CHRIST
(DEEMED TO BE UNIVERSITY)
BANGALORE · INDIA

Notice for the PhD Viva-Voce Examination

Ms Sarwath Unnisa (Registration Number: 1981319), PhD scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore will defend her PhD thesis at the public viva-voce examination on Monday, 6 May 2024 at 10.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029.

Title of the Thesis	:	**Improved Deep Learning Model for Detection and Classification of Pneumonia from X-Ray Images**
Discipline	:	**Computer Science**
External Examiner (Outside Karnataka)	:	**Dr S Domnic** Associate Professor National Institute of Technology Tanjore Main Road, National Highway 67 Tiruchirappalli – 620015 Tamil Nadu
External Examiner (Within Karnataka)	:	**Dr B H Shekar** Professor Department of Computer Science Mangalore University Mangalagangothri, Mangalore – 574199 Karnataka
Supervisor	:	**Dr Vijayalakshmi A** Associate Professor Department of Statistics and Data Science CHRIST (Deemed to be University) Bengaluru - 560029 Karnataka

The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar

Place: Bengaluru
Date: 23 April 2024

ABSTRACT

Pneumonia is a severe respiratory disease that can lead to inflammation, fluid accumulation in lungs and breathing difficulties, which needs immediate and accurate diagnosis. Chest X-Ray images are a necessary tool to diagnose pneumonia because manual interpretation poses challenges, particularly for radiologists with less expertise. Artificial intelligence (AI), specifically Convolutional Neural Networks (CNNs), has become a significant in the field of pneumonia detection within chest X-Ray images in recent years.

This research presents SarNet, a neural network model developed for the identification of pneumonia in chest X-Ray images. The study involved the compilation of dataset containing chest X-Ray images categorized as normal, pneumonia, and COVID-19 pneumonia cases, each accompanied by appropriate annotations. This dataset was employed as the basis for training and assessing SarNet's performance, underscoring its promise in transforming the diagnosis of pneumonia.

SarNet proved highly effective, achieving good accuracy, sensitivity, and specificity compared to traditional diagnostic methods. The model's simplicity, with 41 layers, strikes a balance between depth and computational complexity, enhancing efficiency and ensuring accurate pneumonia detection.

Furthermore, the study expanded its scope to include COVID-19 pneumonia detection. SarNet achieved an accuracy of 99.15% in binary classification and 94.9% in multiclass classification, including healthy, pneumonia, and COVID-19 pneumonia cases.

Keywords: Binary classification, Chest X-Ray images, Coronavirus disease, COVID-19, Convolutional Neural Network (CNN), Multiclass classification, Pooling, Pneumonia detection, Radiology

Publications:

1. **S. Unnisa** and A. Vijayalakshmi, "Deep Neural Network Architecture and Applications in Healthcare," in Deep Learning for Healthcare Decision Making, River Publishers ,2022, PP. 25-46.
2. **S. Unnisa** and A. Vijayalakshmi, "A Review on Convolution neural networks and its imperative architectures" in intelligent computing systems, Kongunadu Publications, 2021, pp. 109-115.
3. **S. Unnisa** and Vijayalakshmi, A., "SarNet-A Novel Architecture for Detecting Covid-19 Pneumonia from Chest X-Ray Images," Journal of Optoelectronics Laser, vol. 41, no. 6, pp. 343-348, 2022. doi: 10050086.2022.06.44
4. **S. Unnisa** and A. Vijayalakshmi, "SarNet-1 -A Novel Architecture for Diagnosing Covid-19 Pneumonia and Pneumonia through Chest X-Ray Images," International Journal on Recent and Innovation Trends in Computing and Communication, vol. 10, no. 1, pp. 1-7, 2022. doi: 10.17762/ijritec. vl0il.12669.
5. **S. Unnisa** & Vijayalakshmi, A, "SvNet for Detecting Pneumonia from Chest X-Ray Images", Indian Journal of Natural Sciences,2023, 13(76), 178-184. doi: 10.17406/IJONS.2023.76.19