Toward Automated Biodiversity Research on the Tropical Ecosystem Using Artificial Intelligence

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Abstract

Biodiversity plays an important role in the tropical ecosystem. Many forests have been planted as they promise. These conversions have a bad impact on the overall ecosystem as many of the biodiversities on the original forest have gone during the process. How much species still exists on the plantation or certain fields? This is a major issue in the order to determine the biodiversity of the plantation or field. The biodiversity can be measured using different methods, such as counting the number of individuals - or even families - in a given area. Due to the size of the field, an automated process could be a great help to produce those metrics. This paper presents algorithms for species classification using machine learning. The algorithms show a positive result, where the precision of 61 %, could be improved after the system was trained using a sparse dataset. In the preliminary stage, the systems were trained using few species only using convolutional neural networks to check the feasibility and challenges. Furthermore, more species may be included in the training sets and the algorithm may be used to detect the species in real time. For the purpose of getting the biodiversity index, having an algorithm which could be the number of different species on the data sets would be enough. The system does not need to tell what the name of the particular species in detail. The final result is not only available for the tropical ecosystem but also any ecosystem where the biodiversity index of the plants needs to be evaluated.

Keywords: Artificial intelligence, biodiversity, tropical ecosystem

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