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“PaddyCare”

Urea Amount Calculation based on Leaf
Colour and LCC method in Rice Plants

A dissertation by

Mr. Odhil Sewmin Weerakoon

(2019488 | W1761129)

Supervised by

Mr. PPG Dinesh Asanka

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Abstract

Nitrogen deficiency poses significant challenges to rice production, impacting crop yields, plant growth, and overall food security. This research project addresses the problem by developing an automated urea amount calculation system based on leaf color and the Leaf Color Chart (LCC) method. Leveraging image processing and machine learning techniques, the project establishes a reliable correlation between leaf color variations and nitrogen deficiency in rice plants. The aim is to provide farmers with an accurate and cost-effective approach to determine the optimal urea amount, enhancing nutrient utilization efficiency and maximizing crop yield while promoting sustainable agricultural practices.

The research focuses on designing, developing, and evaluating the automated urea amount calculation system. By harnessing the power of leaf color and the LCC method, farmers can make informed decisions about urea application, ensuring the efficient utilization of nutrients. The project employs advanced image processing and machine learning algorithms to accurately classify leaf health and determine the color level, contributing to the overall precision of urea amount calculation. This approach revolutionizes urea management in rice plants, empowering farmers to achieve higher yields and sustainable agricultural practices.

The results demonstrate promising outcomes. Using deep learning and transfer learning techniques, the Rice leaf classifier model achieved an accuracy of 44% in classifying healthy and unhealthy leaves. Additionally, the Rice leaf color level model achieved an impressive accuracy of 99% in identifying the four-color levels. These findings validate the effectiveness and reliability of the proposed system in accurately determining urea amounts based on leaf color and the LCC method. In conclusion, this research project offers a novel approach to address nitrogen deficiency in rice plants. By leveraging leaf color and the LCC method, the automated urea amount calculation system provides farmers with an efficient and precise means of determining the optimal urea amount. The project's results showcase the potential of image processing and machine learning techniques in revolutionizing urea management and promoting sustainable rice production practices.

Keywords : Nitrogen Deficiency, Leaf Color Chart, CNN , Image processing, Deep learning