DigitalNaturalist-AIEnabledtoolforBiodiversityResearchers

**TEAMMEMBERS:**

**Teamleader:**

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# PREREQUISITE:

AnacondaNavigator

Anaconda Navigator is a free and open-source distribution ofthe Python and R programming languages for data science andmachine learning related applications. It can be installed onWindows, Linux, and macOS. Conda is an open-source, cross-platform,package management system. Anaconda comes withso very nice tools like JupyterLab, Jupyter Notebook,QtConsole, Spyder, Glueviz, Orange, Rstudio, Visual StudioCode. For this project, we will be using Jupiter notebook andspyder….

To build Deep learning models you must require the followingpackages

Tensorflow:

TensorFlow is an end-to-end open-source platform formachinelearning. Ithasacomprehensive,flexibleecosystemoftools, libraries, and community resources that lets researcherspush the state-of-the-art in ML and developers can easily buildanddeployML-poweredapplications.

Keras:

Keras leverages various optimization techniques to make high-levelneuralnetworkAPIeasierandmoreperformant.Itsupportsthefollowingfeatures:

Consistent,simple,andextensibleAPI.

Minimalstructure– easy toachievetheresultwithoutanyfrills.Itsupports multipleplatformsandbackends.

Itisauser-friendly frameworkthatrunsonbothCPUandGPU.Highlyscalabilityofcomputation.

Flask:

Web frameworkused forbuildingWeb applications

# GITHUBACCOUNT:

I have created my github account with the email id[950619104029@einsteincollege.ac.in](mailto:950619104029@einsteincollege.ac.in) in the https://github.comwebsite.GithubteamIDis**IBM-Project-45818-166073564**

# Abstract:

Digital Naturalist - AI Enabled Tool For BiodiversityResearchers

A naturalist is someone who studies the patterns of nature,identifies a different kind of flora and fauna in nature. Beingable to identify the flora and fauna around us often leads to aninterest in protecting wild spaces, and collecting and sharinginformationaboutthe

species we see on our travels is very useful for conservationgroups like NCC. When venturing into the woods, fieldnaturalists usually rely on common approaches like alwayscarrying a guidebook around everywhere or seeking help fromexperienced

ornithologists. There should be a handy tool for them to capture,identifyandsharethebeautytotheoutsideworld.

Field naturalists can only use this web app from anywhere toidentifythebirds, flowers,mammalsandotherspeciestheyseeon their hikes, canoe trips and other excursions.In this project,we are creating a web application which uses a deep learningmodel,

trainedondifferentspecies ofbirds, flowersandmammals(2subclasses in each for a quick understanding)and get thepredictionofthebirdwhenanimageis beengiven.

# LITERATURESURVEY

* **REVIEW-1:**
* TitleofthePaper:

DigitalNaturalistUsingDeepLearning

* Nameof theAuthor:

Aparna, SaloniM, ChandanaM , NehaU, BanushreeDJ ,Prof.NareshPatelK M

Department of Computer Science and Engineering, BIETDavanagere

* ProblemDescription:

A naturalist is someone who studies the patterns of natureidentify different kingdom of flora and fauna in the nature.Being able to identify the flora and fauna around us often leadsto an interest in protecting wild species, collecting and sharinginformation about the species we see on our travels is veryuseful for conserving groups like NCC. Deep-learning basedtechniques and methods are becoming popular in digitalnaturalist studies, as their performance is superior in imageanalysis

fields, such as object detection, image classification, andsemanticsegmentation.Deep-learningtechniqueshaveachievedstate

of-the -art performance for automatic segmentation of digitalnaturalist through multi-model image sensing. Our task asnaturalist has grown widely in the field of natural-historians. Ithas increased from identification to saviours as well. Not onlyidentifying flora and fauna but also to know about their habits,habitats, living and grouping lead to fetching services forprotectionas well.

# REVIEW-2:

* TitleofthePaper:

AI Naturalists Might Hold the Key to Unlocking BiodiversityDatainSocialMediaImagery

* Nameof theAuthor:

Tom A. August, Oliver L. Pescott,AlexisJoly,PierreBonnet

* ProblemDescription:

The increasing availability of digital images, coupled withsophisticated artificial intelligence (AI) techniques for imageclassification, presents an exciting opportunity for biodiversityresearchers to create new datasets of species observations. Weinvestigated whether an AI plant species classifier could extractpreviously unexploited biodiversity data from social mediaphotos(Flickr).Wefoundover60,000geolocatedimagestagged with the keyword ‘‘flower’’ across an urban and rurallocationin theUKandclassifiedtheseusing AI,reviewingtheseidentificationsandassessingtherepresentationofimages.

Images were predominantly biodiversity focused, showingsinglespecies. Non-nativegardenplantsdominated,particularlyin the urban setting. The AI classifier performed best whenphotos were focused on single native species in wild situationsbut also performed well at higher taxonomic levels (genus andfamily), even when images substantially deviated from this. Wepresent a checklist of questions that should be considered whenundertakingasimilaranalysis

# REVIEW-3:

* TitleofthePaper:

Digital Naturalist Design Guidelines: Theory, Investigation,Development, and Evaluation of a Computational MediaFramework toSupportEthologicalExploration

* Nameof theAuthor:

AndrewQuitmeyer

National University of SingaporeSingapore

[andy@quitmeyer.org](mailto:andy@quitmeyer.org)

* ProblemDescription:

This research aims to develop and evaluate a design frameworkforcreatingdigitaldevicesthatsupporttheexplorationofanimal behaviors in the wild. This paper quickly shares the mainconcepts and theories from the fields forming DigitalNaturalism’s foundation while presenting the key challengesemerging from these critical intersections between field biologyand computational media. It then reviews the development ofthis research’s hybrid methodology designed specifically for itsmulti-year series of “Qualitative Action Research” fieldworkcarried out at a rainforest field station. This paper analyzes theresulting on-site ethnographies, workshops, design projects, andinteractive performances, whose take-aways are synthesized intodesign guidelines for digital-natural media. This framework,itself,isthenevaluatedviaanextra iterationoffieldworkandtheresults discussed. Finally,thepaperidentifies targetsfor

continued research development. Further areas of interest arepresented which will promote Digital Naturalism’s progressionintoitsowntopicofstudy

# REVIEW-4:

* TitleofthePaper:

From Digital Nature Hybrids to Digital Naturalists: RevivingNature Connections Through Arts, Technology and OutdoorActivities

* Nameof theAuthor:

L.Edwards, A.Darby,andC.Dean

* ProblemDescription:

Thisworkconsidershowtheartsandtechnologyincombination can stimulate connections in heritage gardens, andalso nurture care for non-human nature.The chapter divides intotwo overlapping parts. The first part describes and critiques thedesign of Digital Nature Hybrid artifacts for interpreting gardensand exploring nature. The second part builds on the first byshowing how the challenges presented by the Digital NatureHybridsstimulated thedesignofDigitalNaturalistworkshops.Itshows the value of combining arts, digital technologies andoutdoor activities to support active engagements with non-humannatureandtoinspirethedevelopmentofknowledgeand

skills needed to attend to natural environments. Researchthrough design underpins the way of working and the projectuses a critical approach toward technology, to guide the designdecisions. One of the insights is the value that adopting thiscriticalapproachhasinshaping bothprocesses anddesigns.

# REVIEW-5:

* TitleofthePaper:

Digital Naturalism: Interspecies Performative Tool Making forEmbodiedScience

* Nameof theAuthor:

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Digital Media PhD StudentGeorgia Institute of Technology85FifthStreet

Atlanta,GA30308USA[andy@quitmeyer.org](mailto:andy@quitmeyer.org)

* ProblemDescription:

Digital Naturalism investigates the role that digital media canplay in field Ethology. While digital technology plays anincreasingly larger role in the Ethologist’s process, its use tendstobelimitedto theexperimentationand analysisstages.My

goal is to work with scientists to develop context-dependent,behavioral tools promoting novel interactions between animal,man, and environment. The aim is to empower the earlyexploratory phases of their research as well as the laterrepresentation of their work. I will test a methodologycombining analytical tool making and interaction studies withmodernethology.