Assessing Bee Health by Subspecies

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Flatiron Immersive Data Science: Module 4

Data Set: Kaggle

Slide Formatting:
Farmers Market Coalition

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01

Overview

Investigating subspecies of **Honey Bees** by health, region, and pollen presence

Column Descriptions	
File	File name in bee_imgs folder
Date	Date of video capture
Time	Time of day of video capture (military time)
Location	Location (city, state, country)

	file	date	time	zip code	subspecies	health	pollen_carrying	caste	City	State	Country	is_healthy
2916	010_542.png	8/19/18	12:46	50315	Carniolan honey bee	healthy	False	worker	Des Moines	IA	USA	1
2038	016_270.png	8/20/18	11:55	95124	-1	healthy	False	worker	San Jose	CA	USA	1
3830	032_129.png	8/21/18	9:00	50315	Russian honey bee	healthy	False	worker	Des Moines	IA	USA	1
885	030_374.png	8/17/18	17:50	77511	Italian honey bee	ant problems	False	worker	Alvin	TX	USA	0
4353	038_110.png	8/18/18	12:30	30607	1 Mixed local stock 2	Varroa, Small Hive Beetles	False	worker	Athens	GA	USA	0

Zip Code	Zip Code to numerically describe loaction
Subspecies	Subspecies of Apis mellifera species
Health	Health description of bee
Pollen_Carrying	Presence of pollen on the bee's legs
Caste	Worker, Drone, or Queen bee

Count: 973

Polk County; IA

Cheshire County; NH

Count: 92

Santa Clara County; CA

Count: 2,149

Count: 1,051

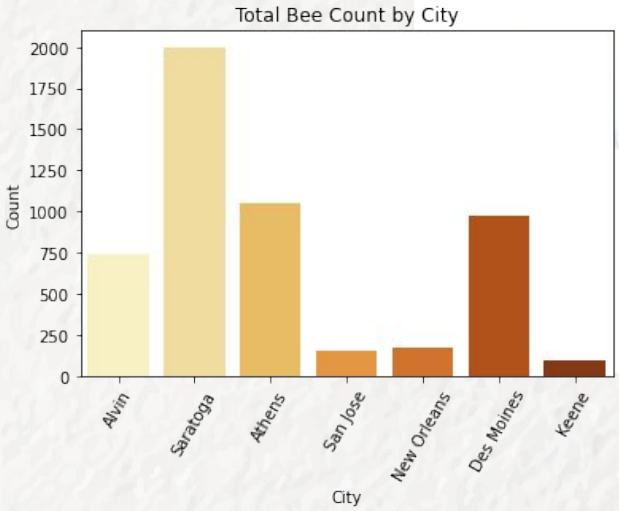
Clarke County; GA

Count: 170

Orleans Parish; LA

Brazoria County; TX

Count: 737



02

Topic Analysis

Investigating subspecies of **Honey Bees** by health, region, and pollen presence

HONEY BEE HEALTH BY NUMBERS

- **33** percent of our global food production relies on pollinators.
- **90** U.S. crops pollinated by commercial honey bees each year.
- **100+** Almond Board-funded honey bee health research projects to date.
- **1995:** The year we created the Honey Bee Health Taskforce to specifically fund research to improve bee health.

Source: Food and Agriculture Organization of the United Nations, 2017.

Image

03

Data Analysis

Investigating subspecies of **Honey Bees** by health, region, and pollen presence

Data: Farmers Market

Engineered

City, State columns

Dropped

Location

Engineered

Counties based off zip codes for mapping

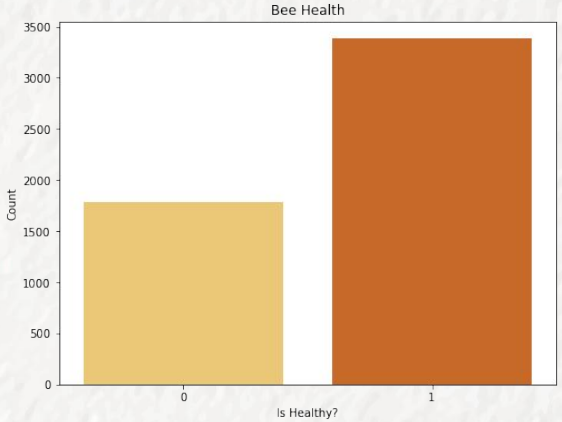
Connected

File column values to respective images

Engineered

Binary encoding on bee health y/n

Bees Carrying Pollen



Bees Carrying Pollen

0.35%

18 Bees

Saratoga: 6
San Jose: 11

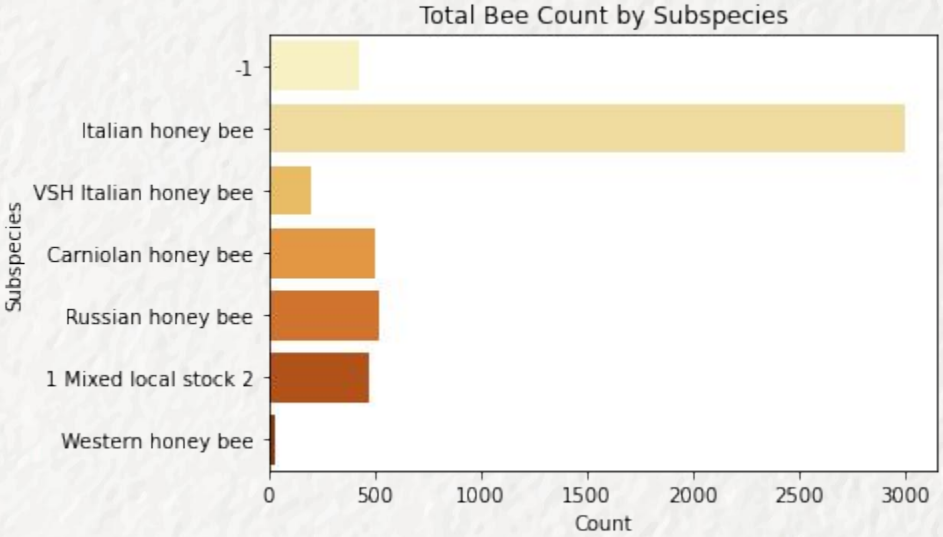
Subspecies

Italian Honey Bee: 6
Undetermined Species: 12

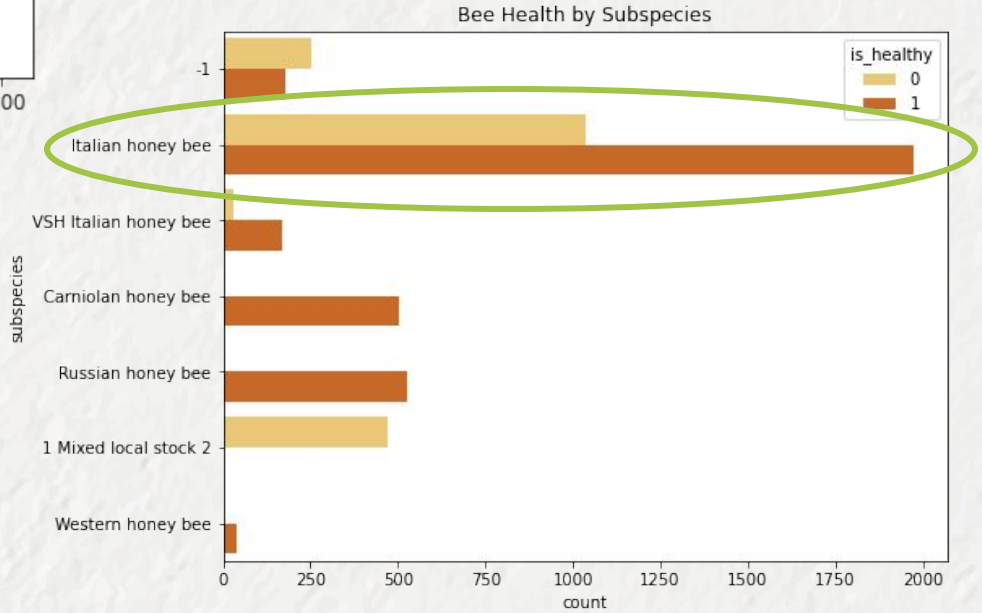
Facts

With the exception of 1 unhealthy bee in Georgia; all pollen carrying bees were recorded in California.

More than 5,000 bees were recorded as non-pollen carrying



The Italian Honey Bee has the highest number of instances in the dataset: **3008**

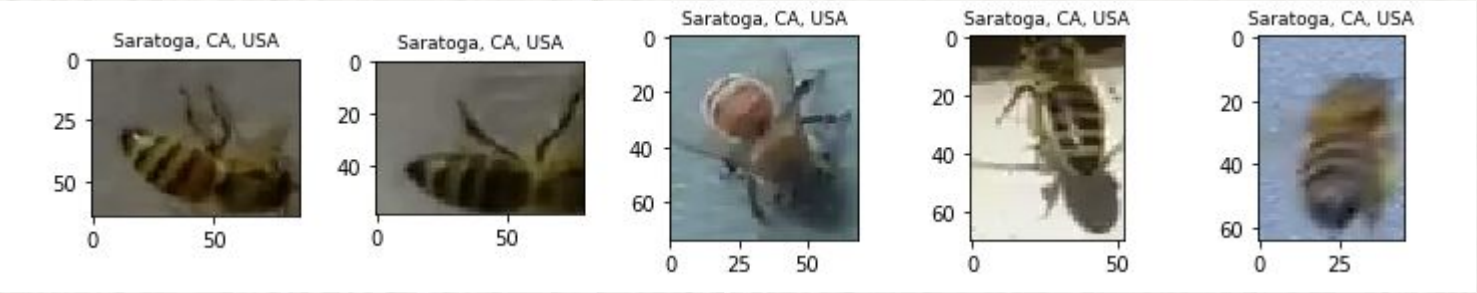


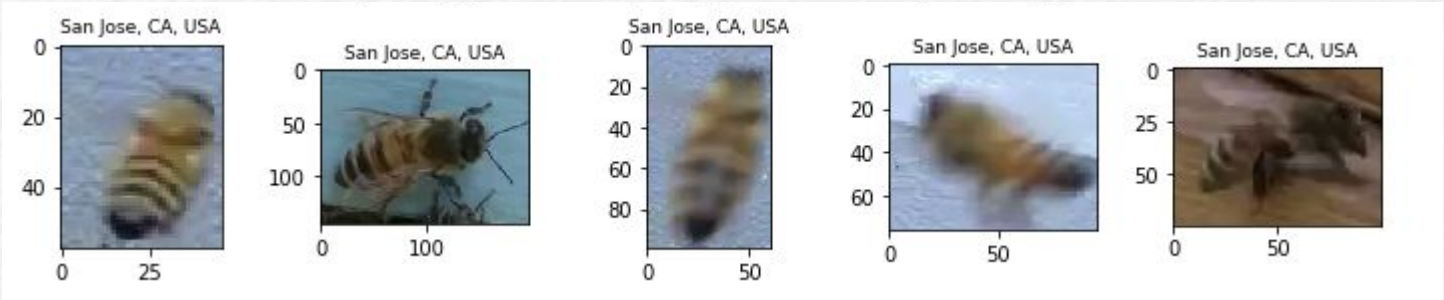
The Italian Honey Bee is split roughly **⅓** unhealthy and **⅔** healthy

EDA

Investigating Italian Honey Bees & California

California Bees:





04

Prediction Modelling

Predicting Bee Subspecies from Images

Accuracy & Precision

Accuracy

89.57%

Precision

Macro Avg: 0.89

Recall

Macro Avg: 0.88

Loss

26.55%

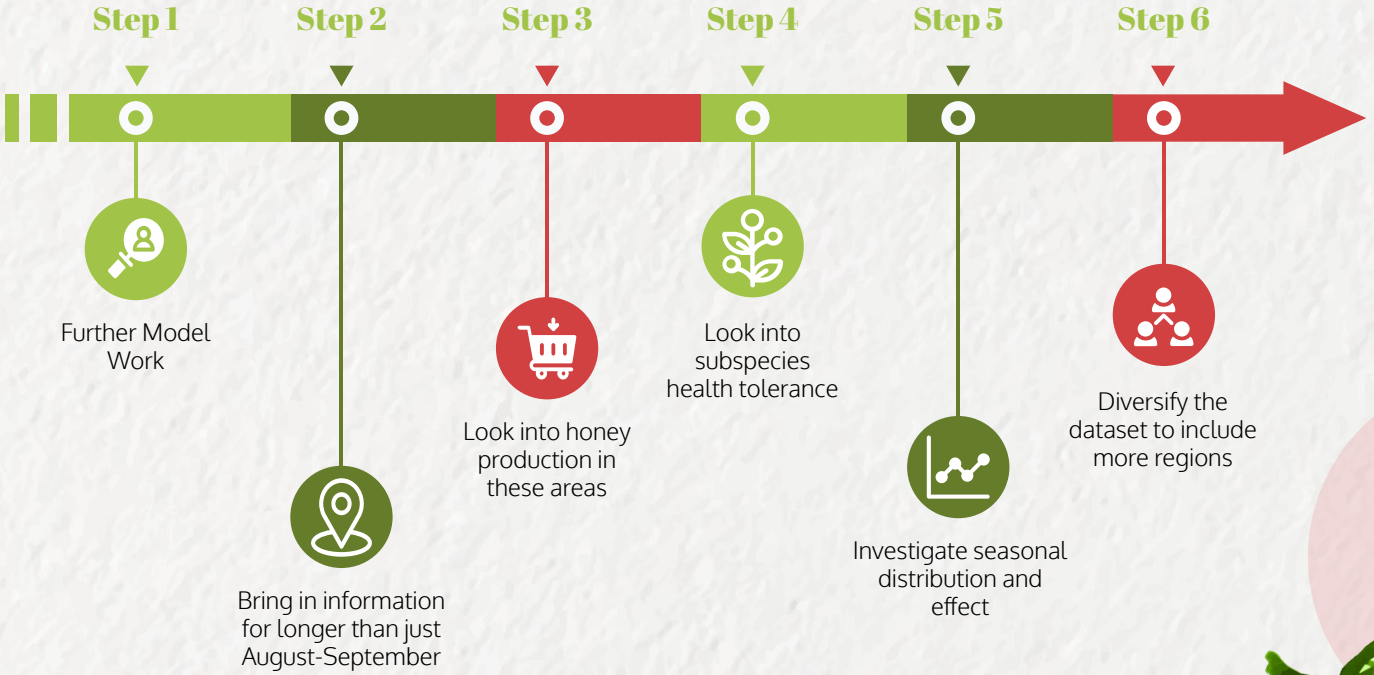
Goals

Find more parameters for training in an effort to increase accuracy and precision

Find more instances of other bee subspecies

Find more data from different times & regions

05 Future Work



06

Conclusion & Wrap Up

Investigating subspecies of **Honey Bees** by health, region, and pollen presence

Thank You!!!