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Essays on Mobile Networks and Applications

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ABSTRACT

The explosive growth of mobile phone usage has opened up a huge market for innovative M-Commerce (Mobile Commerce) products and services. Emerging M-Commerce applications allow users to conduct retail transactions, utilize mobile payment services and receive subscription-based content services such as news, financial information, and entertainment. Additionally, the ability to obtain real-time information on the geographic location of users has introduced a market for location-based services like mobile advertising. While the outlook for M-Commerce appears promising, there are numerous problems that need to be addressed as mobile applications are developed and deployed. This dissertation is composed of three essays that focus on the economic and design issues of wireless networks and mobile applications.

The first essay introduces a game theoretic model to understand location-based advertising (LBA) strategies for competing stores. Specifically, couponing strategies based on consumers' physical location and store loyalty are studied. The second essay examines various economic models (buy, rent, or subscribe) and conditions for the optimal policy in the case of music downloads on mobile phones. The analytical framework provides pricing guidelines for the profit maximizing Digital Content Provider (DCP). The third essay provides solutions to an important optimization problem in wireless networks, known as the Minimum Energy Broadcasting (MEB) problem.