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Abstract

A Grid-enabled Parallel Intelligent Ray Launching Algorithm for Outdoor and Indoor Wireless Propagation Coverage Prediction

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Over the past few decades, 3G/4G networks have been growing rapidly. The need to plan and optimize such networks in an efficient and accurate manner is increasing. Wireless propagation modelling plays a key role in the process of obtaining optimal network configurations. Deterministic approaches, which gradually replace empirical ones, remain time-consuming. One common solution, as proposed in some of the literature, is the trade-off between accuracy and speed.

The study proposes a novel intelligent ray launching algorithm for outdoor and indoor coverage prediction. The algorithm targets a huge number of pixels for different scenarios in an efficient and accurate manner. The outcomes of the study are relevant to both academic and industry.

Grid computing is an emerging technique which aims to utilize world-scale unused desktop resources. It provides the potential capability to solve unlimited complex time-constraint problems. By using grid computing, the propagation modelling, as proposed by the study IRLA (Intelligent Ray Launching Algorithm), will be improved as the problem size that IRLA can solve will be increased by using grid. Also, by developing an intelligent job scheduler for IRLA, the modelling can become potentially fast enough so that many snapshots can be taken in a short time, which will certainly benefit the process of planning and optimization.

The study has investigated the performance related issued of deploying IRLA in distributed remote objects. By fully optimizing IRLA, the experiments show that it is promising in many aspects, as compared to the techniques in the existing literature.