I would like to express my deep and sincere gratitude to my guide Dr. Lalitha rangarajan, Associate Professor in Department of Studies in Computer Science, University of Mysore. It has been an honor to be her Ph.D student. Her wide knowledge and her logical way of thinking have been of great value for me. Her understanding, encouraging and personal guidance have provided a good basis for the present thesis.

I express my thanks to our visionary chairman, Professor G. Hemantha Kumar for all the encouragement and support.

I wish to express my warm and sincere thanks to Professor P. Nagabhushan of in Department of Studies in Computer Science, University of Mysore.

My thanks are also due to University of Mysore, Mysore, India for permitting me to pursue my higher education and complete the requirement for doctoral degree.

I am especially grateful to Mr. N. Ramesh Rao chairman The Indian Institute of Welding, Bangalore branch, for his valuable advice and furthermore, using his precious times to listen to my doubts and give his helpful comments about welding defects detection.

I thank my dear friend Mr. Shahrokh Naserpour for their valuable helping me.

Words fail me to express my appreciation to my dear wife Dr. Shabnam Omidvar, whose dedication, love and persistent confidence in me.

Finally, I would like to thank everyone who has contributed directly or indirectly to the successful realization of thesis, as well as expressing my apology that I could not mention personally one by one.

Alireza Azari Moghaddam
August 2013