Development of a Non-Invasive Algorithm for Anemia Detection in Women in Sri Lanka

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I certify that I have read this thesis and that in my opinion it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Science.

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Declaration of originality

This is to certify that the work is entirely my own and not of any other person, unless explicitly acknowledged (including citation of published and unpublished sources). The work has not previously been submitted in any form to the Sri Lanka Institute of Information Technology or to any other institution for assessment for any other purpose.

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Abstract

Project Title

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Anemia continues to be a considerable health issue for women in Sri Lanka, impacting physical and cognitive growth, general health, and economic efficiency. Diagnostic methods, like blood tests, are invasive, time-consuming, and could be out of reach for populations with limited resources. A non-invasive algorithm is created to detect anemia in Sri Lankan women in this thesis. The algorithm utilizes readily available clinical and demographic information to decrease reliance on conventional blood tests. According to that **—Development of a Non-Invasive Algorithm for Anemia Detection in Women in Sri Lanka‖** entitled as the research title of this thesis.

The research involves data collection from women across varied demographics and regions, combined with vital health parameters and physical indicators relevant to anemia detection. Advanced machine learning models are trained on this data to identify patterns associated with anemia, offering accurate predictions without the need for invasive procedures. A core aim of the study is to enhance early detection, enabling timely intervention and reducing the overall prevalence of anemia among women.

The high sensitivity rate of the algorithm allows for effective anemia detection with minimal input data, according to key findings. Furthermore, its non-invasive characteristics make it appropriate for application in rural regions where healthcare resources are scarce.

The system successfully provides a non-invasive, accurate, and accessible method for anemia detection, using fingertip imaging and machine learning to predict anemia in real-time. With a compact device integrated into a web app, users can monitor their health easily, while healthcare providers can remotely access patient data for timely interventions. The system's cost-effectiveness and ease of use make it particularly valuable for resource-limited settings, offering a scalable solution for anemia management and broader public health impact.

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