

# Predicting Plant Stress Responses Using Deep Neural Network

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**Abstract:** Plants exhibit diverse responses under environmental stresses through regulating the expression of related genes. The ability to predict the genic responses to abiotic stresses using genomic sequence data will yield a deeper understanding on how plants will respond to environmental challenges and hence facilitate crop breeding for extreme environments which is increasingly common due to climate change. Deep learning-based prediction model has been successfully applied to numerous real-world applications including bioinformatics due to its ability to extract high-level features from massive data. However, building a successful and efficient deep neural network model requires access to a massive amount of data, which is rare in most of the plant species. We developed an effective deep transfer learning framework to predict genic response to abiotic stress, leveraging data from different species and different stresses. We applied this model in arabidopsis dataset and outperformed other existing models in term of prediction accuracy.