Acknowledgment

In the venture of the journey towards attaining my Ph.D., this thesis has been kept on track and seen through to completion with the support and encouragement of numerous people. It gives me immense pleasure to express my heartfelt thanks to all those people who made this thesis possible and blessed me with their contribution in different ways. First and foremost, I wish to thank my supervisor Prof. Manabendra Bhuyan, Department of Electronics and Communication Engineering, Tezpur University. His profound knowledge, understanding have inspired me to pursue my research work in the field of biomedical signal processing. He has been supportive since the days I began working on this field with Lab senior, Dr. Mausumi Barthakur, MD, PhD, Guwahati Neurological Research Centre hospital, Guwahati as a post-graduate student. Ever since, he has supported me not only by providing a research assistantship over almost eight years but also academically and emotionally through the rough road to finish this thesis. Thanks to him I had the opportunity to build tool. I convey my deep gratitude for his devoted contribution, untiring effort, constant support and encouragement through the journey of endeavor. I convey my heartfelt thanks for believing in me.

I would like to thank Prof. V. K. Jain, Hon'ble Vice-chancellor, Tezpur University for high positive and helpful suggestions. Furthermore, I would also like to thank Prof. M. K. Chaudhuri, Honble Ex. Vice-chancellor, Tezpur University who have provided me the platform to work with a nice research groups. Moreover, it is worthwhile to mention his nice responses toward the benefit of the student as well as the University. He organized the university in a disciplined way that helps us a lot to carry out the research works. It gives me immense pleasure to express my heartiest gratefulness to him.

I would like to express my sincere gratitude to the Registrar, Dr. Biren Das sir, who allows me to carry out my work. Furthermore, I highly acknowledge and appreciate his positive advises and guidance that greatly help us to attain the goal. I am also very thankful to other administrative stuff Hridoy Saikia, controller of Examination for their fast responses, support for the benefit of students.

I would like to express my sincere gratitude to our head, Prof. J.C. Dutta, Prof. P. P. Sahu, Prof. S. Bhattacharyya and my DRC members, Prof. S. M. Hazarika and Associated Prof. N.M. Kakoty for their encouragement and inspiration to complete this work. Also, I would like to extend my sincere thanks to Prof. S. M. Hazarika and Prof. Utpal Sarma, Department of computer science, TU for their help and suggestion at the

beginning of the research. Specifically, their excellent Doctoral research methodology classes immensely help developing technical skill in the area of soft computing.

I am thankful to Dr. Mausumi Barthakur, Consultant, Dept. of Neurophysiology, GNRC hospital, Guwahati for her support, helps and suggestions. Her deep subjective knowledge, teaching and technical skills help me to tackle many problems during my PhD works. I would also like to appreciate constant help towards the benefit of students in all ways. Her profound subjective knowledge help deeper understanding research problems. I would like to extend my heartfelt thanks to Prof. Subrata Hazarika, Head Department of Physics, Assam University for his constant support and encouragement during my PhD work. Furthermore, his unconditional love and support help promote me many ways. His profound knowledge always inspires me.

My special thank goes to the past and present members of our research groups, Dr. M. Barthakur, Dr. M. P. Das, Dr. Nimisa Dutta, Champak Talukdar (Matu), Dr. Lachit Dutta (Satu), Amarprit Singh (MS), Hilly Gohain Baruah (KG), Rakcinpha Hatibaruah (Strong Man), Rajesh Barman, Pranjal Barman (BK), Satyabrat Malla Bujar Baruah, Palash Phukan for their helps and support many ways. Further, I would like to appreciate my juniors, Jagat Das (Sivanan), Dr. Jayanta Hazarika, Dr. Samiran Hazarika, Dr. Rupam Kalita, Dr. Manikanta Borah, Dr. Kakuli Bhattacharyya, for their enjoyments during my difficult time. Also, I would like to appreciate the help and support of my colleagues, Prakash Kurmi, Tidip ranjan Nath, Nava k. Gogoi, Nabnit K. Roy. Also, I am also thankful to the technical staff, GNRC hospital, for their helps and supports.

I am thankful to the Tezpur University Library for the wealth of the books and journals which I referred for invaluable support of literature. My sincerest thanks go to the librarian Dr. Mukesh Saikia and his team including Jitu Mani Das who helped and guided me directly or indirectly. I would also like to mention that Tezpur University providing a well facilitated as well as good research background for the students.

I would also like to pay my sincere thanks to my relatives, family members and well-wishers. I owe all my accomplishments to them who stood by me all the time throughout my research work and all my difficult times. In this regards, I would like to thank my wife-Meenakshi Boro and sister-nabanita for their valuable advice, support, the encouraging and inspiring words and wish which make me happy. My special thanks goes to my father, Sonaram Hazarika, himself a dedicated professional in his own field to look up during hardships and ups and down in my life and brother, Naba Kanata Hazarika (dada), Nabanita Hazarika (Sister) whose love and sacrifices have led me the way to achieve my goal. All my heartfelt gratitude goes to my lovely family. Above all, I grateful for the immense blessing bestowed upon me by the Almighty God which enable me to complete the work and keeping me in good health.

"Education is the passport to the future, for tomorrow belongs to those who prepare for it today" ...By Malcolm X

(Anil Hazarika), Place: Tezpur, Assam, India