# Notice for the PhD Viva-Voce Examination

Ms Neha Agrawal (Registration Number: 1981315), PhD Scholar at the School of Sciences, CHRIST (Deemed to be University), Bangalore Central Campus will defend her PhD thesis at the public viva-voce examination on Saturday, 03 May 2025 at 11.00 am in Room No. 044, Ground Floor, R & D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka,                                                                                    India.

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| **Title of the Thesis** | : | **Automated Model for Recognition and Classification of 'Vitiligo' Using Deep Learning Hybrid Model** |
| **Discipline** | : | **Computer Science** |
| **External Examiner - I** | : | **Dr Venkanna Udutalapally**<br>Associate Professor<br>Department of Computer Science and Engineering<br>National Institute of Technology<br>Warangal - 506004, Telangana |
| **External Examiner - II** | : | **Dr M Durairaj**<br>Associate Professor<br>School of Computer Science, Engineering and Applications<br>Bharathidasan University<br>Tiruchirappalli - 620023, Tamil Nadu |
| **Supervisor** | : | **Dr Sagaya Aurelia P**<br>Associate Professor<br>Department of Computer Science<br>School of Sciences<br>CHRIST (Deemed to be University)<br>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:** 28 April 2025

# ABSTRACT

Health research is vital for understanding illness trends, treatment outcomes, and public health interventions, especially for conditions like vitiligo. It helps in developing objective diagnostic tools, reducing errors, and improving care. In image preprocessing, RGB images are resized, augmented, and converted to grayscale, followed by edge detection with the Sobel operator. Morphological operations and Otsu thresholding are applied before using the MorphWaterscape algorithm for region segmentation, achieving 93.5% accuracy and 94.1% precision.

The HyFlexNet model, with the Retan activation function, Flexconv, and RFA blocks, classifies images as Vitiligo or Non-Vitiligo. The Retan activation improves model accuracy by 4-5%. Transfer learning with the pre-trained Inception V3 model helps categorize Vitiligo images, achieving 92.59% validation accuracy and 90.80% training accuracy. The Vitiligo Stability Evaluation method compares clinical photo sets to assess treatment effects, using MorphWaterscape for image segmentation to track disease progression or improvement.

**Keywords:** *Vitiligo, Deep Learning, Activation Function, Transfer Learning, Segmentation*

**Publications:**

1. **N. Agrawal** and S. Aurelia, "Segmentation of vitiligo images using modified watershed segmentation," Library Progress International, vol. 44, no. 3, pp. 2934–2941, 2024.
2. **N. Agrawal** and S. Aurelia, "Classification of vitiligo using transfer learning with new activation function Retan," International Journal of Intelligent Systems and Applications in Engineering, vol. 12, no. 3, pp. 288–296, Mar. 2024.
3. **N. Agrawal** and S. Aurelia, "Vitiligo prediction using autoencoder," Computational Intelligence in Pattern Recognition, 2021. [Online].
   Available: https://api.semanticscholar.org/CorpusID:244178460.
4. **N. Agrawal** and S. Aurelia, "Vitiligo prediction using CNN autoencoder," in Computational Intelligence in Pattern Recognition, A. K. Das, J. Nayak, B. Naik, S. Dutta, and D. Pelusi, Eds. Advances in Intelligent Systems and Computing, vol. 1349, Singapore: Springer, 2022, doi: 10.1007/978-981-16-2543-5_45.
5. **N. Agrawal** and S. Aurelia, "A review on segmentation of vitiligo image," IOP Conference Series: Materials Science and Engineering, vol. 1131, 2021. [Online]. Available:https://api.semanticscholar.org/CorpusID:234892699.
6. **N. Agrawal** and S. Aurelia, "Corroboration of skin diseases: Melanoma, Vitiligo & Vascular Tumor using Transfer Learning," 2021 7th International Conference on Electrical Energy Systems (ICEES), Chennai, India, 2021, pp. 590-592, doi: 10.1109/ICEES51510.2021.9383682
7. **N. Agrawal** and S. Aurelia, "Diagnosis of skin pigmentation disorders using image processing: State of art and future scope," Test Engineering & Management, vol. 83, pp. 17884–17897, May–June 2020.