

Project Design Phase-I
Proposed Solution Template

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| Date | 06 May 2023 |
| Team ID | NM2023TMID15487 |
| Project Name | Project - Uncovering the Hidden Treasures of the Mushroom Kingdom: A Classification Analysis |

Proposed Solution Template:

Project team shall fill the following information in proposed solution template.

| S.No. | Parameter | Description |
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| 1. | Problem Statement (Problem to be solved) | <p>The problem statement for uncovering the hidden treasures of the Mushroom Kingdom using classification analysis is to develop a predictive model that can accurately classify different types of mushrooms based on their physical characteristics. The goal is to identify which mushrooms are safe to eat and which are poisonous, as well as to uncover any hidden patterns or relationships between different mushroom species. This analysis could potentially aid in the identification of new species or help to prevent accidental consumption of poisonous mushrooms. The dataset used in the analysis contains information on various physical attributes of mushrooms, such as cap shape, color, and odor, as well as information on whether or not they are edible. The aim is to build a classification model that can accurately predict the edibility of different mushroom species based on their physical characteristics.</p> |
| 2. | Idea / Solution description | <p>The idea/solution for uncovering the hidden treasures of the Mushroom Kingdom using classification analysis begins by pre-processing the mushroom image dataset to remove any noise and standardize the images. Then, the dataset is split into training and testing sets. The pre-trained models such as VGG16, Xception, Inception-V3, ResNet, and DenseNet are then used to extract features from the images. These features are then used as inputs to a fully connected neural network that is trained to predict the edibility of the mushrooms.</p> <p>In addition to the deep learning models, a Flask web application can be developed to allow users to upload an image of a mushroom and get a</p> |

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| | | <p>prediction of whether it is safe to eat or not. The Flask application can use the pre-trained models to classify the image and display the results to the user.</p> <p>Hence , this solution can provide an accurate and efficient way of identifying the edibility of different types of mushrooms, which can help in the prevention of mushroom poisoning and help uncover any hidden patterns or relationships between different mushroom species.</p> |
| 3. | Novelty / Uniqueness | <p>The Proposed Solution uses deep learning models like CNN, VGG16, Xception, Inception-V3, ResNet, and DenseNet for mushroom classification is their ability to learn and extract features from large datasets, including those with complex and subtle variations in physical characteristics. This can potentially allow for more accurate and nuanced classification of mushrooms compared to traditional methods that rely on manual identification by experts.</p> <p>The use of a Flask web application can provide a user-friendly interface for non-experts to quickly and easily identify mushrooms. This can potentially increase public awareness of mushroom toxicity and prevent accidental consumption of poisonous mushrooms.</p> <p>Another unique aspect of this solution is the potential for uncovering hidden patterns or relationships between different mushroom species. By analyzing the features extracted by the deep learning models, it may be possible to identify correlations between physical characteristics and edibility, as well as discover previously unknown species.</p> |
| 4. | Social Impact / Customer Satisfaction | <p>This can potentially help prevent mushroom poisoning and save lives. By accurately identifying which mushrooms are safe to eat and which are poisonous, this solution can provide a valuable tool for mushroom hunters, farmers, and consumers alike. The user-friendly Flask web application can provide easy access to mushroom identification for non-experts, which can increase public awareness of mushroom toxicity and promote safe foraging practices. The accuracy and reliability of the deep learning models used in this solution can also increase customer satisfaction by providing more confidence in mushroom identification.</p> <p>Traditional methods of identifying mushrooms are often subjective and can be error-prone, leading to uncertainty and caution when consuming wild mushrooms. By using deep learning models, the classification accuracy can</p> |

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| | | <p>be improved, which can increase trust and satisfaction among users.</p> <p>It can promote safe foraging practices, prevent mushroom poisoning, and increase public awareness of mushroom toxicity. Additionally, the customer satisfaction can be increased by providing more accurate and reliable mushroom identification.</p> |
| 5. | Business Model (Revenue Model) | <p>The business model for uncovering the hidden treasures of the Mushroom Kingdom using classification analysis could take several forms, depending on the target audience and market. A subscription model, where users pay a monthly or annual fee for access to the web application, could be suitable for regular users such as mushroom hunters or farmers. A pay-per-use model, where users pay for each image they upload to the web application for classification, could work well for occasional users who only need to identify a few mushrooms at a time. Alternatively, the business could partner with mushroom farms, distributors, or retailers to provide a reliable classification service, charging B2B partners a fee based on the number of images classified or a monthly subscription. An advertising model, where the web application includes advertising space for mushroom-related products, could generate revenue by charging advertisers for ad space on the web application. Finally, the business could collect data on mushroom classification and sell that data to researchers, government agencies, or other organizations interested in studying mushroom toxicity. Ultimately, a combination of these business models could potentially create a sustainable revenue stream for the business.</p> |
| 6. | Scalability of the Solution | <p>This includes the size of the image dataset and the computational resources required to train and run the deep learning models.</p> <p>If the image dataset is small, the solution could potentially be scaled up by collecting more images of different types of mushrooms and adding them to the training dataset. However, if the dataset is large, additional computational resources would be required to train the models, which could limit the scalability of the solution.</p> <p>One potential solution to address the scalability challenge would be to use cloud computing resources to train the deep learning models. Cloud computing providers such as Amazon Web Services, Microsoft Azure, and Google Cloud Platform offer scalable compute</p> |

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| | | <p>resources that can be used to train deep learning models on large datasets.</p> <p>Another approach to improve scalability would be to optimize the deep learning models to reduce their computational requirements. This could be done by reducing the size of the models, using lower-precision data types, or using other techniques to reduce the computational requirements.</p> |
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