SOMAIYA VIDYAVIHAR UNIVERSITY

Mini Project Report on
Plant Phenotyping (Leaf Count) for Sorghum Plants

TY Btech IT
(Information Technology)

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Certificate

This is to certify that the mini project report entitled **Plant Phenotyping (Leaf Count) for Sorghum Plants** submitted by Vishal Patil, Taniya Paul and Darshit Shah at the end of semester VI of TY B.Tech is a bona fide record for partial fulfillment of requirements for the degree Bachelor of Technology (Information Technology) of Somaiya Vidyavihar University.

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Guide Head of the Department

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Principal

Date: 3rd May, 2024

Place: Mumbai-77

Somaiya Vidyavihar University

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DECLARATION

We declare that this written report submission represents the work done based on our and / or others' ideas with adequately cited and referenced the original source. We also declare that we have adhered to all principles of intellectual property, academic honesty and integrity as we have not misinterpreted or fabricated or falsified any idea/data/fact/source/original work/ matter in my submission.

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Date: 3rd May, 2024

Place: Mumbai-77

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Certificate of Approval of Examiners

We certify that this dissertation report entitled **Plant Phenotyping (Leaf Count) for Sorghum Plants** is a bona fide record of mini project work done by Vishal Patil, Taniya Paul and Darshit Shah during semester VI.

This mini project work is submitted at the end of semester VI in partial fulfillment of requirements for the degree of Bachelor of Technology in Information Technology of Somaiya Vidyavihar University.

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Internal Examiners

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Date: 3rd May, 2024

Place: Mumbai-77

Abstract

This paper delves into the critical role of leaf counting within plant phenotyping and its implications for agricultural productivity. Recognizing the imperative of resilient crop varieties amidst climate change, we propose an innovative approach: an automated leaf counting system driven by deep learning techniques. By harnessing convolutional neural networks (CNNs) and explainable AI, our system offers rapid and non-invasive evaluations of plant traits, thereby revolutionizing traditional phenotyping methodologies. We outline the design and implementation of our system, emphasizing key aspects such as accuracy, interpretability, scalability, and robustness.

Evaluation results underscore the efficacy of our approach, with a mean absolute error (MAE) of 0.5642, root mean squared error (RMSE) of 0.6203, and a final loss of 0.945. These metrics demonstrate the system's capability in accurately predicting leaf counts and its potential to advance plant phenotyping practices, thereby facilitating sustainable agricultural development.

Key words: Leaf counting, Plant phenotyping, Convolutional neural networks (CNNs), Explainable AI, Mean absolute error (MAE), Root mean squared error (RMSE), Sustainable agricultural development.

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