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# Notice for the PhD Viva Voce Examination

Ms Padmaja K, Registration Number: 2170221, PhD Scholar at the Department of Computer Science and Engineering, School of Engineering and Technology, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Monday, 08 December 2025 at 10.15 am in CDI Conference Hall, Block V, Bangalore Kengeri Campus, CHRIST (Deemed to be University), Bengaluru - 560074, Karnataka, India.

**Title of the Thesis** : **Prediction of Diabetes Using Multidimensional Data Based on Human Islet Cell Condition**

**Discipline** : **Data 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.

**Registrar (Academics)**

**Place:** Bengaluru
**Date:** 29 November 2025

## ABSTRACT

High blood glucose levels are a hallmark of diabetes, a chronic metabolic disorder. Its prevalence is increasing globally, posing a significant risk on public health. This study focused on root cause of diabetes utilizing Deep Learning to predict Type-2 Diabetes (T2D) or hyperglycaemia in human Islet cells an effort to explore the underlying root cause of diabetes. In order to explore the fundamental causes of conditions such as Type - 2 Diabetes, this study employs deep learning algorithms and RNAseq data to identify gene expression patterns associated with the disorder or susceptibility to hyperglycaemia. An enhanced model leads to better early detection and better identification of Islet cell degradation. Using Monte Carlo feature selection, key features are captured. An Optimized Deep Belief Network (ODBN) has a 96.19% classification accuracy for Type - 2 Diabetes cases and non-diabetes cases. With a remarkable accuracy of 98.53%, the study focuses on insulin resistance or insufficiency, which are characteristics of the Islet phenotype. It employs a BiLSTM and Efficient Net B0 approach to identify the molecular pathways underlying Islet cell failure, potential technique targets, and genomic implications. Using the Deepsea framework and enhanced Convolutional Neural Network (CNN) model with several filters, an epigenetic map specific to Islet tissues is produced to assist in identifying regulatory loci associated with Type-2 Diabetes. The recommended approaches found tissue specific regulatory variants for diabetes with an observed 90% accuracy using the benchmark datasets, which made it easier to perform subsequent Genome Wide Association Studies (GWAS) research. Another study showed a deep learning algorithm that uses genetic, gene expression, age, sex, and bmi phenotypes correlation patterns to predict Type - 2 Diabetes by converting numerical data into images, with a reported accuracy of 98%, it combines the SVM Linear kernel classifier with ResNet18, ResNet50 along with skip connections, and Relief feature selection.



**Keywords:** *Type - 2 Diabetes(T2D), hyperglycaemia, Deep Learning, Convolution Neural Networks (CNNs), Bidirectional Long Short-Term Memory (BiLSTM), Deepsea, Genome-Wide Association Studies (GWAS), Support Vector Machine (SVM), EfficientNetB0, Optimized Deep Belief Network (ODBN), Monte Carlo, Chimp Optimization Techniques (ACHOA).*


**Publications:**


1. **Padmaja, K.**, Mukhopadhyay, D. A Model for Detecting Type 2 Diabetes Using Mixed Single-Cell RNA Sequencing with Optimized Data. SN COMPUT. SCI. 4, 768 (2023). https://doi.org/10.1007/s42979-023-02215-z
2. **Padmaja, K.**, Mukhopadhyay, D., An Investigation of Complex Interactions Between Genetically Determined Protein Expression and the Metabolic Phenotype of Human Islet Cells Using Deep Learning. SN COMPUT. SCI. 4, 767 (2023). https://doi.org/10.1007/s42979-023-02222-0
3. **Padmaja, K.**, Mukhopadhyay, D., "A Human Islet Cell RNA-Seq for Genome-Wide Genotype Deepsec Framework Using Deep Learning Based Diabetes Prediction," 2023 International Conference on Network, Multimedia and Information Technology (NMITCON), Bengaluru, India, 2023, pp. 1-6, doi:10.1109/NMITCON58196.2023.10276014.
4. **Padmaja, K.**, Mukhopadhyay, D., "A Predictive Deep Learning Model is used to Identify Human Tissue-Specific Regulatory Variations for Diabetes," 2023 IEEE 4th Annual Flagship India Council International Subsections Conference (INDISCON), Mysore, India, 2023, pp. 1-5 doi:10.1109/INDISCON58499.2023.10270496.