Dissertation Defense
Doctor of Philosophy in Computer Science

“Designing for Awareness: Towards the Design of an Intelligible Proactive Agent to Support Message-based Communication” by Pranut Jain

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Place: 6106 E. Lilly, Sennott Square, Pittsburgh PA 15260

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Abstract:
In mobile messaging, there is a lack of situational awareness about the state of message recipients. With the ubiquity of mobile devices, there is an expectation of fast responses, which can lead to message recipients feeling pressure to respond quickly to incoming messages. This can lead to distractions from ongoing tasks. At the same time, delayed responses to messages have also been shown to affect social relations negatively. To compensate, message recipients often need to apologize and explain these delays to message senders. Messaging applications share cues such as Online/Offline status, read receipts, and last-seen time to improve availability awareness. However, these cues have been shown to be poor availability indicators and can raise privacy concerns.

This dissertation contributes to the design, implementation, and evaluation of a proactive messaging agent, which improves situational awareness in messaging by detecting and sharing unavailability and related context. There are multiple stages involved in the design of this agent corresponding to its goals of (1) improving situational awareness in messaging to reduce the perceived obligation to respond immediately; (2) being fully automated to reduce distractions and effort on the part of the agent owner to share their availability; and (3) preserving user privacy through mutual awareness and understanding of context-sharing preferences. In the first stage, we demonstrate that we can accurately detect user unavailability by leveraging data such as sensor values from a user's smartphone. At this stage, we also identify and understand user preferences related to the utility and comfort of the information the agent could share to inform unavailability. In the second stage, we present the results of evaluating the agent in the real world. In the third stage, we co-design explanations with this agent's users to make the agent function more intelligible for its users and allow for its more appropriate use. Through this work, we contribute to an improved understanding of the crucial factors in designing a virtual assistant to improve situational awareness in mobile messaging and inform the design of future virtual assistants to support asynchronous communication.