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Presented at	MPhil to PhD Transfer Seminar (RS4)		
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Abstract

A Fast and Accurate Propagation Model for Urban Coverage Prediction

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Radiowave propagation prediction has a crucial impact on the quality of wireless networks to be designed. The demand of a fast and accurate algorithm to predict a huge number of receiver points is rapidly increasing, especially in industry. The project studies several existing popular algorithms, analyzes and develop a new approach to predict signal strength in urban environment. An efficient 3D ray launching algorithm for urban/sub-urban coverage prediction is proposed. A new environment database is defined, termed as Cubes Database (CD). CD is very fast to construct (less than a minute) and the size of the CD is at an acceptable level (a few hundred megabytes). With the help of CD, the model achieves a good result in a time that is suitable for wireless network planning. The new approach can predict COST231 Munich city (2400m X 3400m X 100m) with a 5 X 5 X 3 resolution in 3 minutes with a Root Mean Square Error (RMSE) of around 10 dB, which compares favourably with existing methods. The algorithm gives the signal strength at all possible receiver positions within the defined scenario; the results obtained are relevant to academic researchers and industry.