

## Project Initialization and Planning Phase

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|---------------|--|
| Date          | 20 April 2025  |
| Student Name  | Rohit Dadaso Sapkal  |
| Project Title | Uncovering the Hidden Treasures of the Mushroom Kingdom: A Classification Analysis |
| Maximum Marks | 3 Marks  |

### Project Proposal (Proposed Solution):

This project proposal outlines a solution to address a specific problem. With a clear objective, defined scope, and a concise problem statement, the proposed solution details the approach, key features, and resource requirements, including hardware, software, and personnel.

| Project Overview  |   |
|-------------------|---|
| Objective         | To develop a deep learning-based image classification system capable of accurately identifying mushroom species—specifically from the <i>Boletus</i> , <i>Lactarius</i> , and <i>Russula</i> genera—based on visual attributes.   |
| Scope             | This project focuses on image-based classification of mushrooms using deep learning models. It covers the acquisition of image datasets, preprocessing, model training using transfer learning, and evaluation of classification accuracy. The final system will be able to classify images into one of the three target genera. The project is limited to these three categories and assumes images are of reasonable quality. |
| Problem Statement |   |
| Description       | Mushroom identification is challenging and typically requires expert knowledge. Mistakes can be dangerous, particularly when foraging. A reliable classification tool would benefit researchers, foragers, and hobbyists.   |
| Impact            | Precise mushroom classification aids ecological research, education, and safe foraging. An image-based system makes species recognition more accessible to all.   |

| Proposed Solution |  |
|-------------------|--|
| Approach          | The project will employ CNN-based deep learning, using transfer learning from models like ResNet or EfficientNet. The mushroom image dataset will be cleaned, augmented, then used for training and fine-tuning. |
| Key Features      | The system uses transfer learning to train efficiently with limited data, classifying mushrooms into three key genera. Data augmentation enhances model performance, with potential for a web-based interface.   |

### Resource Requirements

| Resource Type           | Description                             | Specification/Allocation                                     |
|-------------------------|---|--|
| <b>Hardware</b>         |   |  |
| Computing Resources     | CPU/GPU specifications, number of cores | 1 x NVIDIA RTX 3060 GPUs                                     |
| Memory                  | RAM specifications                      | 16 GB RAM  |
| Storage                 | Disk space for data, models, and logs   | 500 GB SSD   |
| <b>Software</b>         |   |  |
| Frameworks              | Python frameworks                       | Python   |
| Libraries               | Additional libraries                    | tensorflow   |
| Development Environment | IDE, version control                    | Jupyter Notebook, Git  |
| <b>Data</b>             |   |  |
| Data                    | Source, size, format                    | Kaggle, MushroomObserver.org, JPEG/PNG format, 10,000 images |