Low Level Design (LLD)

**MUSHROOM CLASSIFICATION**

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**ABSTRACT**

Mushrooms can be found extensively in a variety of natural environments and visual identification of mushroom species is well established. Some mushrooms are known because of their nutritional and therapeutical properties. Some species are known all over the world because of their toxicity that causes fatal accidents every year mainly due to misidentification. Some of the edible mushrooms are Ganoderma spp, Cantharellus spp, Agaricus spp, Pleurotus spp, Russula spp, Auricularia spp and Termitomyces spp; but the ornamentals are the beautifully ringed Microporous spp. Amanita spp, Lepiota cristata, Lepiota brunneoincarnata and Inocybe asterospora, C o p r i n u s s p p are among the most important species responsible for mushroom poisoning. Morphological and chemical analyses for mushrooms are occasionally required in forensic science practice. In this work, we will try to predict which mushroom is poisonous & which is edible.

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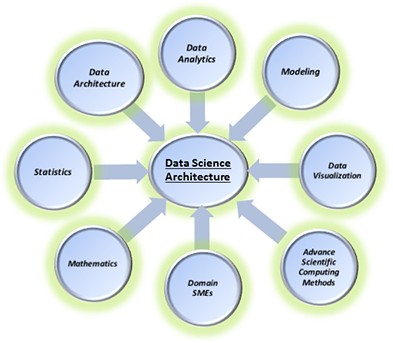
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**Introduction**

# Why this Low-Level Design Document?

The main purpose of this LLD documentation is to feature the required details of the project and supply the outline of the machine learning model and also the written code. This additionally provides the careful description on However the complete project has been designed end-to-end.

# Architecture



**2 Architecture Design**

For this project, we have implemented the machine learning life cycle to create a basic web application which will predict the flight prices by applying machine learning algorithms to historical flight data using python libraries like Pandas, NumPy,Matplotlib, seaborn and sklearn.

# 2.1 Data Gathering

The data for the current project is being gathered from Kaggle dataset, the link to the data is:

https://www.kaggle.com/datasets/uciml/mushroom-classification

## 2.2 Data Description

Data Description: This dataset describes mushrooms in terms of their physical characteristics. They are classified into: poisonous or edible.

1. cap-shape: bell=b,conical=c,convex=x,flat=f, knobbed=k,sunken=s

2. cap-surface: fibrous=f,grooves=g,scaly=y,smooth=s

3. cap-color: brown=n,buff=b,cinnamon=c,gray=g,green=r, pink=p,purple=u,red=e,white=w,yellow=y

4. bruises?: bruises=t,no=f

5. odor: almond=a,anise=l,creosote=c,fishy=y,foul=f, musty=m,none=n,pungent=p,spicy=s

6. gill-attachment: attached=a,descending=d,free=f,notched=n

7. gill-spacing: close=c,crowded=w,distant=d

8. gill-size: broad=b,narrow=n

9. gill-color: black=k,brown=n,buff=b,chocolate=h,gray=g, green=r,orange=o,pink=p,purple=u,red=e, white=w,yellow=y

10. stalk-shape: enlarging=e,tapering=t

11. stalk-root: bulbous=b,club=c,cup=u,equal=e, rhizomorphs=z,rooted=r,missing=?

12. stalk-surface-above-ring: fibrous=f,scaly=y,silky=k,smooth=s

13. stalk-surface-below-ring: fibrous=f,scaly=y,silky=k,smooth=s

14. stalk-color-above-ring: brown=n,buff=b,cinnamon=c,gray=g,orange=o, pink=p,red=e,white=w,yellow=y

15. stalk-color-below-ring: brown=n,buff=b,cinnamon=c,gray=g,orange=o, pink=p,red=e,white=w,yellow=y

16. veil-type: partial=p,universal=u

17. veil-color: brown=n,orange=o,white=w,yellow=y

18. ring-number: none=n,one=o,two=t

19. ring-type: cobwebby=c,evanescent=e,flaring=f,large=l, none=n,pendant=p,sheathing=s,zone=z

20. spore-print-color: black=k,brown=n,buff=b,chocolate=h,green=r, orange=o,purple=u,white=w,yellow=y

21. population: abundant=a,clustered=c,numerous=n, scattered=s,several=v,solitary=y

22. habitat: grasses=g,leaves=l,meadows=m,paths=p, urban=u,waste=w,woods=d

## 2.3 Import Data into Database

Created an api for the upload of the data into the SQlL database, steps performed are:

* + - Connection is made with the database.
    - Created a database with name Prediction.
    - SQL command is written for creating the data table with required parameters.
    - And finally, a SQL command is written for uploading the dataset into the data table by bulk insertion.

## 2.4 Export Data from Database

In the above created api, the download url is also being created, which downloads the data into a csv file format.

# 2.5 Data Pre-Processing

Steps performed in pre-processing are:

* First the data types are being checked
* There was no missing vlaues in the data. But when we go through the data, we find that missing values in one column is replaced with '?'.
* Replaced such values with numpy "nan" so that we can handle the missing values.
* Performed categorical imputing for the required columns.
* Added quote on the the whole data.

And, the data is ready for passing to the machine learning algorithm.

# 2.6 Modelling

After selecting the features which are more correlated to price the next step involves applying machine algorithms and creating a model. As our dataset consist of labelled data, we will be using supervised machine learning algorithms. The machine learning algorithms that we will be using in our project are:

KNN

Random Forest

# 2.7 UI Integration

The front of the application will be created using the HTML, CSS , Bootstrap framework where users will have the functionality of entering their flight data. This data will be sent to the back-end service where the model will predict the output according to the provided data. The predicted value is sent to the front-end and displayed.

# 2.8 Data from User

The data from the user is retrieved from the created HTML web page.

# 2.9 Data Validation

The data provided by the user is then being processed by app.py file and validated. The validated data is then sent for the prediction.

# 2.10 Rendering Result

The data sent for the prediction is then rendered to the web page.

# 3. Deployment

After getting the model with the best accuracy we store that model in a file using the pickle module. The back-end of the application will be created using Flask Framework where API end-points such as GET and POST will be created to perform operations related to fetching and displaying data on the front-end of the application.

# 3.1 Unit Test

|  |  |  |  |
| --- | --- | --- | --- |
| **Data** | **Expected Result** | **Actual Result** | **Status** |
| User Interface | Verify whether a user is able to give input to all fields. | As Expected | Pass |
| UserInterface URL | verify whether hosted URL is properly accessible or not | As Expected | Pass |
| UserInterface URL | Verify whether the user Interface loads completely for the user when the URL is accessed | As Expected | Pass |