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## Notice for the PhD Viva Voce Examination

Ms Ira Gaba, Registration Number: 2072408, 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, 24 June 2026 at 11.00 am in Room No. 628, 6th Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

- Title of the Thesis** : **A Computational Model for Tea Leaf Quality Prediction Based on Grade Factors Using Hybrid Machine Learning Techniques**
- Discipline** : **Computer Science**
- External Examiner - I** : **Dr Asha Gowda Karegowda**  
Associate Professor  
Department of Master of Computer Applications  
Siddaganga Institute of Technology  
Tumkur - 572103  
Karnataka
- External Examiner - II** : **Dr C Kalaiarasan**  
Professor and Rector  
Guru Nanak University  
Ibrahimpattanam  
Hyderabad - 501506  
Telangana
- Supervisor** : **Dr Ramamurthy B**  
Associate Professor  
Department of Computer Science  
School of Sciences  
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 (Academics)**

**Place:** Bengaluru  
**Date:** 13 June 2026

## ABSTRACT

This study proposes a computational framework for grading tea leaves using texture, color, size, and shape analysis. Tea leaf images were preprocessed to enhance image quality before feature extraction and classification. Radiomic texture features were extracted using GLCM, GLSZM, GLDM, GLRLM, and NGTDM methods. A total of 75 texture features were initially obtained from the tea leaf images. Feature selection techniques including ANOVA, Information Gain, Feature Importance, and Random Forest were applied to reduce dimensionality.

The feature set was optimized from 75 to 29 significant features for improved performance. Healthy leaves were further analyzed to determine tea quality and grading. Color-based categorization was performed using the HSV color model. Tea leaves were grouped into light, medium, and dark color categories. Morphological parameters such as leaf length and width were also evaluated. K-prototypes clustering was employed to grade tea leaves based on combined color and dimensional characteristics. A hybrid CNN–MLP classification model was designed to improve accuracy and reduce computational complexity. This automated grading system can assist farmers in evaluating tea quality and obtaining better market value for their production.

**Keywords:** *Texture Features, GLCM, GLSZM, GLRLM, NGTDM, GLDM, CNN, MLP, K-Means, K-prototype.*

### Publications:

1. **Ira Gaba** and Ramamurthy, “The Fusion of CNN and MLP Algorithm as High-Performance Classification for Identification of Healthy and Unhealthy Leaves”, *GMSARN International Journal*, 2025. (Journal published) [Scopus Index]
2. **Ira Gaba** and b. Ramamurthy, “A Computational model for tea leaf price prediction based on quality factors using hybrid machine learning techniques”, *Journal of Theoretical and Applied Information Technology* 31st May 2025. Vol.103. No.10 [Scopus Index]
3. **Ira Gaba** and R. B, “Identification of the Quality of Tea Leaves by Using Artificial Intelligence Techniques: A Review” *ECS Trans.*, 2022 *ECS Trans.* Vol. 107, p.2053, doi 10.1149/10701.2053ecst [Scopus Index]
4. **Ira Gaba** and B. Ramamurthy, “Image Pre-Processing Algorithms for the Quality Detection of Tea Leaves” in 2022 International Conference on Technological Advancements in Computational Sciences (ICTACS), Dec 2022. doi: 10.1109/ICTACS56270.2022.9988238. [Scopus Index]
5. **Ira Gaba** and B. Ramamurthy, “A Robust Solution for Tea Leaf Classification using the SMOTE and Soft Voting Classifier”, *Indian Journal of Science and Technology*, DOI: 10.17485/IJST/v17i34.1667, Year: 2024, Volume: 17, Issue: 34, Pages: 3502-3511. [Web of Science]

