

**VISVESVARAYA TECHNOLOGICAL UNIVERSITY,  
BELAGAVI**



**A PROJECT REPORT ON**  
**“DETECTION AND PREDICTION OF DISEASES IN  
HYDROPONIC FARMING FOR SUSTAINABLE  
AGRICULTURE”**

Submitted in partial fulfillment for the award of Degree of

**BACHELOR OF ENGINEERING**

**IN**

**COMPUTER SCIENCE & ENGINEERING**

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**2023-24**

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**DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING**  
**CERTIFICATE**

This is to certify that the project entitled **"DETECTION AND PREDICTION OF DISEASES IN HYDROPONIC FARMING FOR SUSTAINABLE AGRICULTURE"** has been successfully completed by

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the bonafide students of **DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING, ALVA'S INSTITUTE OF ENGINEERING AND TECHNOLOGY** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the 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 for the Bachelor of Engineering Degree.

  
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## ABSTRACT

Hydroponic farming has emerged as a promising technique for sustainable agriculture, offering efficient resource utilization and high yields. However, disease outbreaks pose significant threats to crop health and productivity in hydroponic systems. This paper proposes a comprehensive approach for the detection and prediction of diseases in hydroponic farming to ensure sustainable production practices.

Firstly, the detection phase utilizes advanced sensing technologies such as image processing, spectroscopy, and IoT sensors to monitor various parameters including plant morphology, spectral signatures, and environmental conditions. Machine learning algorithms are employed for real-time analysis of sensor data to identify early signs of disease symptoms.

Secondly, the prediction phase employs predictive analytics models to forecast disease outbreaks based on historical data, environmental factors, and crop health indicators. Time-series analysis, regression models, and deep learning techniques are utilized to generate accurate forecasts of disease occurrences, enabling proactive management strategies.

Furthermore, a decision support system is developed to integrate detection and prediction results, providing actionable insights for farmers to implement timely interventions such as targeted treatments, optimized nutrient management, and preventive measures.

The proposed approach offers a proactive and data-driven framework for disease management in hydroponic farming, facilitating sustainable agricultural practices by minimizing crop losses, reducing pesticide usage, and enhancing overall productivity. Implementation of this system holds the potential to revolutionize disease control strategies in hydroponic agriculture, promoting long-term environmental sustainability and food security.