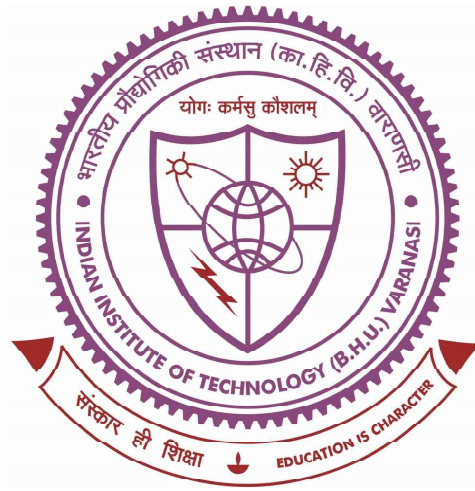


# **Algorithms and their VLSI Architecture to Enhance Image Quality for Real-time Applications**



**Thesis submitted in partial fulfilment  
for the Award of Degree**

**DOCTOR OF PHILOSOPHY**

**by**

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**VARANASI – 221 005**

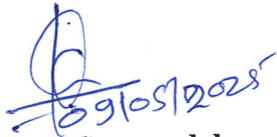
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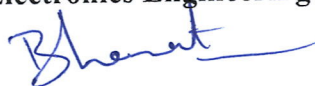
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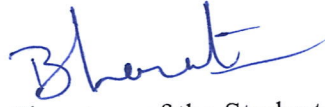
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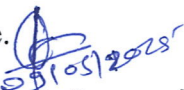
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**Dedicated to my loving parents . . .**



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# Abbreviations

ADAS	Automatic Driver Assistance System
AGVC	Average Gray Value Calculation
ALE	Atmospheric Light Estimation
ALM	Augmented Lagrangian Multiplier
AMD	Advanced Micro Devices
ASIC	Application Specific Integrated Circuit
ASM	Atmospheric Scattering Model
BM3D	Block-Matching for 3D
BRAM	Block Random Access Memory
BRISQUE	Blind/Referenceless Image Spatial Quality Indicator
CLAHE	Contrast-Limited Adaptive Histogram Equalization
CLB	Configurable Logic Blocks
CMOS	Complementary Metal-Oxide-Semiconductor
CMRS	Column Minimum Register Set
CNN	Convolutional Neural Network
CPU	Central Processing Unit

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CT	Computed Tomography
DCP	Dark Channel Prior
DSP	Digital Signal Processing
FGF	Fast Guided Filter
FPGA	Field Programmable Gate Array
FPS	Frames Per Second
GAN	Generative Adversarial Network
GPU	Graphics Processing Unit
HD	High Definition
HDL	Hardware Description Language
HE	Histogram Equalization
IQA	Image Quality Assessment
LIME	Low-light image enhancement via Illumination Map Estimation
LLIE	Low-Light Image Enhancement
LOL	LOw-Light
LUT	Lookup Table
MRI	Magnetic Resonance Imaging
NIQE	Naturalness Image Quality Evaluator
NSS	Natural Scene Statistics
PALA	Pixel-wise Atmospheric Light Adjustment
PB	Pixel Buffer

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PTE	Pixel-wise Transmission Estimation
PSNR	Peak Signal-to-Noise Ratio
RGB	Red Green Blue
RTL	Register-Transfer Level
SD	Scene Dehazing
SSIM	Structural Similarity
VLSI	Very Large Scale Integration
YOLO	You Only Look Once