Info Challenge 2024

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Abstract:

This study focuses on the construction of a Species Distribution Model (SDM) for the frog species Litoria Fallax, native to Australia. The model is developed using the TerraClimate dataset, a comprehensive source of climatic variables at a coarse spatial and temporal resolution. The target variable for the model, the occurrence of Litoria Fallax, is derived from specific frog occurrence datasets. The predictor variables are sourced from the TerraClimate dataset, accessible via the Microsoft Planetary Computer portal. The provided benchmark model, which considers only four predictor variables under certain assumptions, achieves a preliminary F1-score of 0.61. Our objective is to enhance the model's accuracy by incorporating additional TerraClimate variables such as Evapotranspiration, Solar radiation, etc., and addressing the issue of class imbalance inherent in the data. We also plan to apply feature engineering techniques to predict the classes correctly. The research addresses a significant challenge in ecological modeling: accurately representing the localized distributions of frog species. Existing SDMs often fall short in this regard, particularly for species like Litoria Fallax with highly localized habitats. The results of this study will not only improve our understanding of the distribution of Litoria Fallax but also contribute to the development of more effective conservation strategies. This research forms part of a broader effort to leverage data science techniques for biodiversity monitoring and ecosystem health assessment. By improving the accuracy and reliability of SDMs, we can better understand and protect our planet's diverse ecosystems.