Improving **Understanding**, **Trust**, and **Control** with **Intelligibility** in **Context-Aware Applications**

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Ph.D. Thesis Proposal

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To facilitate everyday activities, context-aware applications use sensors to detect what is happening, and use increasingly complex mechanisms (*e.g.*, by using machine learning) to infer the user's context. For example, a mobile application can recognize that you are in a conversation, and suppress any incoming messages. When the application works well, this implicit sensing and complex inference remain invisible. However, when it behaves inappropriately or unexpectedly, users may not understand its behavior, and this can lead users to mistrust, misuse, or abandon it. To counter this, context-aware applications should be *intelligible*, capable of generating explanations of their behavior.

My thesis investigates providing intelligibility in context-aware applications, and evaluates its usefulness to improve user understanding, trust, and control. I explored what explanation types users want when using context-aware applications in various circumstances. I provided explanations in terms of questions that users would ask, such as *why* did it do X, *what if* I did W, what will it do? Early evaluation found that why and why not explanations can improve understanding and trust. I next developed a toolkit to help developers to implement intelligibility in their context-aware applications, such that they can automatically generate explanations. Following which, I conducted a usability study to derive design recommendations for presenting usable intelligibility interfaces of a mobile application. In the remaining work, I will evaluate intelligibility in more realistic settings. First, I shall explore the helpfulness and harmfulness of intelligibility for applications with high and low certainties. Finally, I shall investigate how intelligibility, through improving user understanding, can help the users to more effectively control a context-aware application.

http://brianlim.net/thesis-proposal

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