This dissertation describes a series of contributions to the ways in which autonomous robots acting in the presence of humans can take into account the social-cultural environment in which their actions take place. The algorithms used by such social robots to understand and perceive their social environment should not only give an explanation for the actions of humans but should also predict the outcome of those actions. The contributions of this dissertation are as follows:

1. We used the culture sanctioned social metric (CSSM) based social calculus technique to quantify, analyze and predict the behavior of the robot, human soldiers and the public perception in the Market Patrol peacekeeping scenario.
2. We validated the results of the Market Patrol scenario by comparing the predicted values with the judgment of a large group of human observers cognizant of the modeled culture.
3. We modeled the movement of a socially aware mobile robot in a dense crowds, using the concept of a micro-conflict to represent the challenge of giving or not giving way to pedestrians.
4. We developed an approach for the robot behavior in micro-conflicts based on the psychological observation that human opponents will use a consistent strategy. For this, the mobile robot classifies the opponent strategy reflected by the personality and social status of the person and chooses an appropriate counter-strategy which takes into account the urgency of the robots’ mission.
5. We developed an alternative approach for the resolution of micro-conflicts based on the imitation of the behavior of the human agent. This approach aims to make the behavior of an autonomous robot closely resemble that of a remotely operated one.

Major: Electrical Engineering

Educational Career:
Bachelor’s of Electrical Engineering, BS, 2007, University of Engineering & Technology, Lahore Pakistan
Master’s of Electrical Engineering, MS, 2013, University of Engineering & Technology, Lahore Pakistan
Master’s of Computer Engineering, MS, 2013, University of Central Florida, FL USA

Committee in Charge:
Ladislau Boloni, Chair, Electrical Engineering & Computer Science
Stephen Fiore, Modeling & Simulation
Aman Behal, Electrical & Computer Engineering
Gita Sukthankar, Computer Science
Ivan Garibay, UCF Office of Research & Commercialization

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The public is welcome to attend.