



## **UNDERGRADUATE THESIS**

# **Comparative Analysis of Child Nutrition Using Extreme Learning Machine and Gradient Boosting Machine Methods at Al-Islam Krian Hospital**

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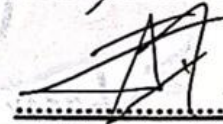
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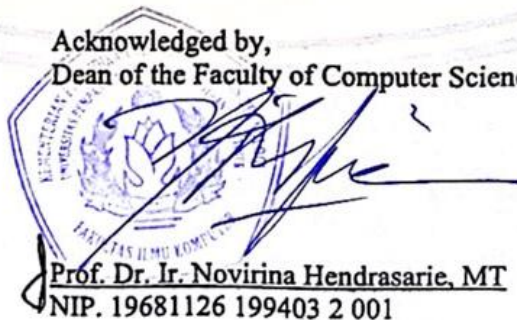
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## **APPROVAL SHEET**

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## ABSTRACT

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Thesis Title : Comparative Analysis of Children's Nutritional Status Using Extreme Learning Machine and Gradient Boosting Machine Methods at RS Al-Islam Krian  
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The nutritional status of school-age children (6–12 years) is a crucial indicator for physical growth and cognitive development. Nutritional issues, including both undernutrition and overnutrition (obesity), require fast and accurate early detection to minimize the risk of degenerative diseases in adulthood. This study aims to design and compare the performance of Extreme Learning Machine (ELM) and Gradient Boosting Machine (GBM) classification models in classifying the nutritional status of children at RS Al-Islam H.M. Mawardi, Krian. The research dataset consists of 257 medical records with feature variables including age, weight, height, gender, and body mass index (BMI). Data preprocessing was performed through numerical transformation, normalization, standardization, and class balancing using the Synthetic Minority Over-sampling Technique (SMOTE) to address data imbalance. The test results demonstrate that the Gradient Boosting Machine (GBM) model provides superior performance with an accuracy of 92%, precision of 80%, recall of 57%, and F1-score of 0.67. Meanwhile, the Extreme Learning Machine (ELM) model produced an accuracy of 90%, precision of 75%, recall of 43%, and F1-score of 0.55. Based on these results, it is concluded that the GBM method is more effective and stable in classifying children's nutritional status compared to the ELM method in this case, thus having the potential to be developed as a medical decision support system.

**Keywords:** Extreme Learning Machine, Gradient Boosting Machine, Children's Nutritional Status, Classification, Machine Learning, SMOTE.

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The author fully realizes that this thesis is far from perfect and may contain shortcomings. Therefore, constructive criticism and suggestions from all parties are highly welcomed for the improvement of this work. Finally, despite all limitations, the author hopes that this report will be beneficial to all readers in general, and to the author in particular.

Surabaya, 21 July 2026

Writer

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