Literature Survey

Date	16 October 2022
Team ID	PNT2022TMID36210
Project Name	Digital Naturalist-AI Enabled tool for Biodiversity Researchers

Abstract :

The increasing availability of digital images, coupled with sophisticated artificial intelligence (AI) techniques for image classification, presents an exciting opportunity for biodiversity researchers to create new datasets of species observations. We investigated whether an AI plant species classifier could extract previously unexploited biodiversity data from social media photos (Flickr). We found over 60,000 geolocated images tagged with the keyword ''flower'' across an urban and rural location in the UK and classified these using AI, reviewing these identifications and assessing the representativeness of images. Images were predominantly biodiversity focused, showing single species. Non-native garden plants dominated, particularly in the urban setting. The AI classifier performed best when photos were focused on single native species in wild situations but also performed well at higher taxonomic levels (genus and family), even when images substantially deviated from this. We present a checklist of questions that should be considered when undertaking a similar analysis.

S.No	Title	Author	Technique Used	Advantage
1.	AI Naturalists Might Hold the Key to Unlocking Biodiversity Data in Social Media Imagery	Tom A.August,Oliver L.Pescott	Deep Learning And Convolutional Neural Networks (Cnns)	❖ Images Are Spatially Clustered ❖ The Urban Area Has a Lower Proportion of Well-Classified Images ❖ The Rural Area Has a Higher Proportion of

				Images of Naturally Occurring, Native Plants
2.	Avoid Oversimplificationsin Machine Learning: Goingbeyond the Class-Prediction Accuracy	Sung Yang Ho, Limsoon Wong,Wilson Wen Bin Goh	Data science, Class-prediction accuracy	Class-prediction accuracy provides a quick but superficial way of determining classifier performance.
3.	Rethinking the Inception Architecture for Computer Vision	Christian Szegedy, Vincent Vanhoucke, Sergey Ioffe	VGGNet, GoogLeNet.	❖ Spatial Factorization into Asymmetric Convolutions ❖ Factorization into smaller convolutions ❖ Utility of Auxiliary Classifiers ❖ Efficient Grid Size Reduction ❖ Model Regularization via Label Smoothing
4.	Machine learning to classify animal species in camera trap images: Applications in ecology	Michael A. Tabak ,Mohammad S. Norouzzadeh,David W. Wolfson	Artificial intelligence, deep neural networks	❖ Deep learning models that automatically classify wildlife ❖ Thismodel achieved the highest

				accuracy (97.6%)to date in using machinelearning to classify wildlife in camera trapimages ❖ The model can also be valuable for researchers studyingother species by removing images without any animals from thedataset before beginning anual classification
5.	Machine learning for image based species identification	Jana Wäldchen, Patrick Mäder	Automated species identification, Computer vision, Convolutional neural network,	❖ It is fast development and ubiquity of relevant information. ❖ Species identification tasks are manifold and were comprehensive. ❖ It is widely adopted

				approach for object detection.

Reference :

Aldhebiani AY (2018) Species concept and speciation. Saudi J Biol Sci 25:437–440. https://doi.org/10.1016/j.sjbs.2017.04.013

Alexander Y, Mar O (2017) Enseñanza y Aprendizaje de las Ciencias the teaching of biodiversity: trends and challenges in pedagogical experiences. Revista Góndola 12:173–185. https://doi.org/10.14483/23464712.11599

Balmford A (2002) Why conservationists should heed Pokemon. Science 295:22367. https://doi.org/10.1126/science.295.5564.2367b

Bebbington A (2005) The ability of A-level students to name plants. J Biol Educ 39:63–67. https://doi.org/10.1080/00219266.2005.9655963

Bodhwani V, Acharjya DP, Bodhwani U (2019) Deep residual networks for plant identification. Proc Comput Sci 152:186–194. https://doi.org/10.1016/j.procs.2019.05.042