



# Mushrooms:

Tasty or Terrifying!



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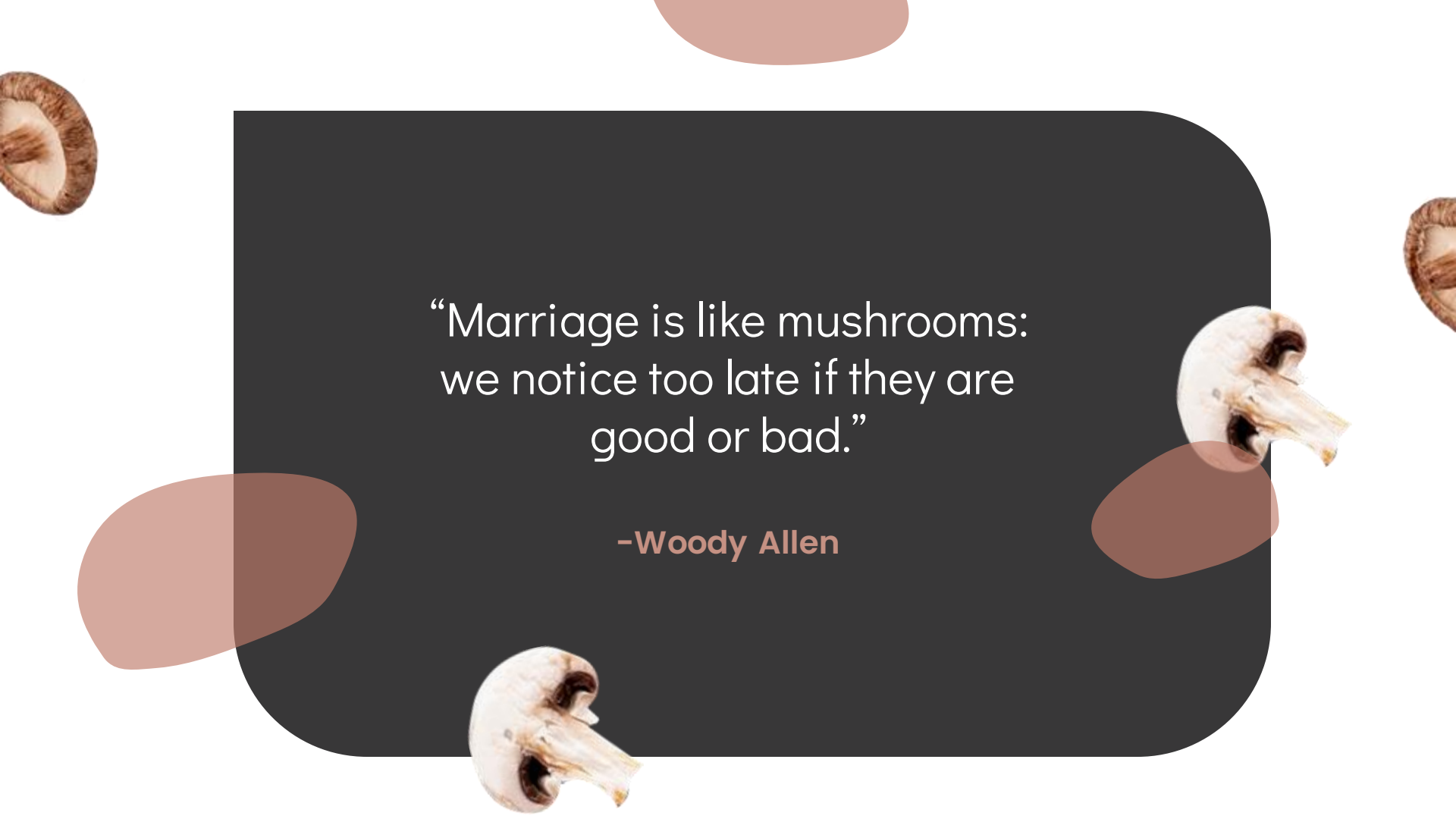


**We need  
Mushrooms!**

# 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**

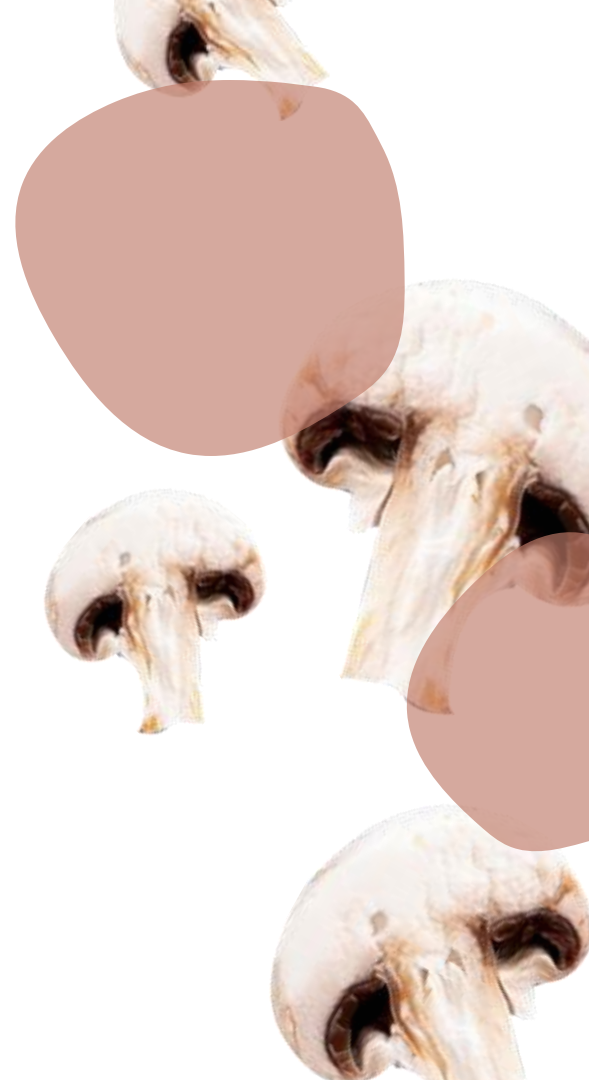


**Pick Them; Well..**



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

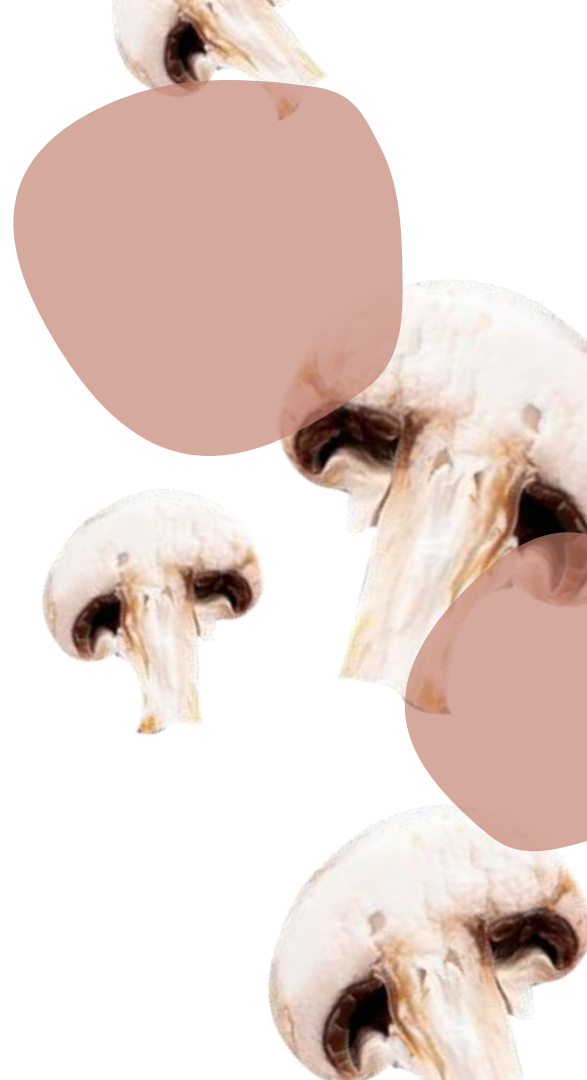
About 12000  
Species are Safe

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

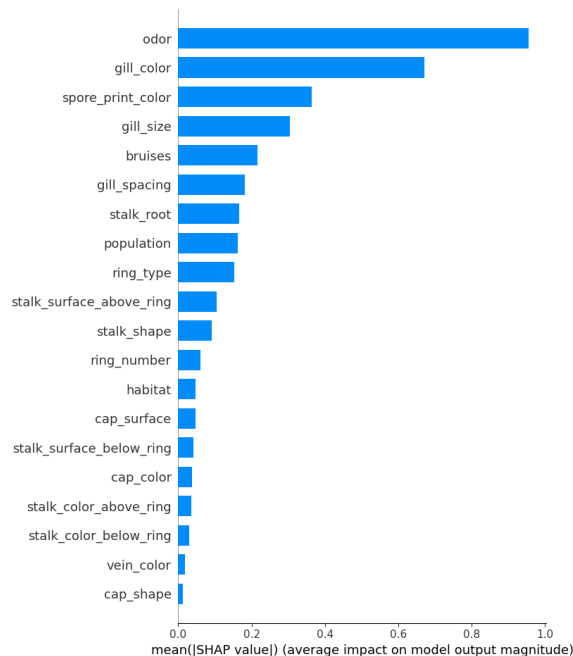
# The Process



## Step 05

### Evaluation

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



# The Process



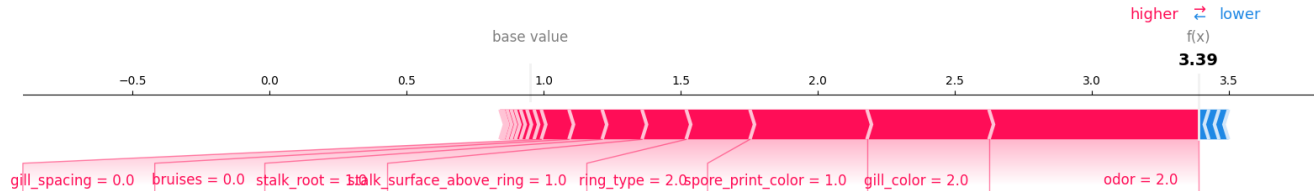
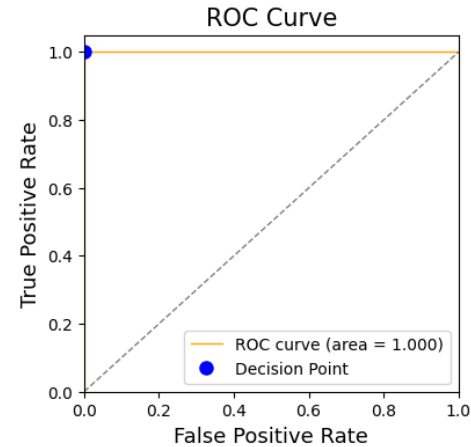
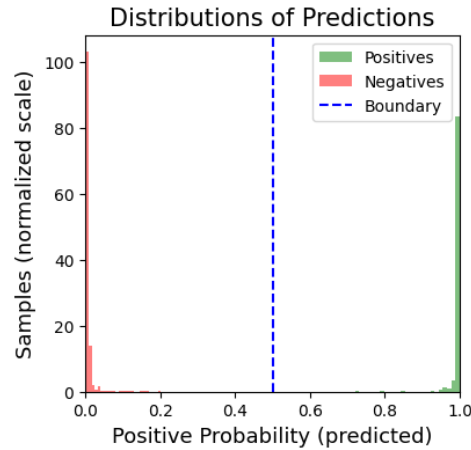
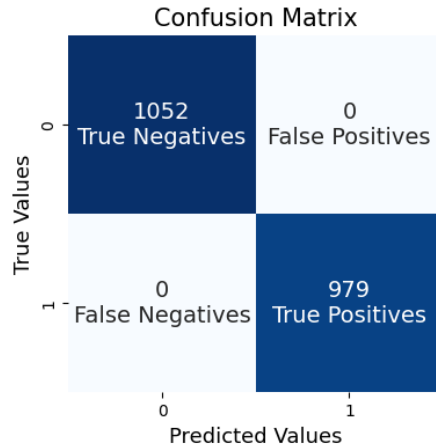
## Step 06

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

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