



Mushrooms:

Tasty or Terrifying!



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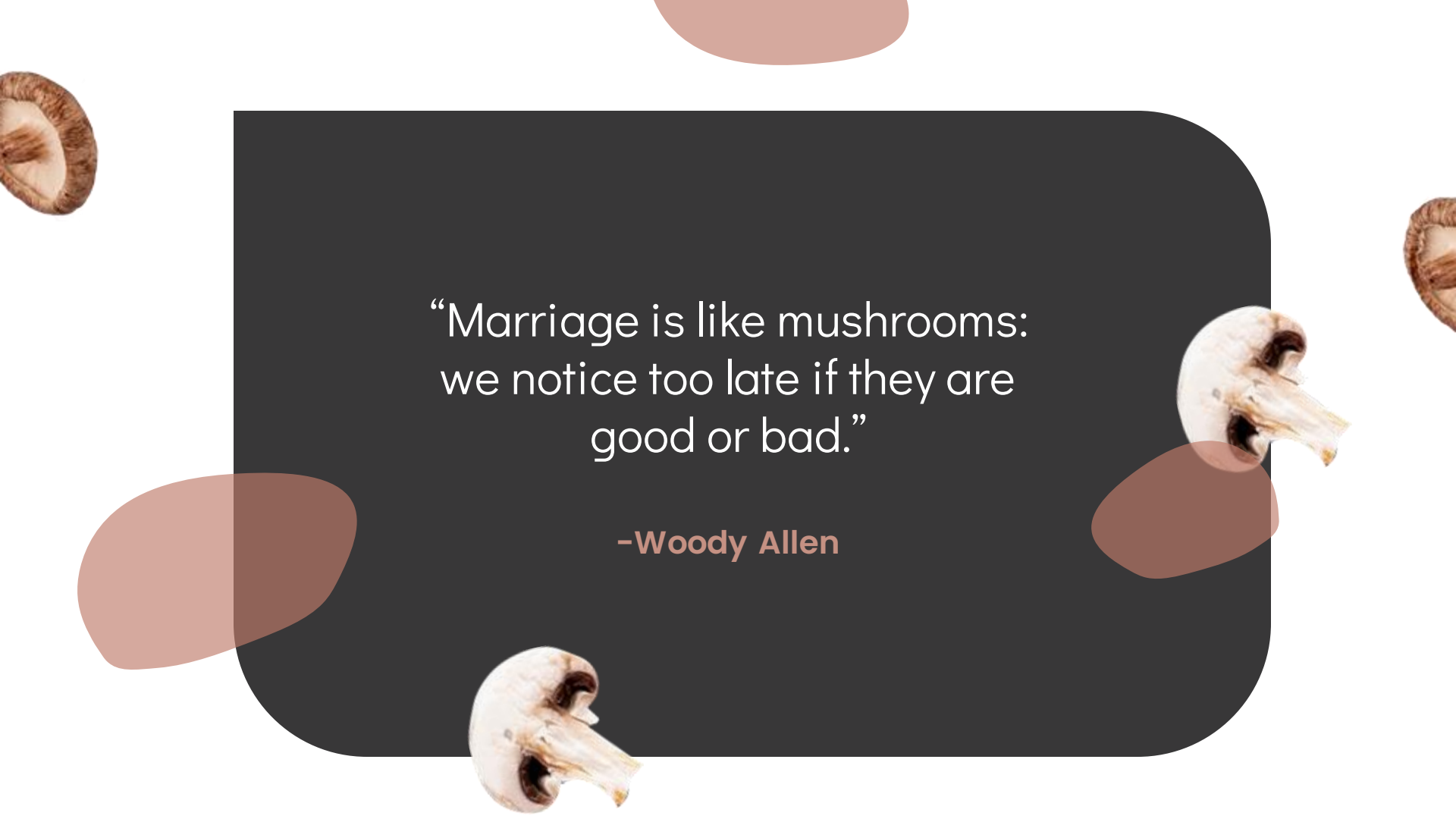


**We need
Mushrooms!**

What are Mushrooms?

- Genetically closer to **Humans** than plants.
- The **fruit**, of the fungus.
- Produce vitamin D.
- Low calorie food.
- Delicious (my opinion).
- They are a key ingredient in many recipes.
- They can also be POISONOUS!





“Marriage is like mushrooms:
we notice too late if they are
good or bad.”

-Woody Allen

01

How do we get
mushrooms?





The Store; Low Risk

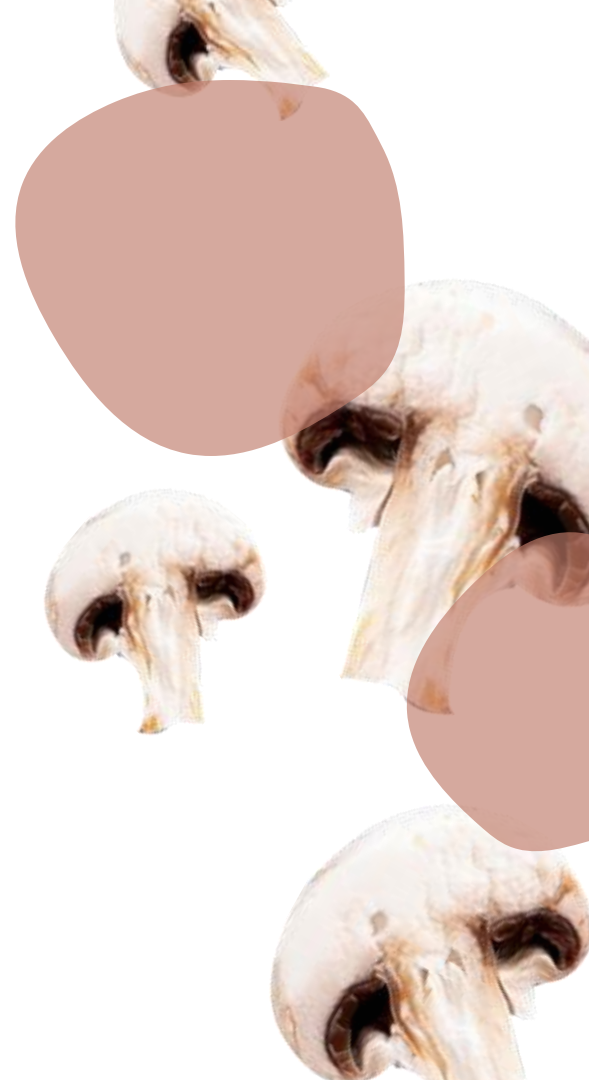


Pick Them; Well..



02

Safe
Shrooming?





Which of these is safe?



This one will KILL you:

Look for the following features:

yellow,
green, or
white cap

white gills

white ring
skirt on
stem

loose
sac-like
cup, often
below
ground



There are 14000 shroom species

Many May Look
Alike

Picking Safe Ones
Is Difficult

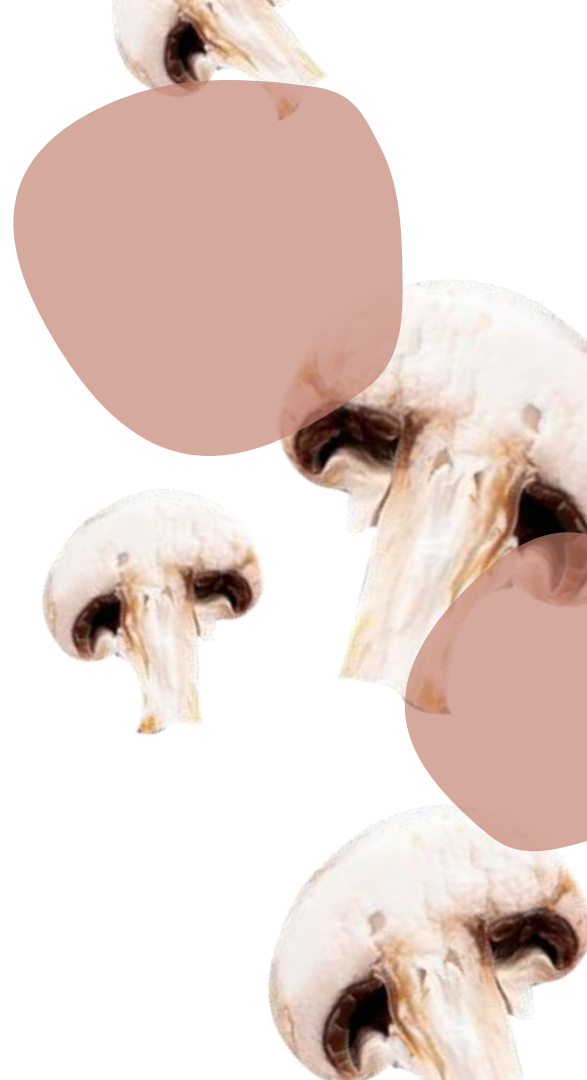
Some Will Be
Tasty

Some Will Make
You Sick



03

Leveraging Data





UC Irvine Data Is Awesome!

UCI ML Mushroom Data



1

Over 8000
Examples

2

23 Features

3

Highly Cited

4

Readily
Available

The Process



Step 01

Acquire Data



Step 02

Explore and Prep Data



Step 03

Modeling



Step 04

Validation



Step 05

Evaluation



Step 06

Deployment

The Process



Step 01

Acquire Data

- Data Acquired from UC Irvine ML Repository

The Process



Step 02

Explore and Prep Data

- Data Understanding Gained Via Documentation
- Data Categorically Encoded Using SKLearn OrdinalEncoder
- Data Split 50-25-25 Train-Test-Validate
- Train Data Explored With Pandas Profiling

The Process



Step 03

Modeling

- XGBoost Classifier Used
- Bayesian Hyperparameter Tuning Utilizing Cross Validation in Hyperopt
- Feature Reduction By Proxy Using Shap Values

The Process



Step 04

Validation

- Key Metric is Recall
- Care About Finding as Many True-Positives as Possible
- $\text{Recall} = 1.0$ On Test Validation

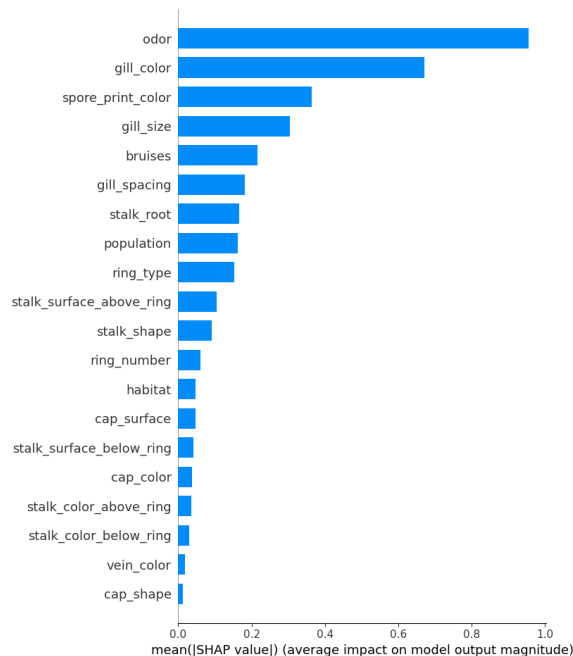
The Process



Step 05

Evaluation

- Reduced To Top 15 Features By Shap
- Same Model Performance
- Simpler Model Is Better!



The Process



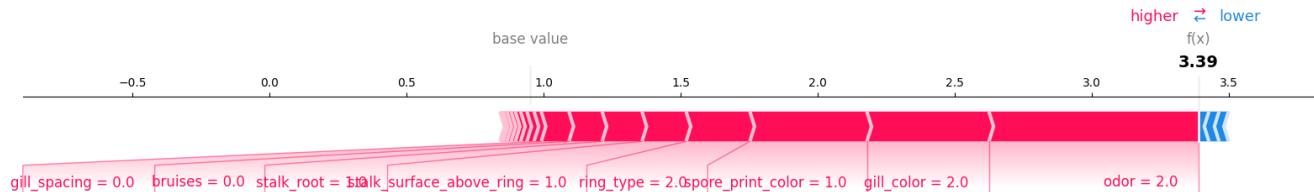
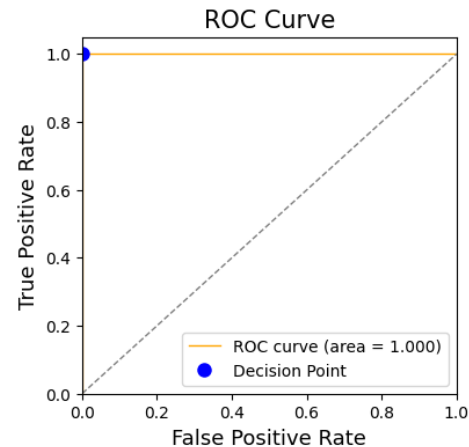
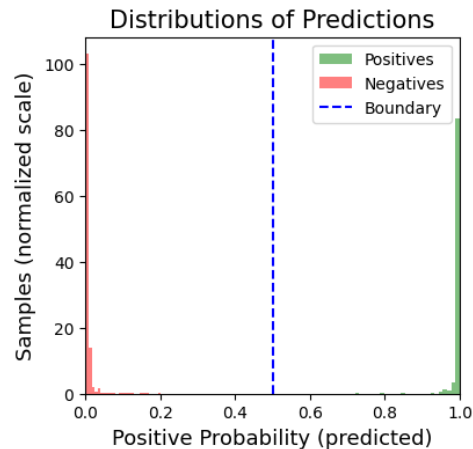
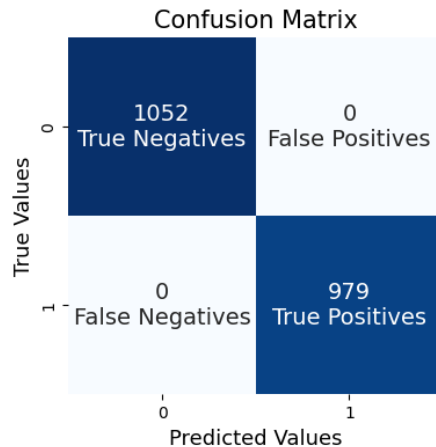
Step 06

Deployment

- Containerize Application
- Can Deploy Container As API To IOT Or Kubernetes

Results?

- Highly Accurate Classifier To Predict Poisonous Mushrooms:



Resources

Fact References

- <https://grocycle.com/mushroom-facts/>
- <https://www.fsis.usda.gov/recalls>
- <https://archive-beta.ics.uci.edu/dataset/73/mushroom>

Photo

- Mushrooms and space on right
- Bowl with mushrooms standing on napkin
- Row of fresh mushrooms

- Top view tomatoes, mushrooms and peppers
- Mushroom veggies cream soup and cloth
- Top view mushrooms in bowl with copy-space
- Mushroom soup in a white jar with mushrooms on a black cloth
- Mushroom soup and empty notepad
- Mushroom soup and white copy space

Icon

- Kitchen Icon Pack



Resources

Vector

- Vegetables concept banner template
- Vegetables concept flyer template
- Vegetables concept banner template
- Vegetables concept poster template
- Vegetables concept flyer template

Photo

- Mushrooms and space on right
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