COLLEGE OF ENGINEERING AND COMPUTER SCIENCE
FLORIDA ATLANTIC UNIVERSITY

Announces the Ph.D. Dissertation Defense of

Syed Qasim Gilani

for the degree of Doctor of Philosophy (Ph.D.)

"Computer-aided diagnosis of skin cancers using dermatology images."

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ABSTRACT OF DISSERTATION
Computer-aided diagnosis of skin cancers using dermatology images.

Skin cancer is a prevalent cancer that significantly contributes to global mortality rates. Early detection is crucial for a high survival rate. Dermatologists primarily rely on visual inspection to diagnose skin cancers, but this method is not highly accurate. Deep learning algorithms can enhance the diagnostic accuracy of skin cancers. However, these algorithms require substantial labeled data for effective training. Acquiring annotated data for skin cancer classification is time-consuming, expensive, and necessitates expert annotation. Moreover, skin cancer datasets often suffer from imbalanced data distribution.

Generative Adversarial Networks (GANs) can be used to overcome the challenges of data scarcity and lack of labels by automatically generating skin cancer images. However, training and test data from different distributions can introduce domain shift and bias, impacting the model's performance. This dissertation addresses this issue by developing deep learning-based domain adaptation models.

Additionally, this research emphasizes deploying deep learning models on hardware to enable real-time skin cancer detection, facilitating accurate diagnoses by dermatologists. Deploying conventional deep learning algorithms on hardware is not preferred due to the problem of high resource consumption. Therefore, this dissertation presents spiking neural network based (SNN) models explicitly designed for hardware implementation. SNNs are preferred for their power-efficient behavior and suitability for hardware deployment.

BIOGRAPHICAL SKETCH
Born in Kashmir, Pakistan
B.S., Comsats Institute of Technology, Abbottabad, KPK, Pakistan, 2013
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CONCERNING PERIOD OF PREPARATION
& QUALIFYING EXAMINATION

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Published Papers:

1. Gilani, S. Q., Syed, T., Umair, M., & Marques, O. (2023). Skin Cancer Classification Using Deep Spiking Neural Network. Journal of Digital Imaging, 1-11.
2. Gilani, S. Q. & Marques, O. (2023). Skin lesion analysis using generative adversarial networks: A review. Multimedia Tools and Applications, 1-42.
3. Naqvi, M., Gilani, S. Q., Syed, T., Marques, O., & Kim, H. C. (2023). Skin Cancer Detection Using Deep Learning—A Review. Diagnostics, 13(11), 1911.