**Data Collection and Preprocessing Phase**

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| Date | 12 July 2024 |
| Team ID | SWTID1720157891 |
| Project Title | Rice Classification using CNN |
| Maximum Marks | 6 Marks |

**Preprocessing Template**

The images will be preprocessed by resizing, normalizing, augmenting, denoising, adjusting contrast, detecting edges, converting color space, cropping, batch normalizing, and whitening data. These steps will enhance data quality, promote model generalization, and improve convergence during neural network training, ensuring robust and efficient performance across various computer vision tasks.

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| **Section** | **Description** |
| Data Overview | For this project, we are utilizing a dataset consisting of various rice grain images, categorized into different types. The dataset is structured in directories where each sub-directory represents a class of rice. This data is crucial for training our convolutional neural network (CNN) to distinguish between different types of rice grains accurately. |
| Resizing | Resizing the images to a uniform size is essential for consistent input to the CNN. In our case, we resized all images to 128x128 pixels. |
| Normalization | Normalization is applied to scale pixel values to the range [0, 1], which helps in faster convergence of the neural network during training. |
| Data Augmentation | Data augmentation techniques are employed to increase the diversity of the training set and improve the model's robustness. Techniques used include:  Horizontal flipping  Shearing  Zooming |
| Denoising | Applying denoising filters can help in reducing noise in the images, which can improve model performance. |
| Edge Detection | Edge detection algorithms highlight prominent edges in the images, which can be useful for emphasizing structural features |
| Color Space Conversion | Conversion between color spaces can be useful for different image processing tasks. For example, converting RGB images to grayscale can reduce the dimensionality of the input data |
| Image Cropping | Cropping images to focus on regions containing objects of interest can improve the model's ability to learn relevant features. |
| Batch Normalization | Batch normalization helps to stabilize and accelerate the training of deep neural networks. |
| **Data Preprocessing Code Screenshots** | |
| Loading Data | Output- |
| Resizing |  |
| Normalization |  |
| Data Augmentation |  |
| Denoising |  |
| Edge Detection |  |
| Color Space Conversion |  |
| Image Cropping |  |
| Batch Normalization |  |