The Rapid Deployment of Wireless Networks in an Industrial Environment

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Abstract

This dissertation documents a doctoral research project undertaken at the Industrial Research Institute Swinburne (IRIS) between the years of 2004 – 2007.

The objective of the research project was to investigate methods, tools and algorithms that could support the deployment of wireless networks in an industrial environment. Specifically, emphasis was on improving the methods available for determining network coverage and performance. To achieve this goal, a number of propagation prediction models (some taken from the literature and others developed during the course of this research project) were investigated.

The primary propagation model of interest was a three dimensional (3D) ray tracing algorithm that demonstrated an ability to produce precise predictive results with only a small number of empirical measurements taken at a given site. Stochastic models able to predict a network's ability to handle many simultaneous voice-over-Internet-protocol (VoIP) calls (under various different conditions) were also investigated and extended during the course of this dissertation.

Finally, a simulation tool, which incorporated the models investigated, was developed. The simulation program was designed to be suitable for both academic investigation and to be robust enough such that it could be realistically be used in practical network deployments, thus satisfying the needs of an applied research program by both producing results of academic interest and a tangible outcome of use in industry.

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Declaration

This thesis contains no material which has been accepted for award of any other degree or diploma in any university or college of advanced education, and to the best of my knowledge and belief contains no material previously published or written by another person except where due reference has been made.

Max Downey
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