

**AN OPTIMIZED DEEP REINFORCEMENT LEARNING FOR RICE DISEASE
PREDICTION**

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Abstract:

Agriculture experts have put a lot of effort into protecting rice plants. However, a thorough investigation of the plant disease issue has not been carried out. The accurate identification of rice infections is essential for avoiding the disease's substantial detrimental consequences on crop production. However, the current methods for diagnosing diseases in rice are neither precise nor effective, and sometimes additional equipment is needed. It is crucial to find any illness early on and before the damaged plants receive the necessary treatment in order to maintain the healthy and normal growth of the rice plants. It makes sense to have an automated system since manual illness detection requires a lot of time and work. This study describes a machine learning-based method for detecting diseases in rice leaves. This research identifies leaf smut, bacterial leaf blight, and brown spot illnesses as three of the most prevalent diseases affecting rice plants. The input consisted of clear pictures of damaged rice leaves on a white backdrop. For that, we proposed an Optimized Deep Reinforcement Learning (Optimized DRL) approach. Following the appropriate pre-processing, feature learning is performed by African Buffalo Optimization (ABO) algorithm. With the optimal features, Deep SARSA algorithm is employed for the classification purpose. After 10-fold cross-validation, the decision tree method produced results on the test dataset with an accuracy of above 97%.

1. Introduction

For any nation, the agricultural output production is quite essential [1]. According to the Food and Agriculture Organisation of the United Nations (FAO), in order to feed 9 billion people by 2050, agricultural production would be 70% more in demand [2]. More over 50% of people