the requirements for the award of the degree of Doctor of Philosophy in Computer Science and Engineering, has been examined by us on .... and found to be satisfactory.

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Signature of Principal Supervisor

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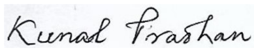

Kunal Pradhan

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Glossary of Terms

BF	Bilateral Filtering
Reg-Cov	Region Covariance
BTF	Bilateral Texture Filtering
SATF	Structure Aware Texture Filtering
SATV	Structure Adaptive Total Variation
FABF	Fast Adaptive Bilateral Filter
RILS	Real-Time Iterative Least Square
GISF	Generalized Image Smoothing Framework
SNR	Signal to Noise Ratio
PSNR	Peak Signal to Noise Ratio
SSIM	Structural Similarity Index Measure
MSSIM	Multi-scale Structural Similarity Index Measure
PIQE	Perception-based Image Quality Evaluator
MI	Mutual Information
D_{KL}	Kullback-Leibler (KL) Divergence
JSD	Jensen Shannon Divergence
MGD	Morphological Gradient Distribution
SGI	Semantic Gradient Image
EPI	Edge Preservation Index
NGD	Normalized Gradient Deviation
FI	Fragmentation Index
NMI	Normalized Mutual Information

Symbols and Notations

δ	morphological dilation
ϵ	morphological erosion
$\delta(\epsilon)$	morphological opening
$\epsilon(\delta)$	morphological closing
$\epsilon(\delta)$	morphological closing
$\delta - \epsilon$	morphological gradient
$(\delta(\varepsilon) + \varepsilon(\delta))/2$	morphological texture filtering