

Acknowledgements

First of all I embrace this opportunity to express my deep sense of respect, personal gratitude and everlasting indebtedness to my supervisor **Prof. Tanmoy Som**, Department of Mathematical Sciences, Indian Institute of Technology (Banaras Hindu University), Varanasi, India. It has been a great privilege to work under his able guidance. His awe-inspiring personality, kind cooperation, patience, continuous encouragement and for providing me the requisite facilities, have been impetus behind this work. His careful guidance shaped my understanding on research life as my chosen field. Without his guidance as a great mentor, this work would not have been possible.

I also want to express my sincere gratitude and heartfelt thanks to my External Supervisor **Dr. Soumitra Kar**, Scientist, Head, Image Processing and Vision Section, Electronics and Instrumentation Services Division, Bhabha Atomic Research Centre, Mumbai, India, for his helpful discussions and moral support, who always encouraged and assisted me by giving suitable suggestions whenever it needed.

I would like to express my sincere thanks to **Prof. Om P. Singh (Head)** and **Prof. Shri Ram (Ex-Head)**, Department of Mathematical Sciences, Indian Institute of Technology (Banaras Hindu University), Varanasi, India, for encouraging me and providing me all facilities to carry out my research work.

I acknowledge my deep sense of gratitude to all members of **RPC** and **DPGC** for their valuable suggestions, appreciation and encouragement.

I would like to thank my husband, **Lalit**, for his unconditional support, caring and love. Lalit, thanks for always believing that I could do it. There is no way I could have done it without you! I would like to thank my life my son, **Shaival**, whose smile and talks at the end of the day always made the hardships of theorem

proving so irrelevant.

At last but not the least; I would like to thank my parents for giving birth to me at the first place and supporting me spiritually throughout my life and for care taken of my son during my research period. I would like to thank my In-laws for their blessings and also for care taken of my son during my research period.

Hitesh Rajput