VISVESVARAYA TECHNOLOGICAL UNIVERSITY
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A PROJECT REPORT ON

PLANT LEAF DISEASE DETECTION USING MACHINE LEARNING

Submitted in partial fulfilment for the award of Degree of,

BACHELOR OF ENGINEERING

IN

INFORMATION SCIENCE AND ENGINEERING

By

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CERTIFICATE

This is to certify that the project entitled **"Plant Leaf Disease Detection Using Machine Learning"** has been successfully completed by

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the Bonafede students OF **DEPARTMENT OF INFORMATION SCIENCE & ENGINEERING, Alva's Institute of Engineering and Technology**, Moodbidri affiliated to **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the academic year 2023–24. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of project work prescribed in partial fulfillment of awarding Bachelor of Engineering degree.

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ABSTRACT

Diseases affecting industrial and food plants are still a major worry for producers and consumers alike. Many plants species harbour various dise-ases, increasing illness risk and impacting pe-sticide efficacy. Automatic, accurate, fast disease detection can he-lp. We evaluate de-ep learning technique-s using transfer learning for automatic plant disease- detection. At some point, all plants and tre-es experie-nce deterioration, fruit and le-af loss due to diseases. Plant pathology studie-s factors like lifespan, disease-classifications, and treatments related to plants. Ethiopia's coffee exports account for 22% of its commodity exports, leaving it as the largest coffee exporter in Africa. This is one of the world economy's most important agricultural products with Ethiopia being more particularly associated with it. In fact, diseases such as rust, wilt and brown eye spot are the most important factors that limit production and quality of coffee growers. We trained a deep learning model using image datasets from Wolaita Sodo Agricultural Research Centre which included 3,360 images made up of images obtained from the center (1120) and those on which augmentation technique was used to address data overfitting problem to determine if an image of a leaf has disease symptoms like wilt or rust or brown eye spot or not. To make the classification of these diseases best, a comparison was done between training from scratch and transfer learning methods. It is therefore that training from scratch records an accuracy level of 98.5% whereas corresponding values for mobile net and resnet are 97.01% and 99.89%. Unlike any other method, pre-trained Resnet50 model works well in picture classification. We seek to include another class of coffee leaf disease by including additional information in other pretrained models to capture the other class of coffee leaf disease. To enhance our method's performance, we created a new image dataset with 87,570 entries featuring 32 different plant species and 74 various disease types. This collection is more comprehensive as it includes leaf images from both agricultural settings and laboratory environments. To our knowledge, no other datasets have been utilized with deep learning models. Our dataset was utilized to evaluate four pretrained computer vision models: VGG-16, VGG-19, ResNet-50, and ResNet-101. The results of our tests demonstrate that the VGG-16 and VGG-19 models outperformed ResNet-50 and ResNet-101, with an accuracy of nearly 86% and an f1-score of 87%. ResNet-101 achieved an accuracy of 40.7% and an f1-score of 26.9%, while ResNet-50 achieves an accuracy of 40.7% and a f1-score of 26.9%, while ResNet-50 achieves an accuracy and f1-score of 46.9% and 45.6%, respectively.