

# **A Constructive Memory Architecture for Context Awareness**

**Yohann Daruwala**

**A thesis submitted in fulfilment of the requirements  
for the degree of Master of Philosophy**



**Key Centre of Design Computing and Cognition  
Faculty of Architecture, Design and Planning  
University of Sydney**

**January 2008**

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## **Thesis Declaration**

I declare the research presented in this thesis is original and has not been submitted in any form for another degree or diploma at any other University or institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in this thesis and a list of references is provided.

Yohann Daruwala

31<sup>st</sup> January, 2008

## **Abstract**

Context-aware computing is a mobile computing paradigm in which applications can discover, use, and take advantage of contextual information, such as the location, tasks and preferences of the user, in order to adapt their behaviour in response to changing operating environments and user requirements. A problem that arises is the inability to respond to contextual information that cannot be classified into any known context. Many context-aware applications require all discovered contextual information to exactly match a type of context, otherwise the application will not react responsively. The ability to learn and recall contexts based on the contextual information discovered has not been very well addressed by previous context-aware applications and research.

The aim of this thesis is to develop a component middleware technology for mobile computing devices for the discovery and capture of contextual information, using the situated reasoning concept of constructive memory. The research contribution of this thesis lies in developing a modified architecture for context-aware systems, using a constructive memory model as a way to learn and recall contexts from previous experiences and application interactions. Using a constructive memory model, previous experiences can be induced to construct potential contexts, given a small amount of learning and interaction. The learning process is able to map the many variations of contextual information currently discovered by the user with a predicted type of context based on what the application has stored and seen previously. It only requires a small amount of contextual information to predict a context, something common context-aware systems lack, as they require all information before a type of context is assigned. Additionally, some mechanism to reason about the contextual information being discovered from past application interactions will be beneficial to induce contexts for future experiences.

## Acknowledgements

There are many people who assisted with the preparation of this Master's thesis, whom I would like to thank for their guidance, support and involvement in this degree.

First and foremost, I would like to thank both my supervisors, Professor Mary Lou Maher and Dr Andy Dong. I was fortunate enough to work with both supervisors over the course of the degree. The first half of the degree was supervised by Professor Mary Lou Maher, who provided tireless support, encouragement and inspiration throughout my university candidature. It was her belief in me and her persistence that has enabled me to come as far as I have. Professor Maher was and still is an invaluable mentor in my life. With Professor Maher taking academic sabbatical leave, Dr Andy Dong accepted to supervise my thesis for the rest of the degree. Dr Dong offered his knowledge and resources willingly to help me understand my research. He raised and discussed several issues to make my research clear and more defined. I am grateful to Dr Dong for his habit of challenging my thinking and asking difficult questions to help frame the research. His enthusiasm for and knowledge of my research was always welcomed. I would like to thank both supervisors wholeheartedly for the insurmountable hours and time spent in reading and preparing for weekly meetings. Without this dedication, there would be no thesis.

I would like to thank the Faculty of Architecture at the University of Sydney and the National Information Communications Technology of Australia (NICTA) for providing me with assistance in many forms. They have enabled me to be a part of a friendly and supportive research environment during my university life. My gratitude is also directed to all colleagues and friends at the Key Centre of Design Computing and Cognition for their direct and indirect help in my research. Any suggestions and guidance offered were readily accepted and greatly appreciated.

My friends are a big part of my support network, both in academic and personal life. If I could name you all, it would be a thesis in itself. I would like to collectively express my deepest thanks to all of you for all the chats, advice, discussions and laughter that we have shared. These things helped me preserve my sanity and at difficult times gave me a better sense of perspective. You all know who you are, so thank you very much.

Finally, this thesis would not exist if it were not for my family and extended family located around the world, who have supported me throughout my university life. I am especially grateful to my parents and brother for their continuous encouragement and great support. I would not be where I am today without their love, guidance, patience and the sacrifices they have made for me. They have allowed me to neglect my duties as a son and brother at times, to which I am indebted.

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