

## ACKNOWLEDGEMENT

First of all, I would like to take this opportunity to thank my supervisors, Dr. Hari Prabhat Gupta and Dr. Bhaskar Biswas, for their invaluable guidance and support. I feel fortunate to work under your supervision. This thesis is the outcome of your insights, expertise, and specially your boundless vision throughout the process. Besides the academic guidance, you gave me suggestions on how to deal with difficulties that I met in my life. Thank you for the great working atmosphere you have created.

My gratitude extends to the other members of my Doctoral committee, Prof. Sanjay Kumar Singh, Department of Computer Science and Engineering, and Prof. Subir Das, Department of Mathematical Sciences, for their advice and constant feedback on the progress of my research work. Special thanks to Dr. Tanima Dutta for her invaluable assistance and help. I would also like to express my deep gratitude to Dr. Rajeev Srivastava, Head of Department of Computer Science and Engineering, and faculty members, for their endorsement to this work.

I also owe a great debt to my colleagues, Surbhi Saraswat, Randheer Bagi, and Ramakant Kumar, for helping me think through some of issues in the work. My special thanks goes to my friend and colleague, Rahul Mishra, for his brilliant perception about the problems I had worked on.

I would also like to express my heartfelt gratitude to my parents Mrs. Pushpa Gupta and Mr. Bhawani Deen Gupta, for their immense support and encouragement. My wife, Priyanka Gupta, also deserves a great thanks for her affectionate love and unending gratitude on innumerable fronts. I am also thankful to my son, Anvit Gupta, for cheering me up in difficult moments.

Finally, I would like to thank and praise the *Baba Kashi Vishwanath Ji*, the one who blessed me with the ability to undertake and finally complete this work.

**(Ashish Gupta)**