Acknowledgements

First and foremost, I would like to thank my supervisor, Prof. Dhruba Kr. Bhattacharyya of Tezpur University for giving me an opportunity to work under him on this challenging and burning topic and providing me ample guidance and support through the course of this research. I also thankful to him for inspiring my interests in data mining and gene expression data analysis. I am grateful for his guidance, encouragement and support throughout my doctoral research work at Tezpur University and also in my life. This thesis comes from his helpful discussions, supervision and meticulous attention to details.

I want to express my deep gratitude to my thesis co-supervisor, Professor Jugal Kumar Kalita of University of Colorado, USA, for his constant motivation, encouragement and support. He is a wonderful advisor and mentor. Throughout my research, he gave me countless constructive comments and insightful suggestions.

I take this opportunity to express my appreciations to all the members of my doctoral research committee including Prof. Malay Ananda Dutta, Dr Utpal Sharma and other faculty members for their constructive suggestions through out the research. I am also thankful to all my respected teachers in the Department and all my friends, especially J Binong and Pritpal Singh for their direct or indirect help, inspiration and motivation. I am grateful to all the technical and non-technical members of the Department for their support.

I want to express my greatest gratitude to my dear maa, dida, my beloved wife, my only loving sister, father and mother in-law for their endless love, constant support, encouragement and patients throughout my research without which I would not have reached this position.

Last but not least I would like to thank almighty for everything.