Chapter 7
Results and Discussions of Palm-Dorsa-Veins-Based Systems in the Cloud IoT-Based M-Health Environment

ABSTRACT

The results of palm-dorsa-veins-based m-health systems in a cloud-computing environment are discussed and analyzed in a detailed way in this chapter of the book. The sample images S1, S2, S3, and S4 are being used for hardware designs and performance evaluation in the cases of re-sampling, segmentation, median filters, thinning and Top veins, which will be used for critically ill and general patients' identity verification in the cloud IoT-based m-health environments. The ModelSim-Altera hardware design language is used as a simulator tool to simulate the hardware design with sample veins images. Further, the ModelSim-Altera simulation outcomes are compared with MATLAB implementations for evaluating the performances of hardware designs of the described algorithms in the cloud IoT-based m-health environment. The outcomes are analyzed, and the details of these outcomes are discussed in this chapter.

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THE RESULT DISCUSSION OF RE-SAMPLING IN THE M-HEALTH ENVIRONMENT

Figure 1 shows the resultant veins images for samples S_1, S_2, S_3, and S_4 after applying re-sampling with MATLAB functions in the m-health environment. The obtained re-sampled veins images are RS_1, RS_2, RS_3, and RS_4. The figure 1 is showing the relationship of actual veins images and re-sampled veins images obtained after implementing re-sampling with MATLAB. One can see very little difference between the actual veins images and the re-sampled veins images with the help of our open eyes. So, the MSE and PSNR values can be used to determine the quality difference of re-sampling between MATLAB and hardware design implementation of veins images. Table 1 shows the PSNR and MSE results obtained for MATLAB and hardware design implementation of veins images in the cloud IoT-based m-health environment. After analyzing the outcomes of table 1, it can be said by the authors that there is very little difference between the qualities of veins images obtained using MATLAB and hardware design implementations.

Further, the resultant veins images obtained from the re-sampling of hardware design and MATLAB are compared with respect to pixel accurateness in the cloud IoT-based m-health environment. Here, pixels of the veins image after the re-sampling of hardware design are represented in the form of 8-bit grayscale. Table 2 shows the average execution time required by MATLAB and the re-sampling hardware design for each of the sample veins images. The experiments were conducted using the MATLAB and ModelSim-Altera in the cloud IoT-based m-health environment on Windows 10 operating systems with Intel i7 computers. Based on experiments, it can be observed by the researchers that the described hardware design approach has considerably better execution time than MATLAB. During experiments, it was observed that the re-sampling hardware design approach may not be 100% accurate as compared to MATLAB. However, it has a significantly faster execution time than MATLAB in the cloud IoT-based m-health environment. Hence, it can be concluded that the re-sampling hardware design can be a better choice in comparison compared to MATLAB for implementing *Re-sampling* in identity verification of patients in the cloud IoT-based m-health environment. For performance comparison, the research works given in (Nuño & Arias, 2005; Lin et al., 2010; Wang et al., 2011; Mahale et al., 2014) have been used in this chapter.