Mushroom Classification

Is it edible? Or is it poisonous?

Data Science Project by David Wan

As mushroom enthusiasts out in the wild, how can you tell whether a mushroom could potentially be edible or poisonous?

Edible vs Poisonous?

Source: https://americanmushrooms.com/edibles3.htm

Source: https://www.wildfooduk.com/mushroom-guide/destroying-angel/

Edible vs Poisonous?

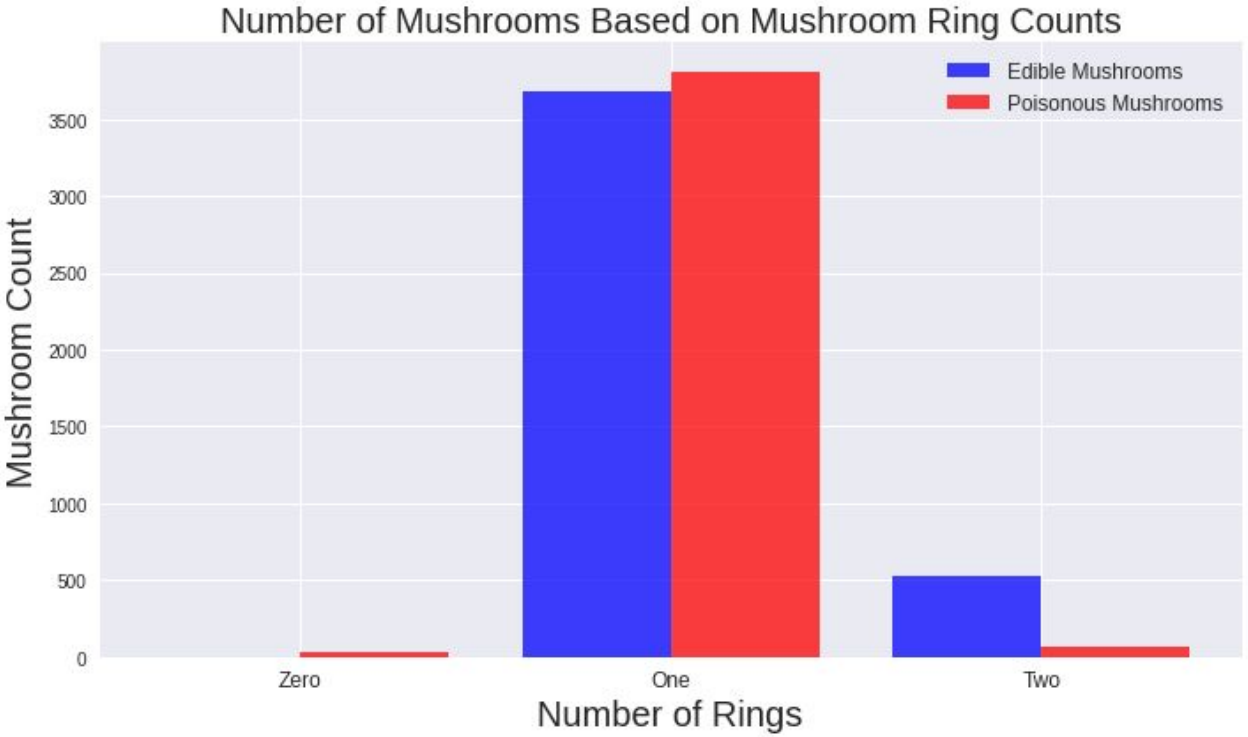
Source:
https://www.allrecipes.com/article/what-are-morel-mushrooms/

Source:
https://www.manisteenews.com/news/article/Don-t-get-fooled-by-these-morel-look-alikes-17062084.php

Project Overview

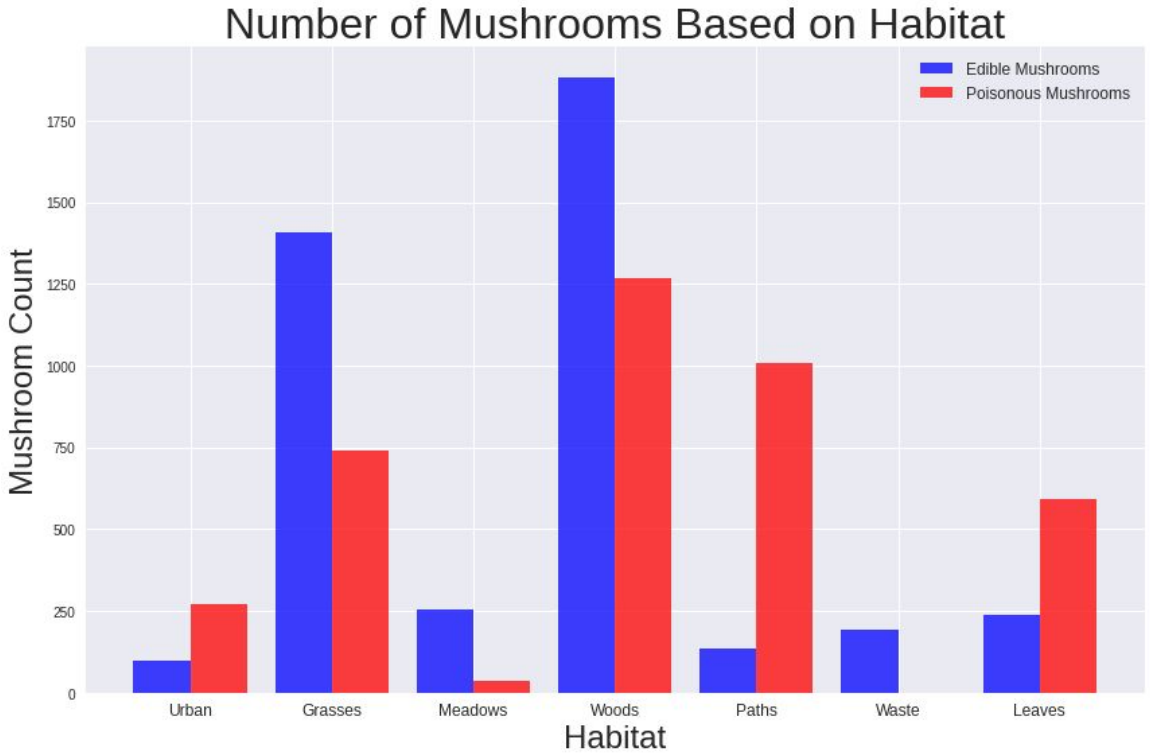
- Source of dataset from Kaggle, courtesy of UCI Machine Learning repository
- Use characteristics of mushrooms to help identify edible vs poisonous
- Find correlations of certain features of mushrooms to help classify mushrooms
- Employ optimized XGBoost machine learning model to make the most optimal predictions on classification of mushrooms

Classification by Mushroom Ring Counts



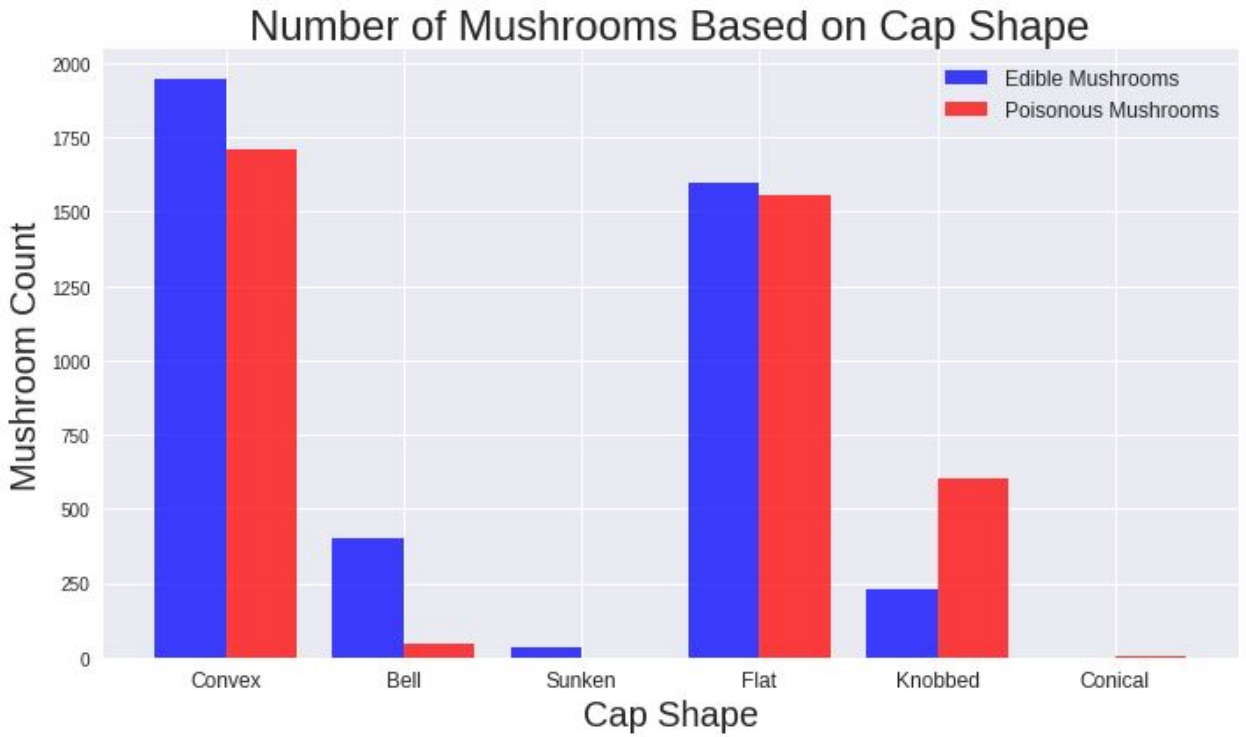
All 0 ring mushrooms poisonous, even split in 1 ring, majority of 2 rings edible

Classification by Mushroom Habitat



Majority of grasses, meadows, woods, waste edible; majority of urban, parks, leaves poisonous

Classification by Mushroom Cap Shape



Mostly even split on convex, flat; majority of bell and sunken edible; majority of knobbed and conical poisonous

Model Strengths/Limitations

- Optimized XGBoost model performed very well with near-perfect accuracy in classification of mushrooms as either edible or poisonous (accuracy score of 1.0)
- Large variety of mushroom features in the dataset made the modeling process reliable
- No false positive or false negative results!
- However, model does not take into account any potential mutations in the mushroom structure and characteristics.
- More importantly, model does not factor human error in feature misidentification in terms of real-life application for mushroom classification.
- Mistaking poisonous mushrooms for edible ones may result in seizures, hallucinations, and possible even death!

Final Recommendations

- Continue exploring more mushrooms and their features.
- Understand common characteristics of poisonous mushrooms (i.e. white spore markings, white gills, bright red cap colors, etc.).
- Stick to supermarkets and grocery stores if using mushrooms for culinary purposes.
- If planning on consuming wild mushrooms, always have a mushroom expert on hand to make the final determination on mushroom classification.
- When in doubt or unfamiliar, do not attempt to consume wild mushrooms, especially in the backyard or local parks! More often than not, they are poisonous!

References

- GitHub repository: https://github.com/davidwan08/Mushroom-Classification-Modeling-and-Analysis-Project
- Kaggle dataset: https://www.kaggle.com/datasets/uciml/mushroom-classification
- Puffball image link: https://americanmushrooms.com/edibles3.htm
- Destroying Angel image link: https://www.wildfooduk.com/mushroom-guide/destroying-angel/
- Morels image link: https://www.allrecipes.com/article/what-are-morel-mushrooms/
- False Morels image link: https://www.manisteenews.com/news/article/Don-t-get-fooled-by-these-morel-look-alikes-17062084.php

Questions? Comments?