Chapter 4
Algorithms for Vein Image Enhancement and Matching in the Cloud IoT-Based M-Health Environment

ABSTRACT

In this chapter, the authors have described the methodologies to achieve the objectives of veins image enhancement, feature extractions, and matching with other veins images in the cloud IoT-based m-health environment. The initial steps to propose the algorithms for veins image enhance and feature extractions will have five parts. Once the proposed algorithm is written, the hardware architecture designs of the proposed veins image enhancements and feature extraction algorithm will be described by the authors. The hardware designs are presented in subsequent sections of this chapter. Further, the hardware designs are elaborated in detail for each of the techniques. The presented algorithms are implemented in MATLAB 11.0 software, and these algorithms are simulated and integrated with different veins sample images. The hardware designs of veins image enhancements and feature extractions are implemented using Verilog Hardware Language Description (VHLD), and these implemented results are simulated using MSA (Model-Sim-Altera) for sample images of different types of veins.

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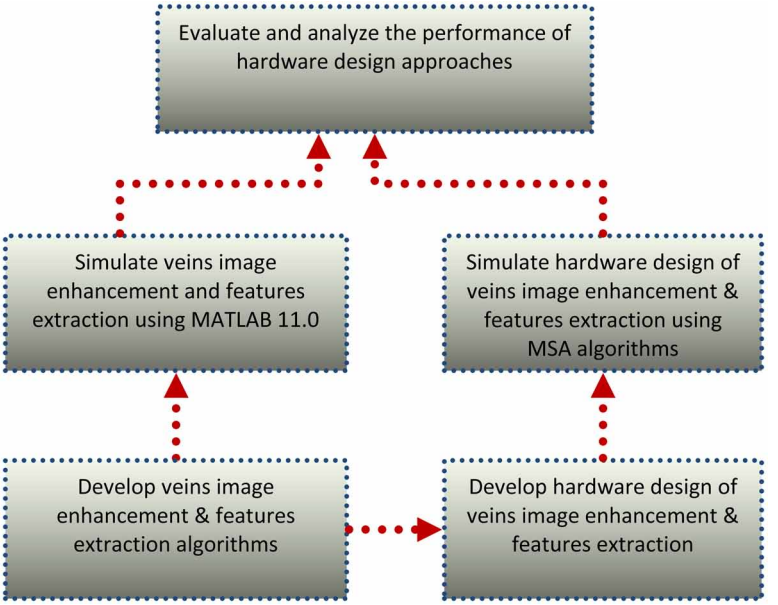
OVERVIEW OF PROPOSED VEINS IMAGE ENHANCEMENT, FEATURE EXTRACTION, AND HARDWARE DESIGN METHODOLOGIES

See Figure 1.

Figure 1. An overview of proposed veins image enhancement, feature extraction, and hardware design methodologies



THE ALGORITHM

It is a well-known fact that the veins exist under the human skin, and veins images are captured online by using an infrared (IR) camera using the trans-illumination method. Sometimes the quality of captured veins images becomes poor because of unusual light scattering and natural human skin absorption characteristics. Hence, veins images may include noises, poor quality illumination and shading artifacts. Thus, it becomes very difficult to differentiate between veins and non-veins. In these situations, the simple technique cannot differentiate whether it is a vein or a non-vein. Hence, veins image improvement becomes important for veins image feature extraction.