The Master Thesis with Title:

A Deep Learning Based Approach for a Real Time Diagnosis of Skin Diseases.

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By:

Nashwan Ahmed Mohammed Marched

Supervisor:

Prof. Ghaleb AL-Gaphari

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ABSTRACT

Skin disease is one of the lesions that must be investigated and diagnosed right away; misdiagnosis and late diagnosis may result in life threats. In spite of growing interest in using fog computing and IoT applications to diagnose skin diseases, there are a limited number of accurate models and frameworks available for real-time diagnosis. Unfortunately, a concrete fog-IoT-based solution with high-accuracy diagnosis models is still lacking for real-time diagnosis. The main objective of this study is to integrate a transfer learning pre-training VGG-19 model with fog computing and IoT devices for real-time skin disease diagnosis. The new architecture follows the Dermnet dataset standard; the model was trained, validated, and tested. Furthermore, this study identified the best performing parameters for the fine-tuned model, which achieved of 100% in training accuracy and 93.3% validation accuracy for nine diseases (Acne, Bullous, Eczema, Lupus, Melanoma, Normal, SJS-TEN diseases, Skin Allergy, and Vitiligo disease) in the skin disease classification. The trained module is able to correctly classify the images attaining accuracy of 100% in testing images for skin diagnosis. This study used the Fog-IoT enable framework with FogBus, which was used to deploy and test the performance of the proposed model in terms of latency, jitter, accuracy, and execution time, in diverse fog computation scenarios.

INDEX TERMS Fog computing, Edge Computing, Healthcare, Machine Learning (ML), Deep Learning (DL), Internet of Things (IoT), Skin Disease, VGGN19.