Bluetooth Low Energy applied Mobile Payment System with Indoor Positioning Technology

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ABSTRACT

The information technology has given a way for faster and convenient payment process flows and new methodology of design for next generation payment system. Recently, the usage growth of mobile devices has fostered a new and popular mobile payment environment. Most of the current generation mobile phones support BLE technology to communicate with nearby BLE-enabled devices. It is reasonable to construct a BLE-based mobile payment system as one of the payment methods for the people in the smart city. In this talk, an indoor positioning technology and the mobile payment authentication protocol in the payment system design are proposed. For the positioning technology, with the modified time of arrival (TOA) measurements, the weighted least square scheme in the multistatic sensor system is applied. Besides, the payment protocol consisting of three phases: initialization phase, session key construction phase, and authentication phase are described. Once the system has detected the legal device within the payment-enabled area, the payment system will automatically start up the authentication process through BLE communication channel to generate a secure session key and establish an authenticated communication session to perform the payment transaction accordingly. For the secure concerning, the security analysis is conducted to evaluate the security strength of the proposed protocol.