Introduction:

Why Social Interactions are Important?

Social interaction refers to any form of mutual communication between two individuals or between an individual and a group . Such communications involve any or all forms of sensory and motor activities as deemed necessary by the participants of the interaction. Researchers working in the area of social psychology, personality studies, developmental sociology and other related areas, strongly believe that the ability of individuals to effectively control expressive behavior is essential for the social and interpersonal functioning of our society. Such social interactions are the aggregate cause of social behaviors, social actions and social contact that helps not only in effective bilateral communication, but also in forming an efficient feedback driven behavioral learning loop. It is this feedback (termed as *social feedback*) that children use towards developing good social and communicative skills.

What is the problem?

Recent studies in behavioral psychology are furthering our understanding of the importance of social behaviors and social actions in everyday context. Researchers have revealed an unconscious need in humans to mimic and imitate the mannerisms of their interaction partners. An increasing number of experiments have highlighted this need for imitation to be very primeval and that they offer an elegant channel for building trust and confidence between individuals.

Unfortunately, people with sensory disability (like visual and hearing impairment) perceptual disability (like Prosopagnosia or Akinetopsia) and cognitive disability (like autism or developmental disorder) miss out on both social feedback and empathy due to the lack of appropriate sensory, perceptual or cognitive processing.

How technology and computing could provide Solutions?

This growth in ubiquitous computing has penetrated various fronts of human lives that the concept of computing is no longer technology centric but human centric [REF]. Newer human centric areas of research have emerged due to this interaction between humans and technology such as Human Centered Computing (HCC) [REF], and more recently Human Centered Multimedia Computing (HCMC) [REF]. These areas have an overlapping goal of putting technology closer to humans and making technology adapt to human needs rather than requiring the human to adapt to the technology. Fallout of these research areas are the newer applications where the human centered technologies are being targeted at improving the quality of life of humans on an everyday basis.

Parallel to the advances made in HCMC, Reality Mining [REF] and Computational Social Systems [REF] are highlighting the importance of understanding interactions of humans among themselves and with their environment. From epidemic prediction to mapping of information flow, human mobility, human activity and human interactions are becoming the forefront of computational modeling. Understanding human-human social interactions offers unprecedented insight into the above three important aspects of social systems. Recent work by Alex Pentland [REF] has shown the importance of technology insertion into the human-human communication channel to tap into the unconscious social signals. His work has highlighted how humans relay upon non-verbal cues in everyday interactions. Augmenting these concept developments, Social Computing [REF] is discovering that humans, though geographically distant, are not too far on a social map. Six degrees of separation forms the human web where a randomly sampled human is connected to any other randomly sampled individual within a separation of five other individuals between them. With an exploding increase in communication media and virtual TelePresence technologies, people are only going to get closer within the social web. Thus, modeling the social interaction primitives in humans is essential to the overall understanding of the human web.

One such technology is the Embodied Social Interaction Assistant that is being developed at the Center for Cognitive Ubiquitous Computing (CUbiC) that focuses on providing assistance to people who are blind or visually impaired to engage in everyday social interactions with their sighted peers. As described in the related work section, recent research into the social interactions of humans have revealed the importance of *social signals* that form the very basis fabric of human societies [REF].