DOCTORAL DISSERTATION

TOMRAS: A Task Oriented Mobile Remote Access System for Desktop Applications

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CERTIFICATE OF AUTHORSHIP/ORIGINALITY

I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Abstract

Mobile remote access to desktop applications is a potential enabler to improving the productivity and convenience of individuals and businesses. There is an increasing research interest in developing mobile remote access solutions for desktop applications. The developed proposals, however, are challenged by the hardware limitations of most mobile devices, such as the small display size. These limitations have a direct impact on the way existing desktop applications are presented on mobile devices.

This thesis focuses on developing new ways of achieving effective mobile remote access to existing desktop applications. A conceptual model and implementation architecture for a task-oriented mobile remote access system (TOMRAS) have been introduced. The TOMRAS model adopts a user interface refactoring approach to generate task-oriented user interfaces for existing desktop applications without re-developing or modifying these applications.

TOMRAS has a number of novel aspects, including, inferring user interface and behaviour knowledge from existing applications and transparently exposing the functionalities of existing desktop applications to be remotely accessible via a wide spectrum of mobile devices and platforms without redeveloping these desktop applications. The TOMRAS strategy of decoupling the generated mobile task's user interface from the functionality of existing applications also allows for a possible enriching of the mobile task's user interface with multimodal interaction capabilities.

The thesis describes the TOMRAS conceptual model, and a potential implementation architecture for this model. The proposed implementation architecture articulates the intrinsic building blocks for mobile remote access

solutions that adopt the TOMRAS model. The limitations of how widely and generically the model and techniques can be applied are also detailed in the thesis. Furthermore, a prototype that validates the feasibility of the TOMRAS implementation architecture is provided, and an evaluation of the effectiveness of the task-oriented approach is presented.