Abstract

Moustafa Hussein Aly

Scalable ZigBee-Based Smart Authentication and Access Control System Design Using XMOS Programmable Chips

In this paper, an efficient, inexpensive, scalable, and ZigBee-based smart authentication and access control system is proposed. The system consists of a central node and remote nodes. The central node holds a database of authorized users and it is mesh-networked to a set of remote nodes which are spread throughout the premises of an enterprise. For each remote node, a radio frequency identification (RFID) reader is mounted which is used to communicate with the RFID tags. User identification is performed by reading the RFID tag number and authentication is done by means of a password entered by the user through a keypad that resides on the remote node. This data is then transmitted through the wireless 802.15.4 interface to the central node for verification. An event log file with date/time stamp is created for each user that is granted access to the system. It maintains footprints of all users' movement activities within the premises and it is stored on an SD card mounted to the central node. Moreover, the central node can be connected to a computer via the serial port, where the real-time event logs will be visualized on the screen along with the ability of automated parsing and storing the received information directly to Excel without the need of any additional programming requirements. This paper is based on a prototype development of the proposed system. It presents both hardware and firmware design aspects.