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Notice for the PhD Viva Voce Examination

Ms Najmusseher, Registration Number: 2071302, PhD Scholar at the Department of Computer Science, School of Sciences, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Wednesday, 29 April 2026 at 10.30 am in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

- Title of the Thesis** : **AI-Driven Model for Automated Epileptic Seizure Classification**
- Discipline** : **Computer Science**
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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.

Place: Bengaluru
Date: 21 April 2026

Registrar (Academics)

ABSTRACT

Epilepsy diagnosis remains challenging due to the complex, noisy, and patient-specific characteristics of EEG signals, which necessitate accurate differentiation of ictal, pre-ictal, and inter-ictal states. This study proposes SeizureWaveNet, an integrated framework that combines advanced signal processing, feature fusion, and deep learning techniques for automated seizure detection and classification. The framework employs Adaptive Inverse Fast Fourier Transform with Non-Uniform Sampling (AIFFT-NS) to enhance transient dynamics resolution and minimize edge distortions, combined with Uniform Manifold Approximation and Projection (UMAP) to preserve spatial electrode relationships during dimensionality reduction. A dual-classifier architecture comprising a Sequential Boosting Network (SeqBoostNet) and an Improved Deep Belief Network (IDBN) is utilized to achieve robust performance across diverse datasets, including BONN, CHB-MIT, and the real-time Bangalore EEG Epilepsy Dataset (BEED). SeqBoostNet demonstrates high accuracy, achieving up to 98% sensitivity and 99% specificity in binary classification, and 96% sensitivity with 98% specificity in multi-class scenarios. Spectral analysis reveals distinct frequency-band signatures supporting seizure type classification and onset localization. A real-time GUI further enables clinical deployment. SeizureWaveNet provides a scalable, interpretable, and high-performance solution for automated epilepsy diagnosis and personalized management.

Keywords: *Epilepsy, Seizure Detection, EEG Analysis, Signal Processing, Fourier Transform, Deep Learning, Machine Learning.*

Publications:

1. **Najmusseher**, Banu, P. N., & Janardhan, D. C. (2024). Automated epileptic seizure classification using adaptive fast Fourier transform with non-uniform sampling and improved deep belief network. *International Journal of Intelligent Engineering Informatics*, 12(4), 460-512.
2. **Najmusseher**. & BANU P K, N. (2024). BEED: Bangalore EEG Epilepsy Dataset [Dataset]. UCI Machine Learning Repository. <https://doi.org/10.24432/C5K33B>.
3. **Najmusseher**, & PK, N. (2024, June). EEG Waveband Computation for Seizure Brain State Identification. In *World Congress on Smart Computing* (pp. 171-182). Singapore: Springer Nature Singapore.
4. **Najmusseher**, & Umme Salma, M. (2022, September). Impact of feature selection techniques for EEG-based seizure classification. In *Congress on Intelligent Systems* (pp. 197-207). Singapore: Springer Nature Singapore.
5. Umme Salma, M., & **Najmusseher**. (2021, October). Classification Algorithms Used in The Study of EEG-Based Epileptic Seizure Detection. In *2021 2nd International Conference on Smart Electronics and Communication (ICOSEC)* (pp. 1518-1521). IEEE.
6. Umme Salma, M., & **Najmusseher**. (2022, July). An Empirical Study of Signal Transformation Techniques on Epileptic Seizures Using EEG Data. In *Congress on Intelligent Systems: Proceedings of CIS 2021, Volume 2* (pp. 797-806). Singapore: Springer Nature Singapore.
7. Banu PK, N. (2024). Feature Engineering for Epileptic Seizure Classification Using SeqBoostNet. *International Journal of Computing and Digital Systems*, 16(1), 1-14.