Mushroom classification app using Transfer learning.

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OCCURRENCE METRICS

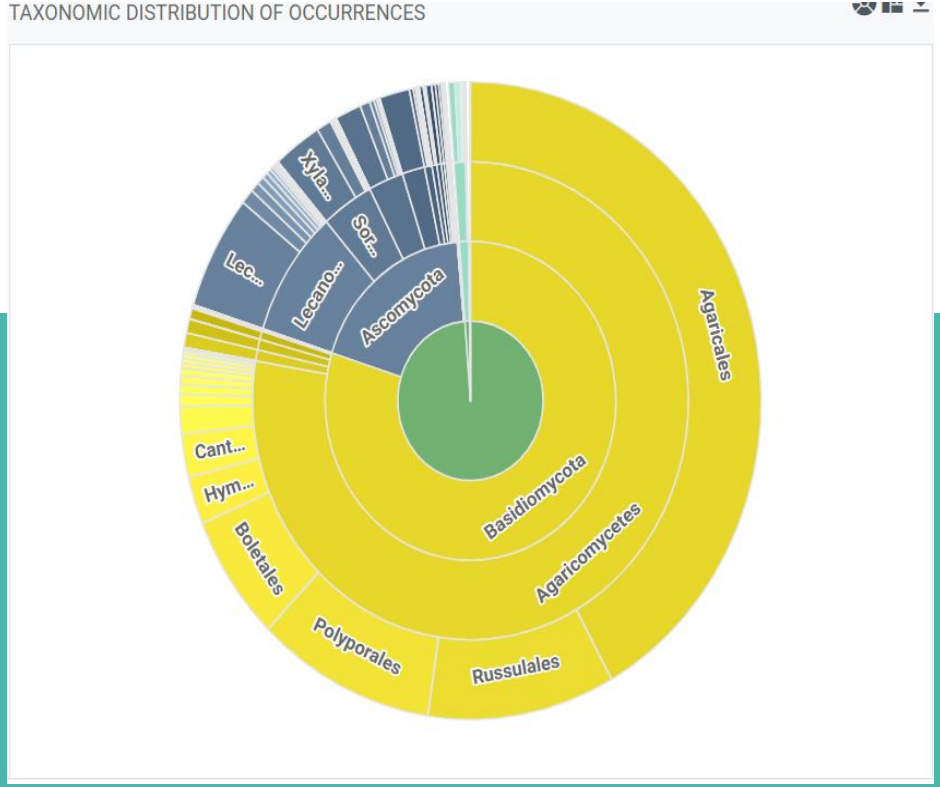
1,041,603
Occurrences

99.8%
With taxon match

99.9%
With coordinates

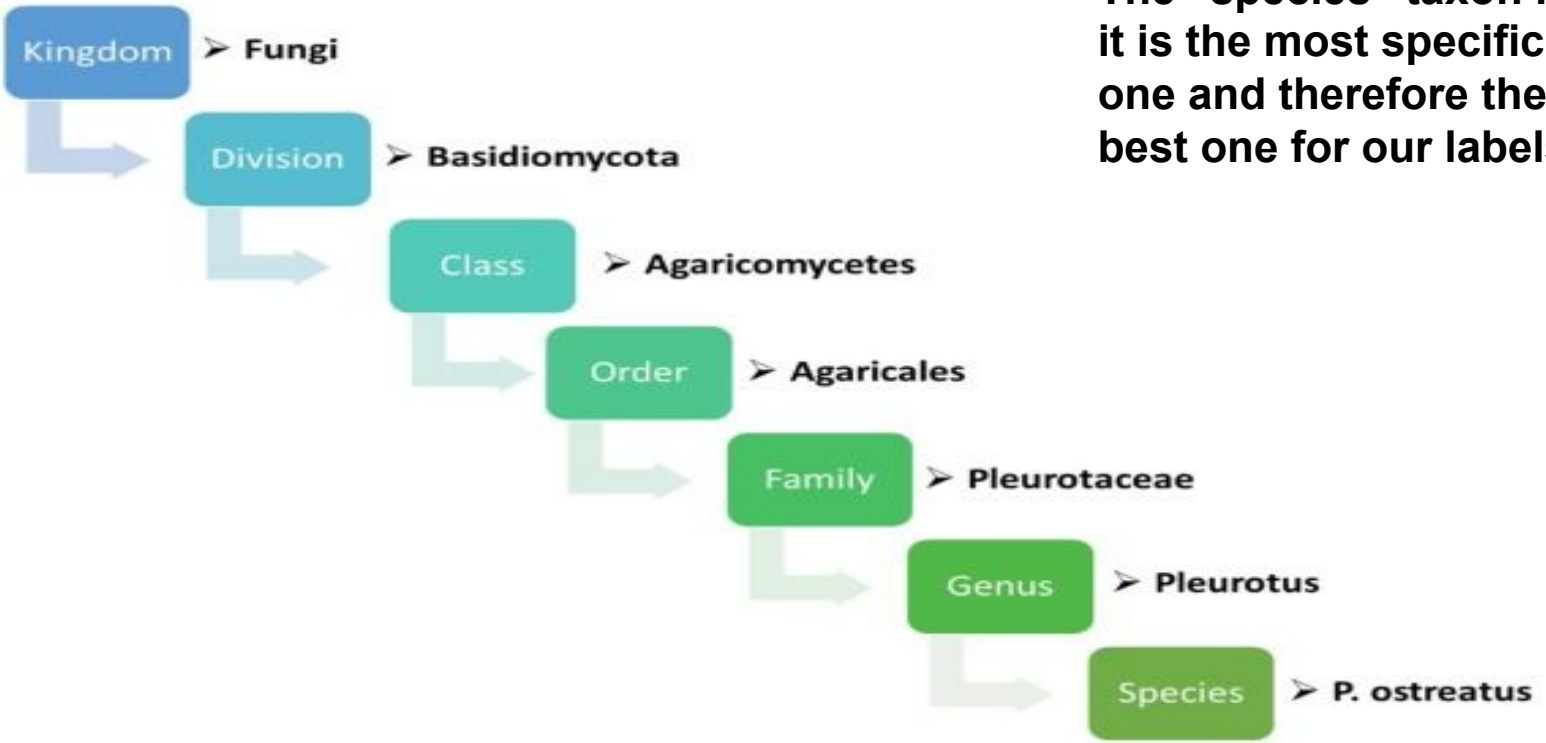
97%
With year

DATA EXPLORATION



- 1041603 occurrences with metada
- 645400 pictures
- 343541 occurences with images, an occurence can have more than one picture
- 5988 identified species with img data

About mushroom's taxonomy

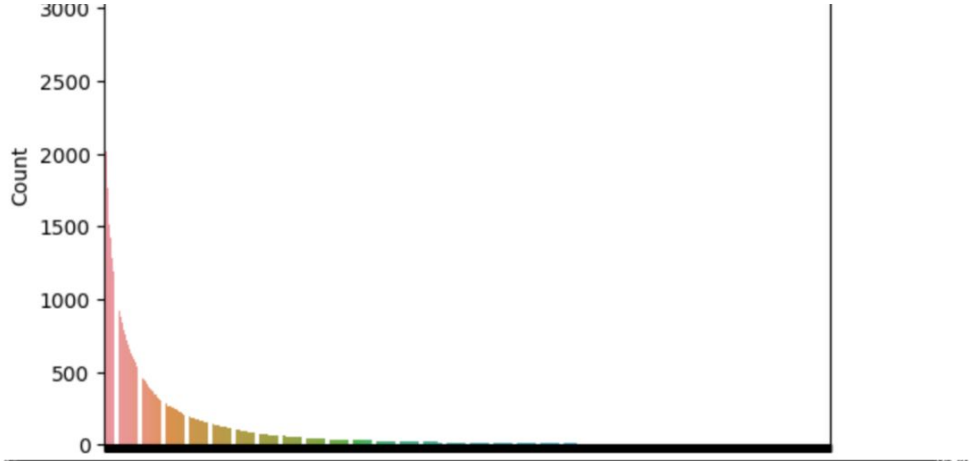


The "species "taxon is it is the most specific one and therefore the best one for our labels

Number of available pictures per species:

```
df_joined.groupby(['species'])['identifier'].count().compute().sort_values(ascending=False).head(20)
```

```
species
Amanita rubescens             3543
Trametes versicolor           3393
Fomitopsis pinicola           3179
Hypholoma fasciculare         2828
Stereum hirsutum              2333
Auricularia auricula-judae    2311
Fomes fomentarius             2308
Bjerkandera adusta            2243
Pluteus cervinus              2238
Hygrocybe conica              2231
Clitocybe nebularis           2141
Pleurotus ostreatus           2083
Boletus erythropus            2075
Boletus edulis                2012
Ganoderma applanatum          1993
Tremella mesenterica          1976
Imleria badia                 1896
Mycena galericulata           1893
Amanita muscaria              1887
Coprinellus micaceus          1885
```



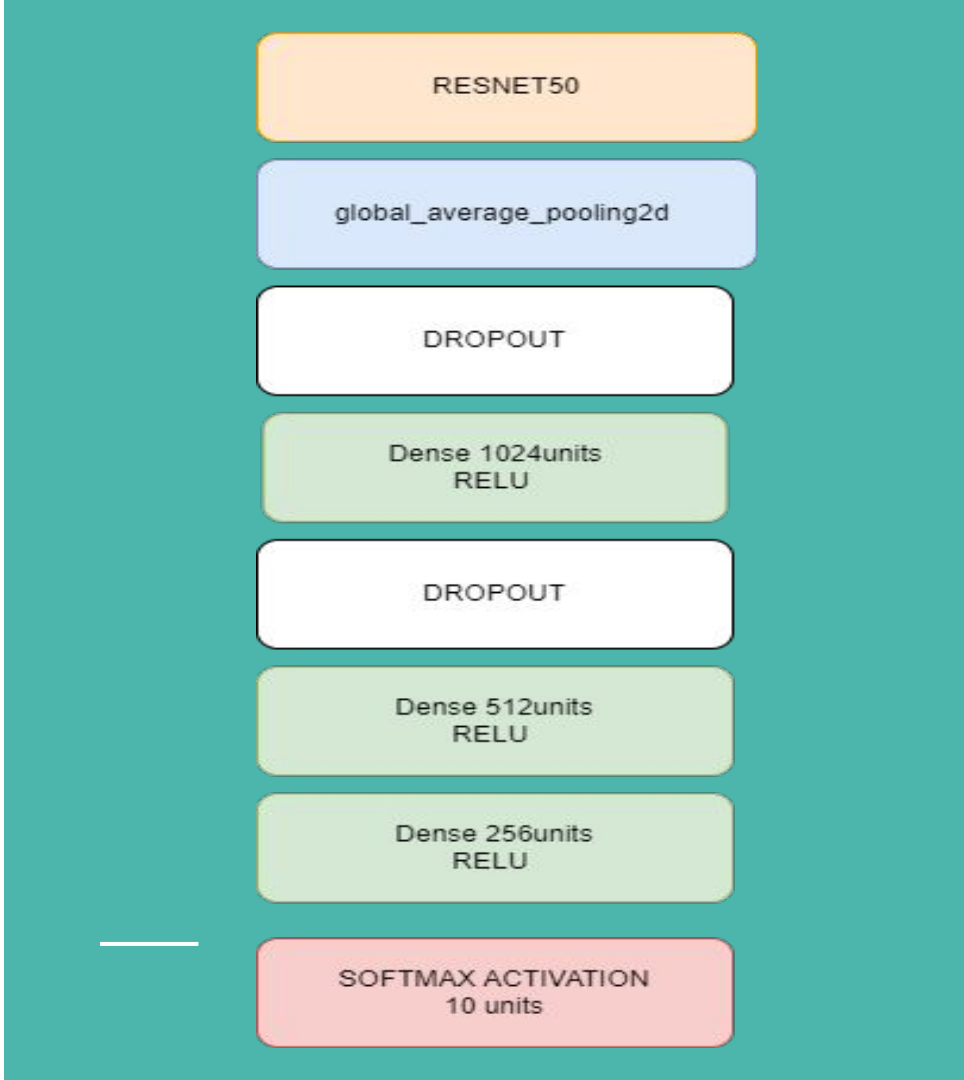
Training data

Due to lack of computational power, I decided to limit myself to 10 species containing each ~1,000 images.

Species:

1. Apioperdon pyriforme
2. Auricularia auricula-judae
3. Dacrymyces stillatus
4. Daedalea quercina
5. Fuscoporia ferrea
6. Psathyrella candolleana
7. Stereum hirsutum
8. Tremella mesenterica
9. Tubaria furfuracea
10. Xylaria hypoxylon

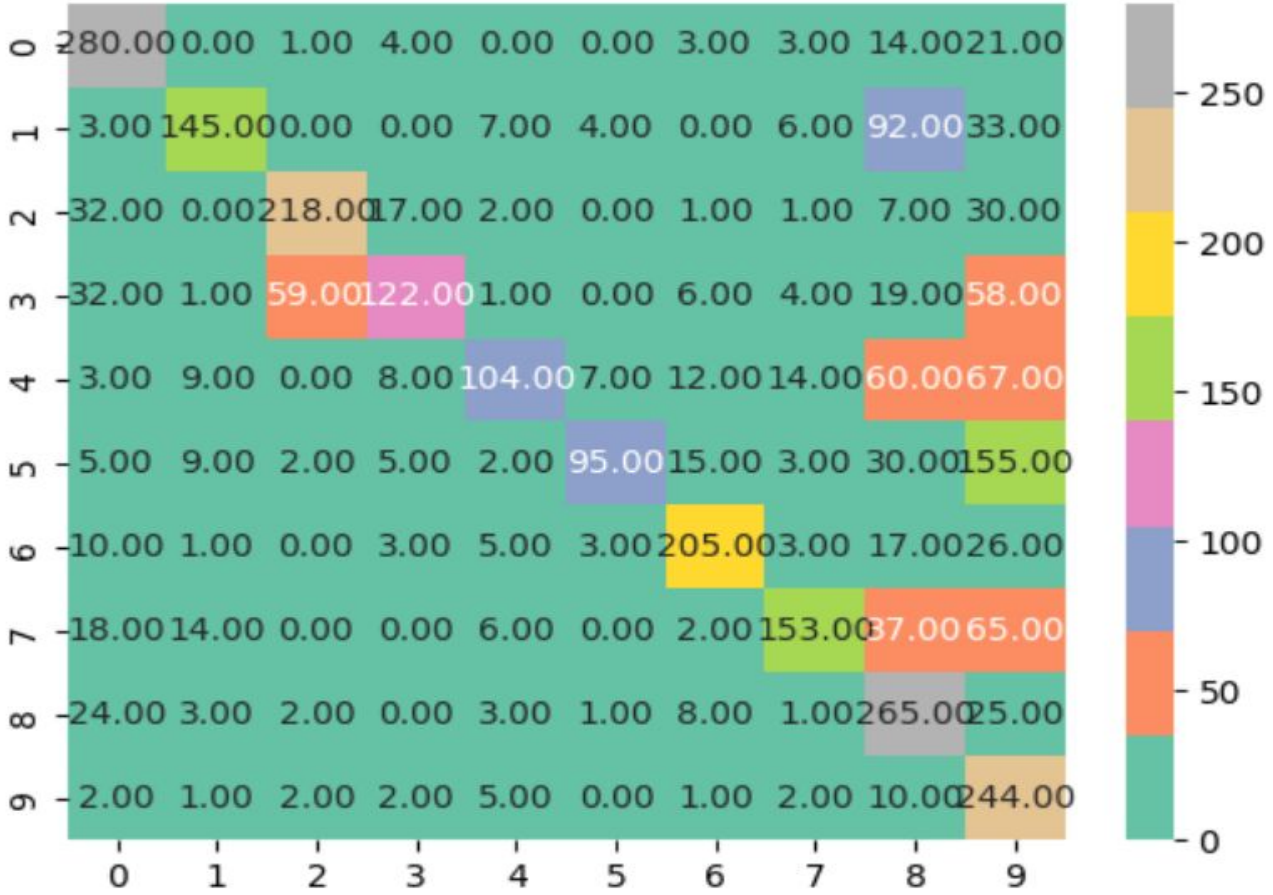
TRANSFER LEARNING



Training and validation results

Model	Training Loss	Training Accuracy	Validation Loss	Validation Accuracy
Inception V3	0.9743	0.6560	2.1635	0.3700
ResNet50	0.2997	0.9043	0.3393	0.8864
EfficientNetB1	0.0495	0.9848	0.2356	0.9375

Confusion matrix



3- Tubaria furfuracea

2- Psathyrella candolleana

Beta Mushroom Identifier

Hello! This is the beta version of the mushroom identifying app.
Due to lack of computational power, I was only trained on classifying 10 species.

Attention:

Note that while some of these mushrooms are edible, it is important to exercise caution when foraging and consuming wild mushrooms. Always consult an expert or field guide to ensure that you are properly identifying the mushrooms you encounter, and never consume any mushroom unless you are certain of its identity and edibility.

Upload Image

PREDICT

The app:

- Backend: Python + Flask
- Frontend: html/css + javascript

TensorFlow.js

Upload Image

Also known as the pear-shaped puffball, this mushroom has a round fruiting body that is white at first and then turns brown as it matures. It is edible when young and fresh.

Top-5 Predictions

- Apioperdon pyriforme 98.81002902984619%
- Psathyrella candolleana 1.148820947855711%
- Tubaria furfuracea 0.017736178415361792%
- Auricularia auricula-judae 0.009487523493589833%
- Xylaria hypoxylon 0.00520960456924513%

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NEXT STEPS:

1. **Take into account the different species distributions:**

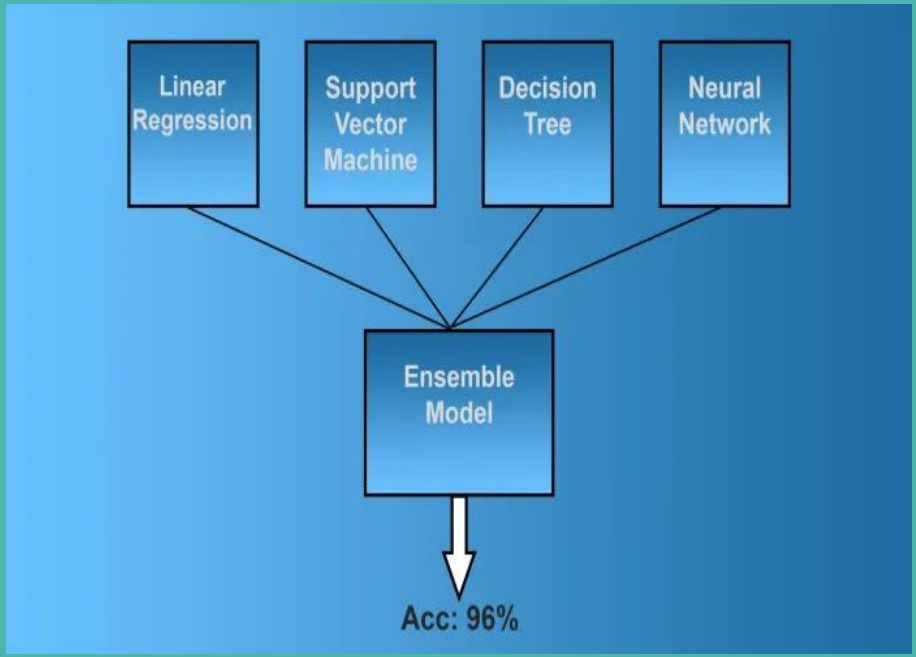
- Species rarity, that is, its relative frequency in the database.
- The geographical distribution of the species.
- Phenology of the species, its seasonality.

2. **Category distribution of the fungi dataset is long-tailed**:

- Long-tailed datasets can cause models to perform poorly on the tail, including the rare events or minority classes.

Use ensemble learning for better classification

"The reason ensemble learning is efficient is that your machine learning models work differently. Each model might perform well on some data and less accurately on others. When you combine all them, they cancel out each other's weaknesses."



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THANK YOU !!!

QUESTIONS?