

Research on IEEE 802.15.1 standard and application in building an interface for connecting devices supporting personal health information collection

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Abstract: This thesis investigates the IEEE 802.15.1 standard (Bluetooth) and its application in developing a connectivity interface for personal health data collection devices. The research addresses the critical need for seamless, low-power, and secure wireless communication between wearable health monitors and central processing units. A comprehensive analysis of the Bluetooth protocol stack, including its physical layer, baseband, and higher-layer profiles, is conducted to identify optimal configurations for health-related data transmission. The study proposes a system architecture that leverages the Serial Port Profile (SPP) and Generic Attribute Profile (GATT) to establish reliable links between heterogeneous devices such as heart rate monitors, pulse oximeters, and blood pressure cuffs. An experimental interface was implemented and evaluated for data throughput, latency, and power consumption. Results demonstrate that the proposed solution achieves stable connectivity with minimal packet loss, supporting real-time health monitoring. This work contributes to the advancement of personal healthcare systems by providing a standardized, interoperable framework for integrating diverse sensor devices, thereby facilitating efficient data aggregation and remote patient monitoring.

Keywords: IEEE 802.15.1, Bluetooth, connection interface, health information collection