DIGITALLY NATURALIST -AI ENABLED TOOL FOR BIODIVERSITY RESEARCHERS.

ABSTRACT:

˝ **the major problems in the world are the result of the difference between how nature works and the way people think".**

We don't want to protect the environment .We want to create a world where the envirnoment does not need protecting.

The ultimate aim of the project is to create an application for the hikers to identify the rare species of birds,flowers,mammals by giving them a picture taken by them.

Development from our side: to create an mobile application focusing not only on the hikers but the general people population to identify the rare species of birds,flowers,mammals along with the objective to know the significance of the that species and updating their status as whether they are in line of endangered species or not and the origin of species

Reason for development: As many species were getting destroyed as many people lack the knowledge of flora and fauna of their own region, thinking many rare and medicinal plants as weeds.

SOURCE OF ENLIGHTMENT:

GOOGLE LENS: intial release was on october 4,2017.

Developer: Google's I/O developer conference, CEO sundar pichai.

It uses aritificial intelligence to identify text and objects both within images and a live view from your phone's camera.

REFERENCE; Patenlyapple.com: google lens patent published by the U.S patent office titled " smart camera user interface".

Example taken is a user could see when they take a photo of a poster announcing a coming concert.
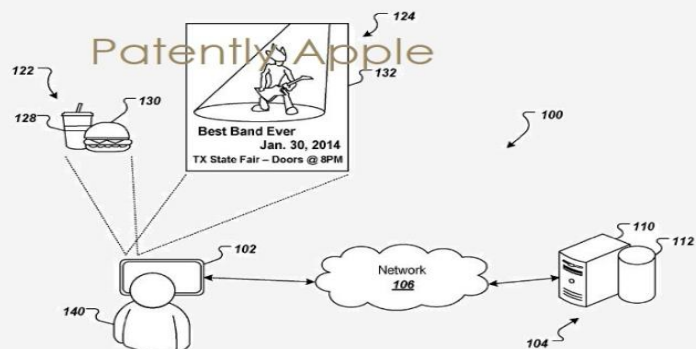
FIG. 1

Best Band Ever
Jan. 30, 2014
TX State Fair – Doors @ 8PM

Network
106

FIG. 2A

Best Band Ever
Jan. 30, 2014
TX State Fair – Doors @ 8PM

FIG. 2B

Best Band Ever
Jan. 30, 2014
TX State Fair – Doors @ 8PM

FIG. 2C

Buy Tickets

Download Album

Add to Calendar

Receive image data

Identify entit(y/ies)

Receive annotation(s)

Determine action(s)

Action?

Y

N
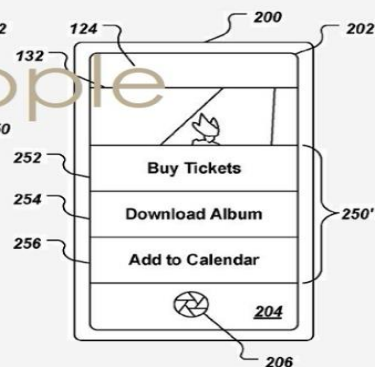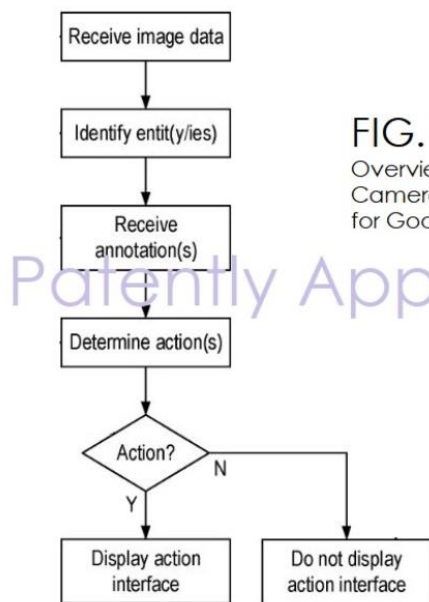
Display action interface

Do not display action interface

FIG. 3
Overview of
Camera Process
for Google Lens

GOOGLE LENS PATENT NUMBER: US20170155850…..

[0013]- US2017/0155850

APPLE INATURALIST:

REFERENCE: apps.apple.com

Inaturalist is a <u>social media network</u> for sharing biodiversity information to help each other learn about nature.

The primary goal is to connect people to nature and the secondary goal is to generate scientificaly valuable biodiversity data from these personal encounters.

Inaturalist helps you identify the plants and animals with visually similar suggestions and verification by dedicated contributors.

Difference between seek by inaturalist and inaturalist:{ web source}

In seek by inaturalist- no personally identifiable information is collected from users who do not log in with their inaturalist information.

Inaturalist: photo,location and time are recorded with each of your observation in the inaturalist database.

Screenshots of inaturalist taken from apple store
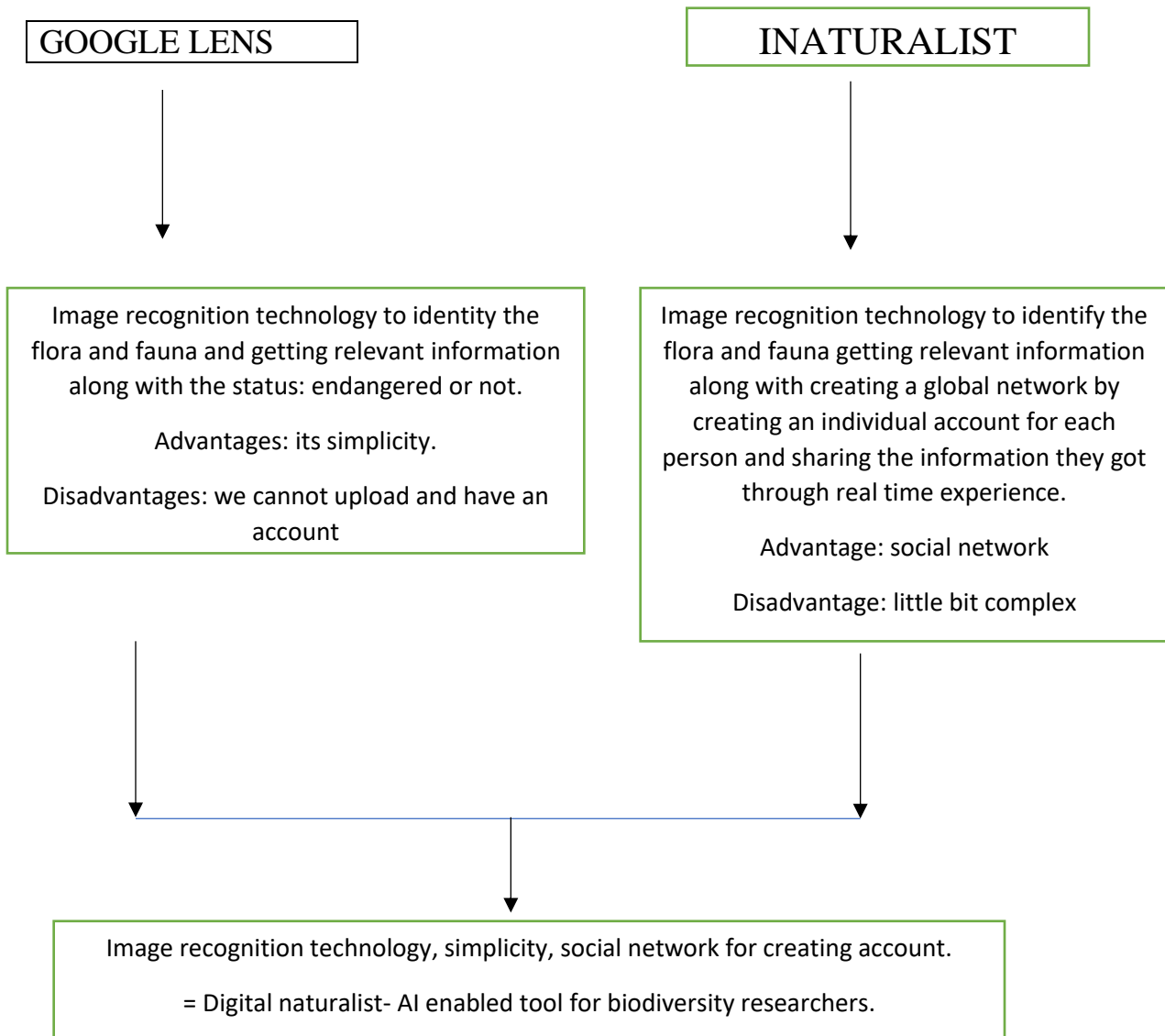
OUTCOME FROM THE RESEARCH:

Both google lens and inaturalist uses the image technology namely " **Image recognition technology as a base**".

Google is not only used for identification of flora and fauna, it is a general search engine which brings relevant information related to objects it identifies using visual analysis based on neural network.

First it was announced as a standalone app, later being integrated into android's standard camera app.

Whereas inaturalist is made specifically for the identification of flora and fauna and moreover it is a social media network where people can share the their information about flora and fauna with others forming a global network.

Then both uses multilanguages making these ideal apps.

GOOGLE LENS	INATURALIST

Image recognition technology to identity the flora and fauna and getting relevant information along with the status: endangered or not.

Advantages: its simplicity.

Disadvantages: we cannot upload and have an account

Image recognition technology to identify the flora and fauna getting relevant information along with creating a global network by creating an individual account for each person and sharing the information they got through real time experience.

Advantage: social network

Disadvantage: little bit complex

Image recognition technology, simplicity, social network for creating account.

= Digital naturalist- AI enabled tool for biodiversity researchers.

BASIC KNOWLEDGE:

<u>Artificial intelligence</u>: the father of artificial intelligence is john McCarthy the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages.

Additional information: Meet 'Phraser': A New Artificial Intelligence (AI) Tool That Uses Machine Learning to Help Users Write Prompts for Neural Networks.

References:
- https://80.lv/articles/phraser-a-new-ai-tool-that-helps-users-write-better-prompts-for-neural-networks/

- https://phraser.tech/, udmey notes.

NEURAL NETWORK:

Neural networks, also known as artificial neural networks (ANNs) or simulated neural networks (SNNs), are a subset of <u>machine learning</u> and are at the heart of <u>deep learning</u> algorithms. Their name and structure are inspired by the human brain, mimicking the way that biological neurons signal to one another.

References: IBM.com

<u>PYTHON</u>:

A NumPy array is **a grid of values, all of the same type, and is indexed by a tuple of nonnegative integers**. The number of dimensions is the rank of the array; the shape of an array is a tuple of integers giving the size of the array along each dimension.

Outline for the project and resources required for project

Project flow

- Create dataset.
- Augment the dataset
- Pre-process images and data of images into numpy arrays.
- Train test split on dataset
- Define model creation function: adding neural network
- Fit model on train data and check for accuracies
- Save the model and its dependencies
- Create a web application using flask.

REVELANT SOURCES AND PROGRAMMING BASE (learning stuffs)

- Programming language used: python.
  Source: learn as one of our programming subjects and done separate course by few team members, IBM classes
- Creation of dataset: it is done with the help of the websites suggested from the company's side.
  Source: Kaggle.com
- The basic knowledge required for proceeding the project are given in **learning resources namely: artificial intelligence, Watson assistant, neural network, understanding of NLP, cloudant DB**
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Find & Evaluate & Manage the Information (testing and evaluation)

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- Real time testing:

  NLP (natural language processing) with Python coding: **jupyter notebook, visual studio code**.

- Artificial intelligence and neural network: **anaconda**

- Cloudant: **IBM cloud**

- Project evaluation and submission: **GitHub**

Overall REVIEW and REFERENCES:

Other references: udemy course for artificial intelligence
                Book named: national geographic the photo ark: one man's quest to document the World's animal by Joel sartore, the magnificient book of extinct animals.