**Introduction**: The task involved developing a CNN model to classify rice images into five different varieties. The objective was to explore the effectiveness of CNNs in image classification tasks and contribute to the field of agricultural technology.

**Conclusions**:

* Key strengths of the proposed solution include high accuracy in rice variety classification and robustness to outliers.
* Limitations include the reliance on pre-trained CNN architectures and the need for further optimization.
* Recommendations for future work include exploring different CNN architectures, optimizing hyperparameters, and expanding the dataset to improve generalization.

**Results**:

* The main findings indicate high accuracy in rice image classification, with models achieving up to 97% accuracy.
* The system performs well compared to other methods, showcasing the effectiveness of CNNs in image classification tasks.

**Experimental design:**

* Parameters were selected for optimization based on their impact on the model's performance, such as learning rate, batch size, and regularization.
* Evaluation metrics included validation accuracy and loss.
* The dataset was split into training and validation sets, with a portion reserved for testing.
* Data pre-processing involved normalization to scale pixel values between 0 and 1.
* Outliers were identified and handled during data preprocessing to ensure data quality.

**Abstract**: This project aimed to develop and test a convolutional neural network (CNN) model capable of classifying rice images according to their variety. A dataset containing images of Arborio, Basmati, Ipsala, Jasmine, and Karacadag rice varieties was utilized. The CNN models were trained and tested on a subset of the dataset, and various parameters were optimized to improve performance. The main findings indicate successful classification of rice images with high accuracy, reaching up to 97%. Recommendations for future work include further optimization and exploration of different CNN architectures.

**Methodology**: The selection of models and methods involved utilizing pre-trained CNN architectures such as AlexNet, GoogLeNet, and NASNetLarge. Transfer learning was employed to fine-tune these models for the rice image classification task. Data augmentation techniques were applied to increase the diversity of the training dataset.



Developing a Convolutional Neural Network Model for Rice Image Classification

By Chihab Lamri

