

High Level Design (HLD)

Mushroom Classification

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Abstract

Mushrooms have high benefits in the human body. However, not all mushrooms are edible. While some have medical properties to cure cancer, some other types of mushrooms may contain viruses that carry infectious diseases. This paper is set to study mushroom behavioral features such as the shape, surface and color of the cap, gill and stalk, as well as the odor, population and habitat of the mushrooms. The classification accuracy, coefficient metric, and time taken to build a classification model on a standard Mushroom dataset were measured. The behavioural feature of `odour' was selected as the highest ranked feature that contribute to the high classification accuracy.

1 Introduction

1.1 Why this High-Level Design Document?

The purpose of this High Level Design (HLD) Document is to add the necessary details to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as reference manual for how the modules interact at a high level.

The HLD will

- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design feature and the architecture of the project
- List and describe the non-functional attribute like:
 - Security
 - Reliability
 - Maintainability
 - Portability
 - Reusability
 - Application compatibility
 - Resource utilization
 - Serviceability

1.2 Scope

The HLD document presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

2 General Description

2.1 Product Perspective

The Mushroom Classification solution system is a data science-based machine learning model which help us to detect the Mushroom Classification.

2.2 Problem Statement

To create an AI solution for Mushroom Classification and to implement the following use cases 1) Mushroom is Edible 2)Mushroom is poisonous

2.3 Proposed Solution

The solution proposed here is a data science model based on machine learning can be implemented to perform above mention use cases. In first use case , we will take input from a edible mushroom and in second use case, we will take input from poisonous mushroom then we get to know model is performing or not.

Tools used

Python programming language and frameworks such as NumPy, Pandas, Scikit-learn, Flask etc are used to build the whole model.



Visual Studio Code



- Virtual Studio Code is also used as IDE
- Heroku is also used for deployment of the model.
- Python, Flask is used for backend development
- Github is used as Version Control System.

2.4 Constraints

The Mushroom Classification solution system must be correct enough that it not mislead any report and as automated as possible and users should not be required to know any of the workings.

2.5 Assumptions

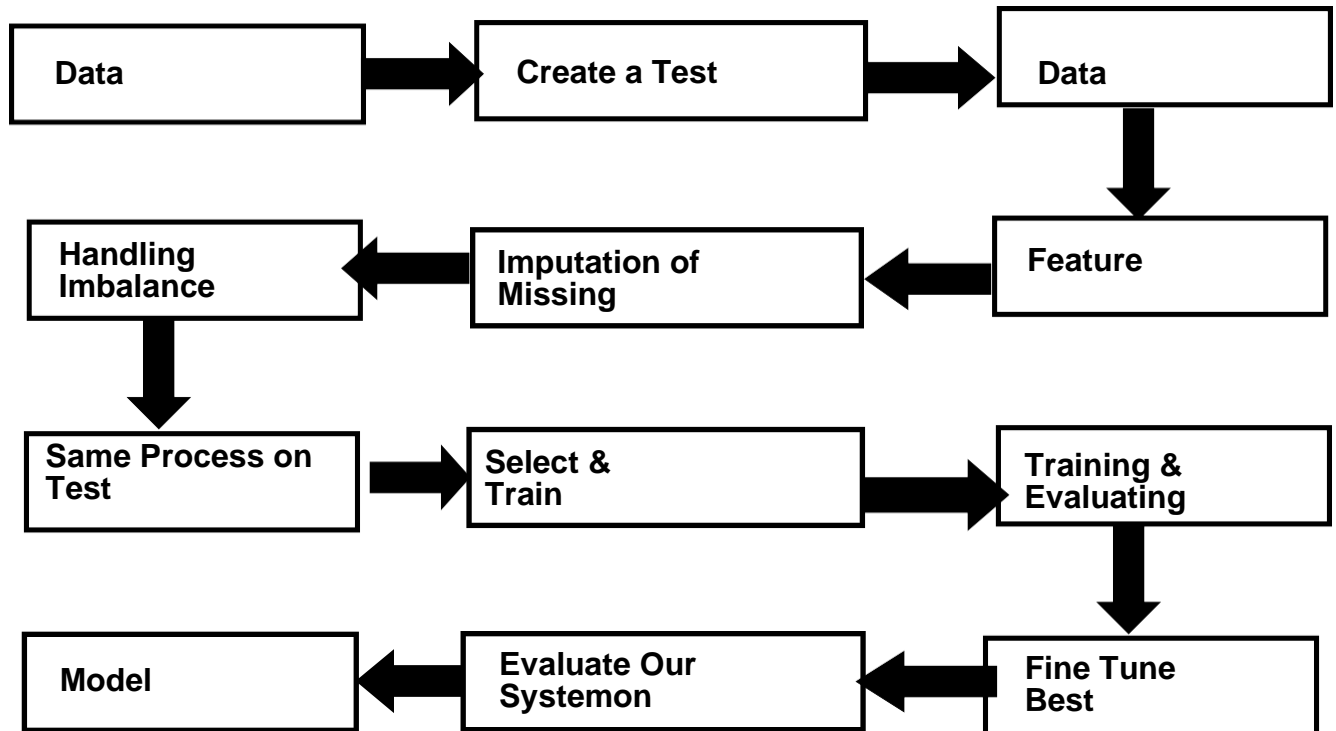
The main objective of the project is to implement the use cases as previously mentioned for new dataset that comes which has this solution install in their computers.

3 Design Details

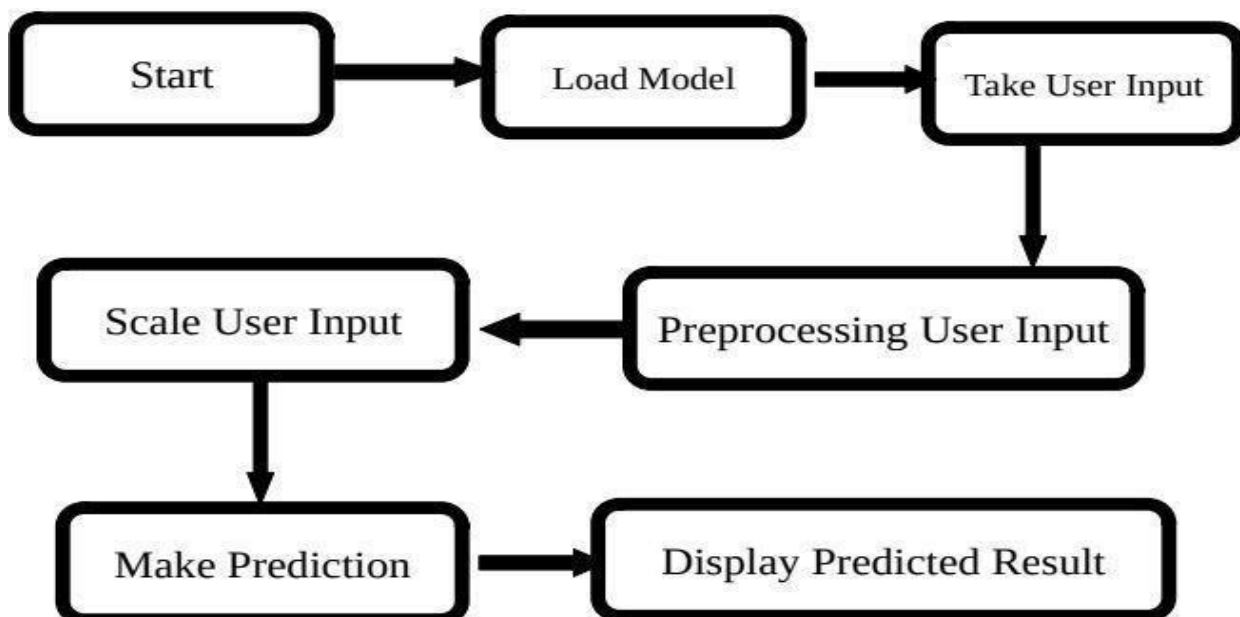
3.1 Process Flow

For Mushroom Classification, we will use machine learning base model. Below is the process flow diagram is as shown below

3.1.1 Model Training and Evaluation



3.1.2 Deployment Process



3.2 Event log

The system should log every event so that the user will know what process is running internally.

Initial Step-By-Step Description:

1. The System identifies at what step logging required.
2. The System should be able to log each and every system flow.
3. Developer can choose logging method. You can choose database logging/ File logging s well.
4. System should not hang even after using so many loggings. Logging just because we can easily debug issues so logging is mandatory to do.

3.3 Error Handling

Should errors be encountered, an explanation will be displayed as to what went wrong? An error will be defined as anything that falls outside the normal and intended usage.



4 Performance

The machine learning based Mushroom Classification solution will be used for Mushroom Classification. Also model retraining is very important to improve performance.

4.1 Reusability

The code written and the components used should have the ability to be reused without problems.

4.2 Application Compatibility

The different components for this project will be using python as an interface between them. Each component will have its own task to perform, and it is the job of the Python to ensure proper transfer of information.

4.3 Resource utilization

When any task is performed, it will likely use all the processing power available until that function is finished.

4.4 Deployment



5 Conclusion

Using only 19 pieces of information, we can conclude with 100% certainty that a mushroom is edible or poisonous. These are the 19 features, ranked in descending order by the absolute value with their correlation with the target, class. Recall that in the target class, edible was marked as 0 and poisonous was marked at 1.

6 References

[UCI Machine Learning Repository For Data Set](https://archive.ics.uci.edu/ml/datasets/mushroom)

URL: <https://archive.ics.uci.edu/ml/datasets/mushroom>

