

# Abstract

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## **Smartphone Payment via Flashlight: Utilizing the Built-in Flashlight of Smartphones as Replacement for Magnetic Cards**

Since society nowadays depends deeply on technology, smartphones, smart payments and credit cards in most daily tasks, it is a necessity to provide a secure, easy and inexpensive way of communication between the smartphone and automatic teller machines (ATM) card readers. In this paper, we have practically implemented a system which replaces the magnetic card with the built-in flashlight of an Android smartphone to transmit the data stored on the magnetic strip to a small, inexpensive module on the ATM. The feasibility of the system is tested using two different common types of smartphone flashlights: the high brightness, low speed Xenon flashlight and the comparably low brightness but faster light emitting diode (LED) flashlight. The implemented system succeeds in sending the required information error-free at data rates of 15 bps and 500 bps using Xenon and LED flashlight, respectively, over a short distance light shielded channel. When tested in outdoors noisy conditions without light shield, the higher brightness Xenon is more noise resistant than LED. However, the system experienced challenges due to the interference of ambient light especially with larger distances between transmitter and receiver and in too bright environments, proving the necessity of a light shield.