Acknowledgement

It is a pleasant aspect that I have now the opportunity to express my gratitude for many people who accompanied and supported me during the journey of my work. Firstly, I offer my adoration to almighty who created me, gave me the strength and courage to complete my research work. I would like to express my deep gratitude to my supervisor Dr. Tanmay Pawar, Professor and Head, Department of Electronics Engineering, BVM Engineering College, Vallabh Vidyanagar, for his guidance and whole hearted cooperation. His helping nature, valuable moral support and appreciation have inspired me and will continue to inspire for the rest of my career.

I would also like to extend my sincere gratitude to my Foreign Co-Supervisor, Dr. Arun Somani, Associate Dean for Research, IOWA State University, IA, for his cooperation, help and motivation throughout the research work. I would like to thank my doctoral progress committee: Dr. Narendra M Patel, Associate Professor, BVM Engineering College and Dr. Shanmuganathan Raman, Assistant Professor, Electrical Engineering Department, IIT, Gandhinagar for their insightful comments and encouragement during entire period of research work.

It is an honour for me to express my deep sense of gratitude to Dr. C. L. Patel Sir, former Chairman, Charutar Vidya Mandal (CVM) for giving permission to pursue in-service Ph.D. I am extremely thankful to Dr. R. K. Jain Principal, ADIT for his kind support, continuous inspiration and providing necessary resources during the research work. I take this opportunity to thank Dr. Narendra Chauhan, Head, Information Technology Department, ADIT for providing me mental support and inspiration. It is my pleasure to acknowledge the help and suggestions from Mr. Prashant Italiya, alumni of ADIT.

I also would like to thank my students for helping me in carrying out this work. I also thank teaching and non-teaching staff of Department of Information Technology and Computer Engineering Department, ADIT who participated and helped me in creating fingerprint image dataset.

I am short of words for my family members being grateful to them for all the sacrifices they have made for me. I owe deepest gratitude to my parents, my sister and in-laws for their mental support. My heartiest thank to my wife and true inspiration, Zankhana Shah,
for her care and all the sacrifices. This work would not have been completed without her unconditional love and support during entire period of my work. I am short of words to express my loving gratitude to my adorable son Dirgh, whose innocent smile and love has given me mental support during the entire work.

Sudhir P Vegad