

DEDICATION

This thesis is compiled with the support of my family. I praise GOD and thanks to all who have helped, directed, and supported this work. I dedicate the work to my beloved parents NIKEN SOERWIHATSANTI and ALFA INDRIAWAN HARJANTO.

Finally this thesis is dedicated to all informatics students in the world. I hope that this research may provide valuable contribution in Computer Science.

ACKNOWLEDGMENTS

This thesis is compiled with the effort, help, and support from both students and lecturers. I would like to express my deepest gratitude and thanks to:

1. My supervisor, Dr. Ade Romadhony S.T., M.T., for dedicating her time to guiding me continuously throughout the completion of this thesis and providing valuable insight and suggestions regarding my research.
2. Dr. Setyorini, S.T., M.T. as Head of Master of Informatics at Telkom University who has provided the facility that eased the completion of my thesis.
3. All lecturers of Master of Informatics at Telkom University, for providing valuable knowledge that helped me to understand my research better.
4. My parents, my brothers Dipta and Ditya, and my sister Aisha, for their support and prayer that helped me to complete this thesis.
5. My beloved Azarine Zada Kalonica Widyadhana, for her unconditional support that encouraged me throughout my thesis completion.
6. All my friends and colleagues, for providing valuable information and support that helped me to accomplish my master's degree.