

Abstract

Wireless technology has become an integrated part of our life. Due to decreasing prices and complexity of components, such devices are now widespread in consumer electronics and sport technology as well. The mixture of those two product lines contains virtual sport devices, which makes possible to simulate certain sport activities. The topic of this thesis is to design and development of a new Bluetooth-based electronic sport hand-device.

The extremely low energy needs and low complexity of the Bluetooth Low Energy standard contributes to the spreading of such devices. This enables a small Bluetooth sensor or a game powered by a button cell to operate for a long time.

In my thesis I have designed and developed a virtual sport device, as described before. As a result I created a fitness tool, which enables us to simulate numerous sport activities. The device detects the movements of our hands using a 3 axis accelerometer and sends those data to a smart device. The smart phone or tablet app determines which sport exercise is to be performed. The device uses a vibrating motor to feedback to the user.

After describing the exact details of the design, I start with a review of the Bluetooth Low Energy standard. Then, in chapter 3 I discuss the preliminaries for hardware design which is followed by the description of the whole implementation lifecycle from component selection to the production of the printed circuit board. Chapter 4 introduces the steps of the design and implementation of the firmware, together with the steps of power up tests.