

Mushroom Foraging: Feast or Fatal?



AI Boot Camp: Project 2 / Group 1/ LADS

LADS Team Members:

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Problem Summary

- Ingestion of wild and potentially toxic mushrooms is common in the United States and many other parts of the world.
- Over the last 18 years in the US, 133,700 cases (7428/year) of mushroom exposure, mostly by ingestion, have been reported.
- Approximately 704 (39/year) exposures have resulted in major harm.
- Fifty-two (2.9/year) fatalities have been caused by adults unintentionally ingesting poisonous mushrooms.

Executive Summary

Objectives:

- Evaluate performance of multiple Machine Learning models (Random Forest, Logistic Regression, K-Nearest Neighbors, and Support Vector Classifier) for classifying mushrooms as either edible or poisonous.

Findings:

- Random Forest model outperformed other models in accuracy, precision, recall, and F1 score.

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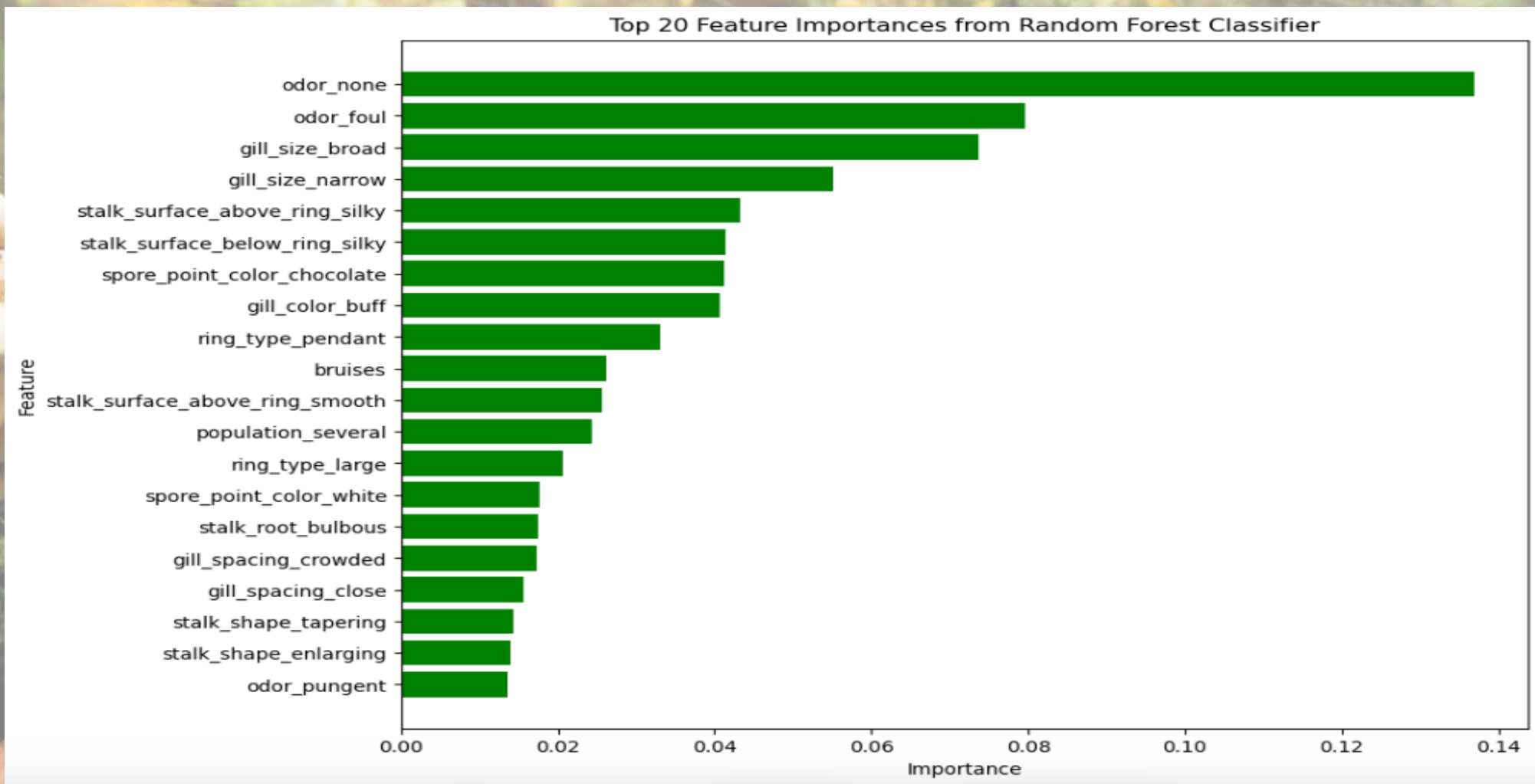
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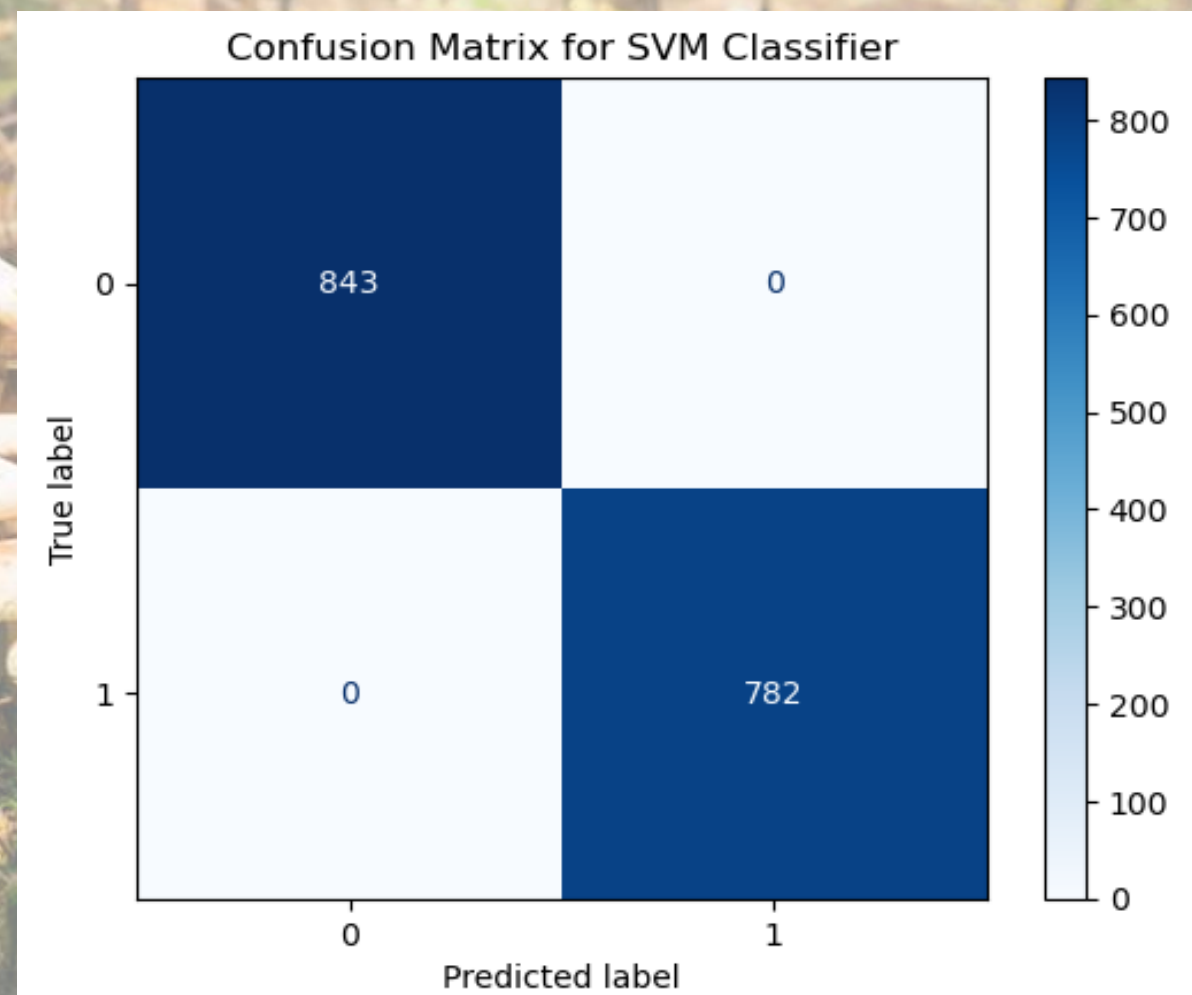
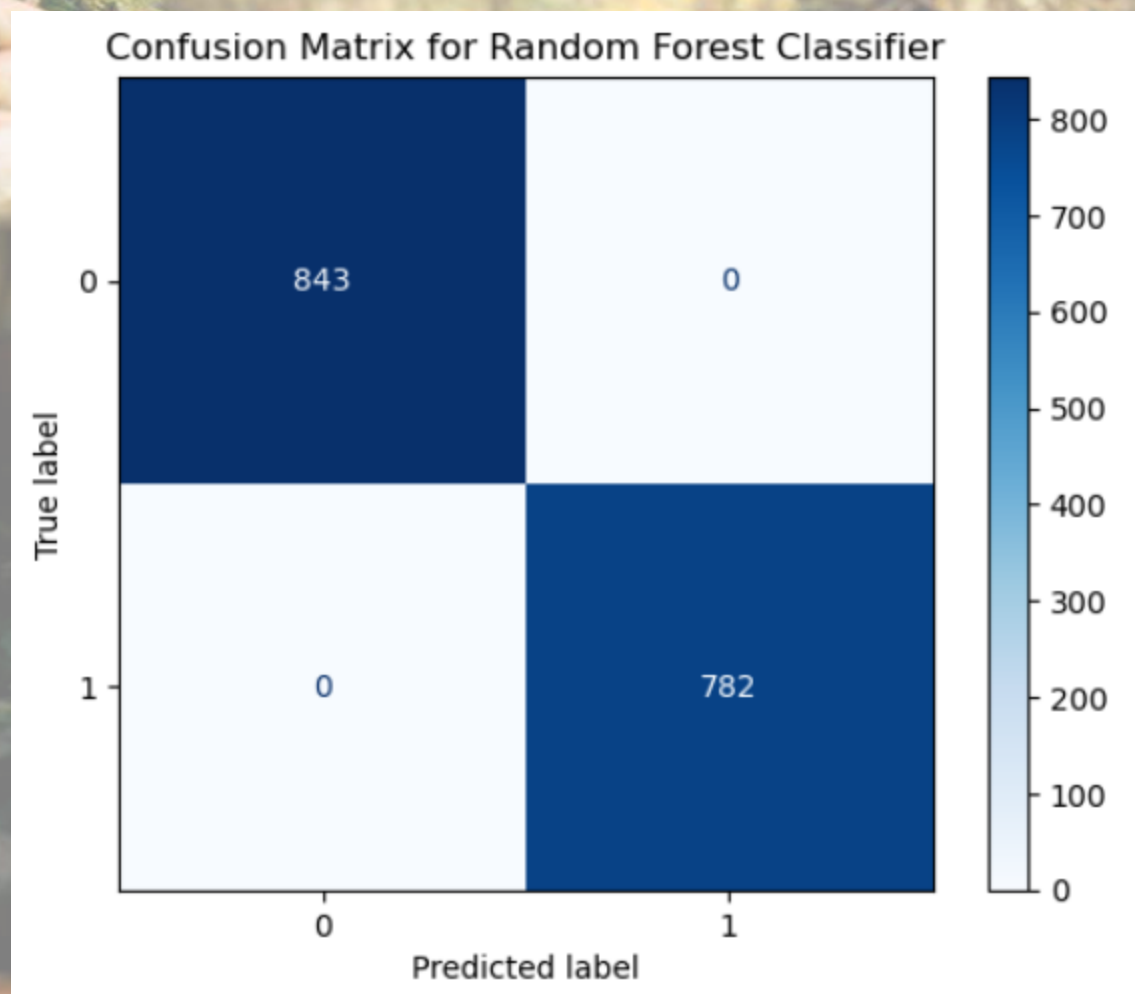
Data Collection, Clean Up, & Exploration

- We sourced two datasets from Kaggle.
 - Unable to use the first dataset due to unable to decode the dataset.
- We dropped the Cap Shape column
 - This column had many “undefined” values.
 - Column had second to the lowest in feature importance.
- We used one-hot encoder to handle the categorical variables.

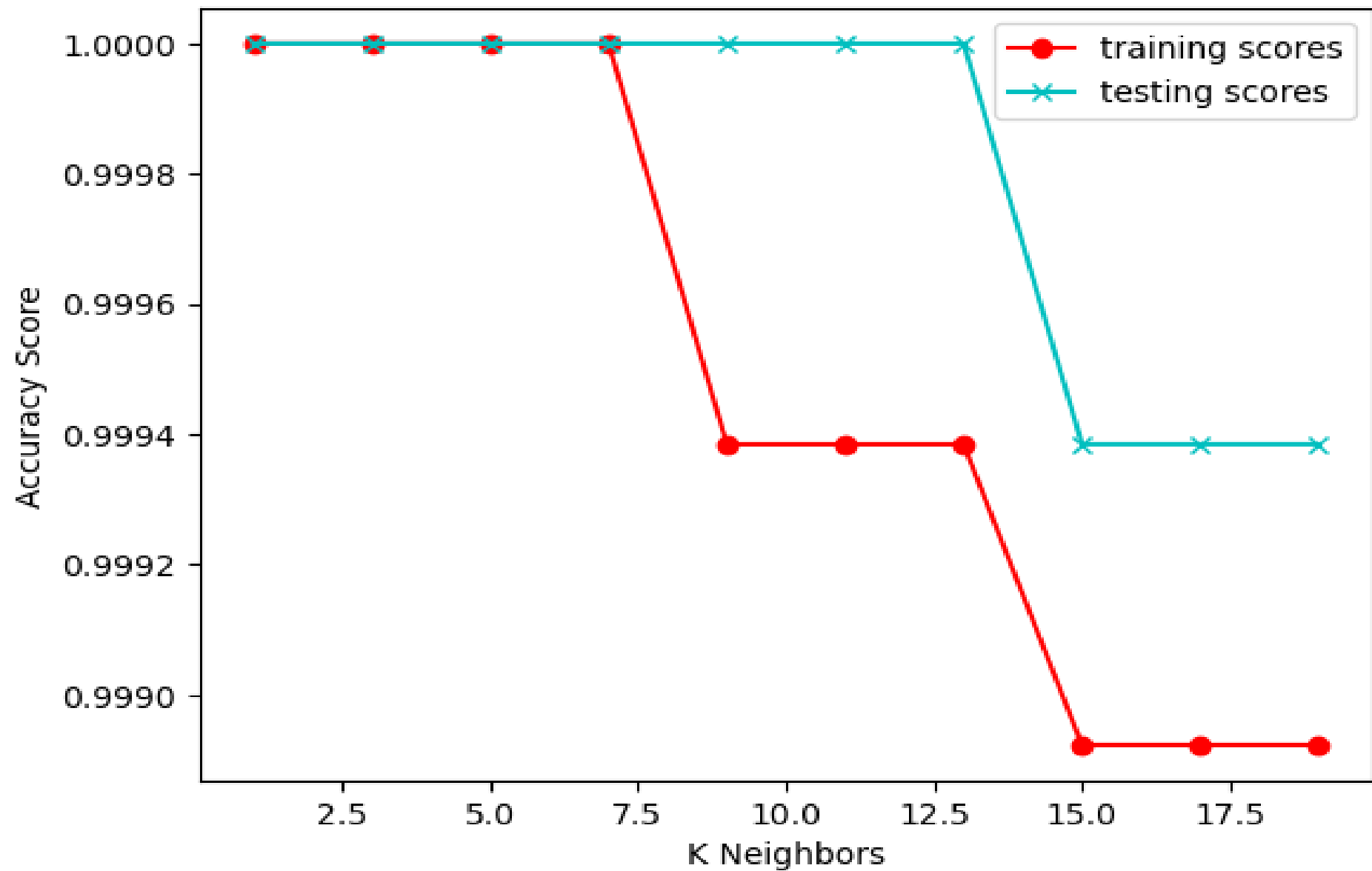


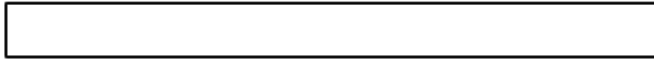
Creating Language Models and The Pipeline

- Initial Structure and Testing
- Language Models Utilized
- Accuracy Scores and Confusion Matrix
- Compare and Contrast

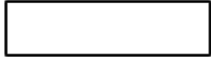


Accuracy of K Nearest Neighbors





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Future Research

- Investigate ensemble learning approaches
- Expand dataset with more mushroom specimens
- Incorporate user feedback and crowdsourcing
- Create user-friendly mobile application
- Add the other 106 variables from the original dataset to the model

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Conclusion

- Demonstrates potential for ensemble learning for complex problems
- Inspires research in applied AI for natural resource management and conservation
- Beyond mushroom foraging safety, it:
 - Promotes sustainable practices
 - Enhances appreciation for mushroom diversity
 - Shows broader impact of integrated AI systems on technology and environment understanding.



Death Cap

(Amanita Phalloides)

Odor = Pungent

Gill Size = Broad

Population = Solitary

- One of the deadliest of all mushrooms.
- Closely resembles several edible mushrooms.
- Within 6 to 12 hours after consumption, violent abdominal pain, vomiting, and bloody diarrhea appear. This leads to coma and death in more than 50% of recorded incidents.



Common Morel

(Morchella Americana)

Odor = None

Gill Size = Broad

Population = Clustered

- Rich flavor and unmistakable meaty texture.
- One of the most sought after mushrooms for its unique flavor.
- Rare, with a high retail price, morel season is short and hunting patches are often passed down in families like heirlooms



Banded Mottlegill

(Panaeolus Cinctulus)

Odor = None

Gill Size = Narrow

Population = Clustered

- A common type of psilocybin mushroom which contains hallucinogenic substances.
- In the 1900's these were often found in the same beds as commercially grown grocery-store mushrooms. Mushroom farmers had to weed them out from the edible mushrooms because of its hallucinogenic properties.